

ECLAS CONFERENCE GHENT 2018

ECLAS
EUROPEAN COUNCIL OF
LANDSCAPE ARCHITECTURE
SCHOOLS

LANDSCAPES OF CONFLICT *BOOK OF PROCEEDINGS*



09—12.09.18



VLAAMSE
LAND
MAATSCHAPPIJ



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La Bataille de l'Argonne, 1964.
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SABAM Belgium 2018

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1. INTRODUCTION

SIMON BELL
ECLAS President 2012 – 2018

Welcome to the 2018 ECLAS Conference hosted by our colleagues at the University College Ghent in the Flemish part of Belgium. This is the first time that the ECLAS Conference has been hosted in Belgium and the timing and the theme are together highly relevant.

Back in 1918, towards the end of the First World War, parts of the Flanders landscape comprised the Western Front of the confrontation between the German and the Anglo-French armies. The scene looked very different from how it does today, being devastated by shelling and dug over with trenches. This was a landscape of conflict and at the end of that war the nations tried to ensure that it was the war to end all wars. Sadly, this proved not to be the case and even now we can see images of many landscapes of conflict – especially in Syria, with shelled and bombed cities and in sprawling refugee camps. Some landscapes are still no go areas in certain countries due to land mines while others, such as the line of the former Iron Curtain have become rich nature reserves as a result of their neglect and lack of access during the Cold War. The devastation of the trenches and shell holes in Ypres and other parts of the Flanders battlefields as well as the ruined towns and villages could be restored and put back to use, although the landscape also now contains the war cemeteries where thousands of young men are buried. The symbol of the war landscape is the poppy which seeds and grows on disturbed land – in this case disturbed by shellfire.

The famous poem (well-known in Britain and other English-speaking countries at any rate) by John McRae is a haunting reminder of the results of war and how the landscape can be a testimony to it:

*In Flanders fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.*

*We are the Dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie,
In Flanders fields.*

*Take up our quarrel with the foe:
To you from failing hands we throw
The torch; be yours to hold it high.
If ye break faith with us who die
We shall not sleep, though poppies grow
In Flanders fields.*

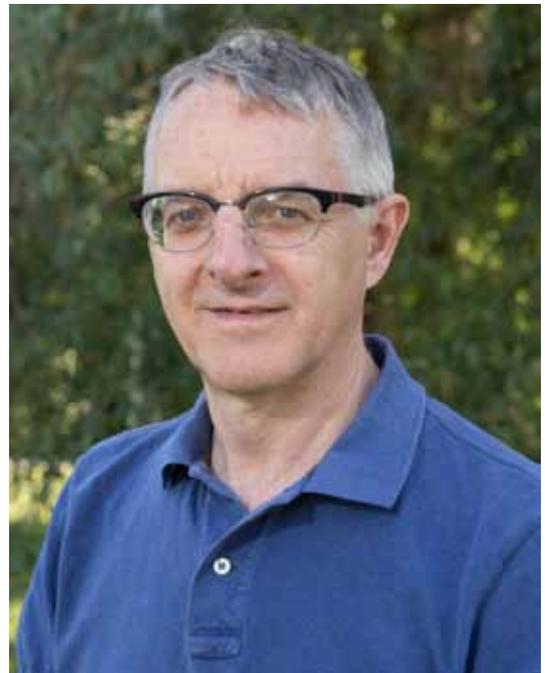
PAST AND CURRENT PRESIDENTS OF ECLAS:

1989 – 1998	Mike Downing University of Newcastle
1998 – 2004	Richard Stiles Vienna University of Technology
2004 – 2009	Jeroen de Vries Van Hall Larenstein University
2009 – 2012	Diedrich Bruns University of Kassel
2012 – 2018	Simon Bell Estonian University of Life Sciences/University of Edinburgh

Landscape architects could and should be more involved in dealing with the impact of landscapes of this type of conflict. However, of course conflicts in the landscape do not always end in military solutions and in civil society we also encounter a range of conflicts over, for example, conservation or development and many aspects such as the power relations between developers and citizens and there are new approaches, often led by idealistic young landscape architects in field such as landscape and democracy, spatial justice and new ideas on taking urban spaces for community use and so on. There are also conflicts (or debates at any rate) in theory and practice. A wide range of conflicts will be explored in the conference and one of the tours afterwards will allow some of us to visit the Flanders Fields, although it will be too late in the year to see the poppies.

This is my last conference as ECLAS president and I wish you all a great and rewarding time.

Simon Bell
ECLAS PRESIDENT 2012 – 2018





University college Ghent



University college Ghent

2.

WELCOME TO UNIVERSITY COLLEGE GHENT

STEFANIE DELARUE

Programme Chair ECLAS Conference 2018,
Chair of the Landscape and Garden Architecture and
Landscape Development Programmes

**WELCOME TO UNIVERSITY
COLLEGE GHENT,
WELCOME TO THE ECLAS
CONFERENCE 2018!**

The conference is hosted by the School of Arts of the University College Ghent and is curated and coordinated by the educational programmes in Landscape and Garden Architecture and in Landscape Development, and the Research Unit Landscape Architecture. We are honoured to host this important event on European landscape architecture education and research.

We welcome you to Belgium, a small country in north-western Europe. The northern part of Belgium, Flanders, is one of the most densely populated regions in Europe. With seventy percent of the Flemish population residing in an urban-rural complex, network urbanity and fragmented multifunctional open spaces are omnipresent. The strong urban-rural overlap and its related multi-functionality makes the region a fascinating laboratory for research and practice in landscape architecture. The conference is held in Ghent, a historic yet young and energetic city in the north of Flanders.

CONFERENCE THEME

On the occasion of the hundredth anniversary of the First World War armistice, commemorated in 2018, this year's conference is held in Belgium, where some of the biggest battles on the Western Front took place. This large-scale conflict inspired us to choose the conference theme 'Landscapes of Conflict'.

The ECLAS Conference approaches 'Landscapes of Conflict' in a multi-faceted way – not just about wars. We aim to spotlight places, moments and methods where conflicting interests and issues meet and intensify each other. Questions such as: Through what argumentation, expertise, knowledge and practices do landscape architects recognise, interpret and manage conflicts? When, where and how do they intervene? We investigate how opportunities can arise within or through conflicts and how this may lead to cooperation and integration.

KEYNOTES: LOCAL AND INTERNATIONAL FOCUS

For more than 60 years, our Landscape and Garden Architecture bachelor degree programme has been training the Flemish landscape professionals of the future. With this conference we want to give you an insight into what happens within Flanders in terms of research and practice in landscape architecture. And you'll notice that this is a very multidisciplinary field, where our bachelor graduates put their stamp on the landscape – both public and private, and on all scales – and the discipline. But we aim higher: together with our colleagues from Erasmus University College Brussels we are preparing the first master degree programme in Landscape and Garden Architecture of Flanders to further develop and strengthen this beautiful discipline within Flanders. Our landscape, with such intense demands on it, is in need of such a helicopter view.

But we also want to give you an international perspective on research and education in landscape architecture. With Natalie Jeremijenko (USA) we want to tear down all walls between disciplines, in the tradition of our School of Arts, that we've recently joined. And since most of us are involved in the educational programmes of landscape architecture, we invited Matthew Powers (USA) to share with us his well-developed vision of self-regulated design learning.

THANKS

Finally, we would like to extend our thanks for all the great effort that has been put into this event, as well as to thank all of the outstanding contributors and speakers who have joined us here at Ghent. Especially, we would like to thank ECLAS for the opportunity to organise this conference, our Dean Wim De Temmerman for his support, all involved colleagues and students and the reviewers.

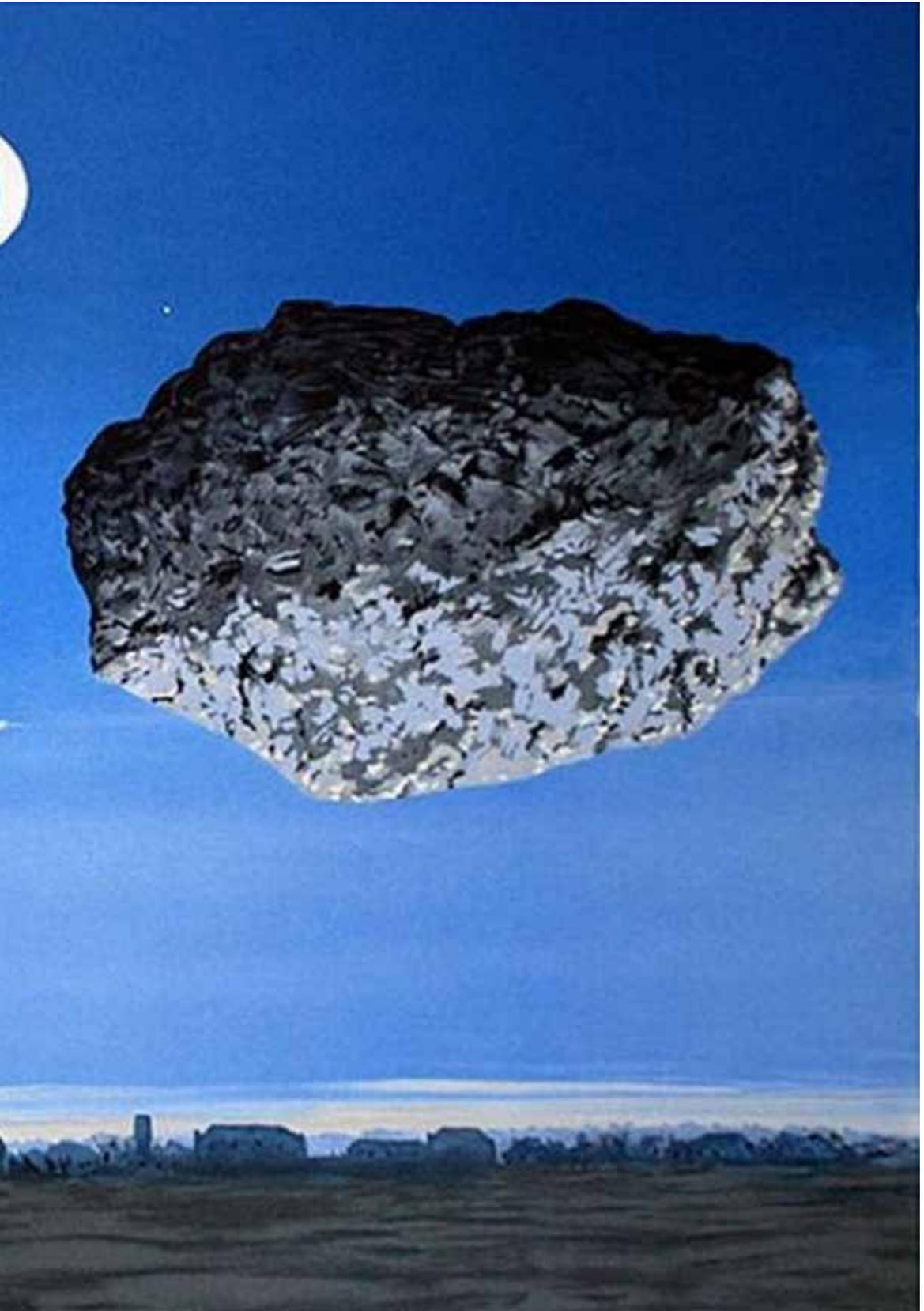


Stefanie Delarue

3. LANDSCAPES OF CONFLICT

ORGANISING COMMITTEE ECLAS 2018





La Bataille de l'Argonne, 1964. MAGRITTE RENE FRANCOIS GH © Succession René Magritte. SABAM Belgium 2018

The occasion for bringing the ECLAS Conference to Ghent (Belgium) is the hundredth anniversary of the armistice of the First World War commemorated in 2018. The conference theme 'Landscapes of Conflict' was inspired by this huge conflict.

The ECLAS Conference approaches 'Landscapes of Conflict' in a multi-faceted way. Conflict refers to a state of opposition between ideas and interests, disagreement or controversy or to opposite opinions. Or to a mental struggle arising from opposing demands or impulses. Conflicts often occur because of misunderstandings due to a lack of communication and collaboration. Their geographical scopes stretch from local sites to regional and global networks. Conflicts transform land uses, urban processes, human settlement patterns and landscapes. They range from instant states of emergency to long-lasting antitheses.

Conflicts influence our everyday activities as landscape architects, academics and teachers. We aim to spotlight places, moments and methods where conflicting interests and issues meet and intensify each other.

What are the logics, forms and expertise and knowledge practices through which landscape architects understand and manage conflicts? When, where and how do and may they intervene? We are looking for ways in which opportunities can arise within or through conflicts and how this can lead to cooperation and integration.

SUBTHEMES

Human and Nature

When it comes to dealing with nature, we humans don't have the best track records. Our slowly accumulating heritage of environmental problems compels us to renegotiate our relation towards the natural world. Landscape architecture and design has always had the ambition to foster and shape our relation to the environment, and so it should find itself at the forefront of moving society in the direction of a sustainable future.

In order to forge a new alliance between humans and nature, we often look to nature itself to find inspiration, trying to work alongside or together with her. But nature is not always a benevolent force. A smooth reconciliation of human and natural interests might not always be desirable, let alone possible. In such instances, can we imagine giving room to those conflicts in our landscape designs, even in such a way that the conflicts become productive?

Experience and Economy

Besides aesthetical and ecological values, it is advisable for landscape architecture to take account of economic viability and reality. In the past, the combination of a wide range of ecosystem services delivered by landscapes guaranteed their continued existence. Today however, only a few projects are explicitly concerned with the economic functions of landscapes. It seems like good design and commercial successes are by definition unrelated or even mutually exclusive.

Still, there are plenty of challenges, but also numerous pitfalls to link ecology, people and economy. Aren't landscapes crucial for food and energy production and recreation and tourism? And what about the experience economy as a driving force for marketing, branding and consumption? To this regard, landscape architecture might play a strategic role to explore new concepts and new agendas and to align diverse and competing forces into interactive and viable alliances.

Participation and Coproduction

People are in need of spaces that give ample possibilities for participating and co-creating. They should therefore be addressed on their role as citizens, differing depending on e.g. their age, gender, place of residence, social-economic status and ethnic-cultural background. More than a change in focus from top-down to bottom-up, participation and coproduction in design seems to be a matter of positioning itself as a valuable forum for spatial and community development.

Interventions are aimed at creating spatial solutions, but also landscape democracy and landscape stewardship. The involvement of citizens throughout the entire journey is therefore essential. Regarding this, how exactly can design contribute to creating a forum for dialogue and a continuing learning process, so that conflicts between different actors create opportunities instead of constraints?

Planting Design and Ecology

In landscape architecture, plants are living design elements. They have inherent ecological value. For instance, the number of plant species in the design already contributes to its biodiversity. Ecology, however, stretches further than that. The ecological value of the design is determined by the nature of the species, the structure of the planting, etc. As the science concerned with relationships between organisms and their environments, ecology can influence the planting design. Natural ecological processes, plant communities or even complete ecosystems can serve as a scientific or inspirational source for planting design. This view may even alter the distinction between man-made planting and natural vegetation - how far reaches the role of the designer and green manager? Planting design can also provide ecosystem services and allow achieving goals of sustainability.

We may ask ourselves: is planting design always of ecological value? Does it need to be? And how do we creatively address ecological challenges such as invasive species?

Theory and Practice

The built works of landscape architects embody – not always explicitly and consciously – certain values and ideas influenced by theoretical frameworks and design theory. Design related theory can in that sense also actively add depth and meaning to places, and enrich contemporary landscape architectural practice. The subject of theory and practice is of importance on many levels and appeals to researchers, practitioners, educators or even policy makers.

On a very practical level theory can be beneficial to practitioners in broadening the understanding of the roles and responsibilities of our profession in connection to related disciplines and ensure to result in well-considered and integrated landscape designs. Conversely, design practice can also give rise to new theoretical knowledge, illustrated by the various types of ‘research by/through/on design’ in landscape architecture as respected research methods.

Teaching and Learning

The current information society and its knowledge explosion makes it difficult for both teachers and students to handle the large volumes of information, to filter them and to navigate them. It poses conflicts in what to teach and how to teach it. Although lectures remain by far the most common form of teaching in universities, research pointed out that talking to students and expecting them to absorb knowledge does not help them very much. That is why this teacher-centered education now goes hand in hand with more student-centered methods, such as problem-based learning.

But how do these teaching methods evolve responding to our changing society? And can we rely on learning processes rather than upon static knowledge? Within this conference subtheme we want to provide a forum for exchanging education experiences and discussing teaching and learning methods.

Conservation and Development

Heritage in the landscape is often seen as objects – the honeypot for tourists – in the form of the cathedral, the castle or the historic garden. The cultural landscape itself is often overlooked. However, some authors like H.J. Massingham have collected local knowledge and compare the complexity of the development of agricultural landscapes to the construction of cathedrals. Here, freezing the landscape is mostly impossible as they grow and change in order to answer new societal claims. However (heritage) traces in the landscape and respect for its historical development should be inserted in the landscape management plan.

How can these two visions be reconciled, and what role might the landscape architect play?

4.

KEYNOTE LECTURES

- 4.1. Piet Chielens
'The Men and Women who Planted Trees'
Coordinator In Flanders Fields Museum
(Ypres, BE)
- 4.2. Peter Vanden Abeele
'Conflict Driven Development. Five Tips and Tricks'
City Government Architect Ghent (BE)
- 4.3. Natalie Jeremijenko
Associate Professor New York University,
Visual Art Department (USA)
- 4.4. Elke Rogge
'Get Your Ducks In A Row! The Potential of Systems Thinking in the Design of Landscapes of Conflict'
Research Institute for Agriculture, Fisheries and Food Coordinator In Flanders (BE)
- 4.5. Matthew Powers
'Re-aligning the Roots of Thought'
Associate Professor Clemson University (USA)
- 4.6. Peter Swyngedauw
'Over de Rand: A Plea for the Landscape Architect as a Chief Architect'
Bureau OMGEVING (BE)
- 4.7. Bas Smets
'Augmented Landscapes in Search of the Resilience of the Territory'
Bureau Bas Smets (BE)

4.1. KEYNOTE LECTURE: PIET CHIELENS

The Men and Women who Planted Trees*

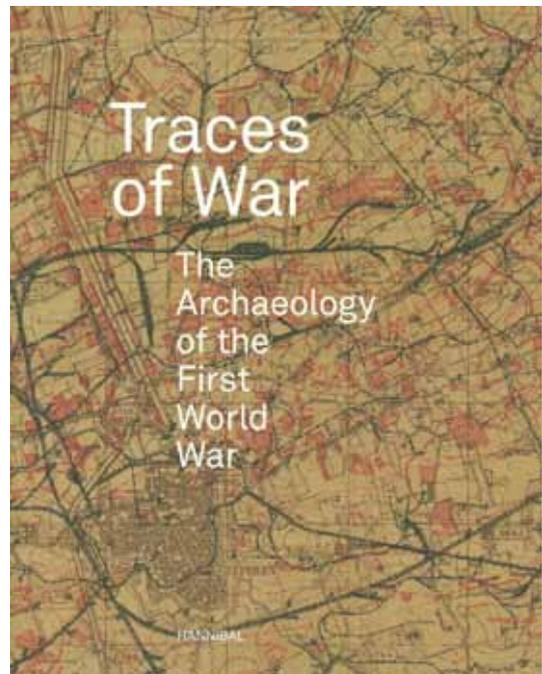
25 Years of 'Landscapes of Conflict in Landscapes in Conflict', in the Former Front Area of the First World War in Belgium

From the early 1990s I started with the help of a few others combining the history of the First World War and its commemoration with the present landscape where that history had occurred and/or where it is remembered in various ways to this day. These were humble beginnings, like creating commemorative concerts in situ. But the idea stuck and grew. Today the In Flanders Fields Museum, one of the largest museums dedicated to WW1 in Europe, uses the present day war landscape as a major mediator between the historical content of the museum and its wide international public, and it invests in the 'museum' that is the war landscape itself. This paper describes the path that was and is followed and presents some of the difficulties and results that were met.

The landscape of memory, i.e. the layer of hundreds of monuments and cemeteries, that was installed across the former war zone in the years after the war, is in fact rather well suited for that. Monuments were mostly built on the exact locations of the events they recalled, cemeteries largely remained where they were started and had 'grown' while the conflict lasted. This is unlike war monuments in other places, like e.g. in most capital cities

of Europe. To these monuments place is a fairly random factor, whereas in former front zones there is a direct and meaningful link between monumental commemoration and their sites. This is the 'genius loci', the sense of place that transcends purely monumental values.

Quite more difficult is it to establish a lasting and permanent relationship between the landscape of conflict itself and the present day landscape. There are still a myriad of visible and invisible relics of the war, above and under-ground, and there are micro-elements of the landscape, like relief, ways and waterways, woodlands, chateau parks and alignments of trees and hedges that all played an important part in the trench warfare. Maintaining a meaningful number of these elements, and interpret them for a wide international public proves quite difficult. The landscape of conflict in Flanders is situated in a densely populated area, where each acre of land is claimed by several stakeholders. The utilitarian approach to the land is in constant opposition with the demands for preservation and historical interpretation. The landscape of conflict



Stichelbaut, B. (ed.), 2018. *Traces of War. The Archaeology of the First World War*. Veurne: Hannibal

is part of a landscape in conflict.

Despite this continuing conflict some results have been reached. In recent years the Flemish government has established a programme of protection of monuments and relics. For the interpretation of the former battlefield some innovative interventions in the landscape and a thorough research of the landscape itself have been undertaken.

*with thanks to Giono, J 1954. *The Man Who Planted Trees*. New York: Condé Nast Publications Inc

BIOGRAPHY

Piet Chielens is the director of the In Flanders Fields Museum (IFFM) in Ypres (Belgium). From 1992 to 2007 he was also artistic director of Peaceconcerts Passendale which created annually international concerts about the shared heritage of WW1.

Since 1996 he has been general co-ordinator of IFFM, which was redeveloped in 2012 to international acclaim. With the small team of the museum he is looking for a constant renewal of the memory of the Great War in Flanders.

Special attention is given to the ways in which micro (personal, family) and macro (cultures, nations, the world) history can be linked.

As an institute with a large historical collection and specialized knowledge, the IFFM also sees an important role for artistic interpretations of our attitudes and concerns about war and peace.



4.2. KEYNOTE LECTURE: PETER VANDEN ABEELE

Conflict Driven Development. Five Tips and Tricks

Cities have always been the location of conflict and struggle. They are the birthplace of unrest, resistance, strikes, occupation and debate. A diverse social context as a fertile basis for opposing opinions, personal benefits, and public interests. The ongoing development of our urban landscape, especially with strong growth, faces us with a multitude of (spatial) claims. From the occupation of public space on the one hand to the privatisation for real estate development on the other hand, one can ask himself: to whom does the city belong? The 'right to the city' implies that not only (financially or politically) strong and persuasive actors are determining, but that urban development guarantees space for all urban users. The resulting process of development implies conflict. No conflict which leaves evident scars or traces in the landscape like walls, trenches or bunkers but a form of conflict which is less obvious readable in space. And yet it is reflected in use of squares and parks. In the type and price of housing. In the choice for office towers, ateliers, factories or public facilities. So, the question is not if there is conflict but how to steer in towards a qualitative (sustainable, affordable, and social inclusive) urban development.

In 2017 the city council of Ghent appointed a 'Stadsbouwmeester' (City Government Architect) in order to safeguard, from an autonomous position, quality and long-term perspectives in

urban development. The *Stadsbouwmeester* gives advice to both city officials and administration as private and institutional actors. From a broad overall perspective, the *Stadsbouwmeester* helps in directing opposing interests in order to generate urban qualities. Therefore, this new position does enable to steer conflicts in urban development using five strategies or tools.

— Don't enforce but persuade

The role of the *Stadsbouwmeester* is a fragile one as this position does not imply any actual power to decide, to invest or to build. The role of the *Stadsbouwmeester* is merely formalized through his authority to give advice. Such advice should not be considered as an instrument to control, grant or approve, but as a method to steer and guide projects. This impedes a process of dialogue with arguments and insight of experts.

(tool 1, Dialogue)

— Organise debate

Dialogue needs organising power, as it has to be structured and cannot merely be an open conversation or smalltalk. The *Stadsbouwmeester* organizes dialogue and debate between the principal actors involved in urban development in order to resolve conflicts and to align initiatives and projects with each other and with the long-term development goals of the city and opinion of a wider group of involved stakeholders and residents. Dialogue is implemented in five specific platforms or chambers for discussion and dialogue: *Advieskamer* (chamber for advising policy decisions), *Stadskamer* (chamber for co-ordination on urban projects), *Kwaliteitskamer* (chamber for quality supervision of building projects), *Ontwerpkamer* (chamber for design competitions and research by design) & *Bouwmeesterkamer* (chamber for city wide events on architecture and urban development).

(tool 2, Chambers)

— **Use design when facing resistance**

The process of design is not a straight line, on the contrary, the benefits of design, redesign and research by design are optimal when facing resistance. Any design is the result of debate, discussion and negotiation. It is at its most effective when facing resistance as it allows to envision alternatives. Therefore design force is an excellent power to tackle conflicts in urban development.

(tool 3, Design)

— **Dare to choose beyond compromise**

An approved way of resolving conflict is through negotiation and achieving a compromise between all parties involved. This however often leads to half measures and solutions. When facing pressing urban questions (whether they are related to affordable housing, water and climate, alternative mobility or public amenities) it is better to opt for a few choices fully instead of compromising and assuring all interests.

(tool 4, Decisiveness)

— **And never waist a good crisis**

Conflicts are from most points of view regarded as something negative and yet they bare opportunities to change situations for the better. Many conflicts are evoked by public processes and regulations installed to ensure consequent evaluation. Conflicting can lead to a revision of this framework. An important example are the alleged claims on faulty protocols for involving private actors in urban development in Ghent. The public debate led to the appointment of the *Stadsbouwmeester*, *Kwaliteitskamer* and now allows for the installation of a very open and uniform city-wide system for public procurement fully directed toward quality. This has to become the basic instrument of the *Stadsbouwmeester*. (tool 5, Change)

BIOGRAPHY

Peter Vanden Abeele (° 1979) is an architect, urban designer and recognized spatial planner. At the end of 2017 he was appointed as the first City Government Architect 'Stadsbouwmeester' of Ghent. Previously he worked as a scientific researcher in the field of regional and urban development. He was project manager for urban development projects in Antwerp and worked for four years as a city planning advisor for the City Government Architect of Antwerp.

He also worked as a freelance urban designer and was co-founder of a design agency. Since 2005 he has been teaching in the field of urban design at the University of Ghent, with in between assignments for Sint-Lucas College for Architecture Ghent and the Academy for Architecture and Urban Planning Tilburg.

As an expert, he works in various urban advisory bodies, worked at various exhibitions and regularly writes about architecture and urban planning.



4.3. KEYNOTE LECTURE: ELKE ROGGE

Get Your Ducks in a Row! The Potential of Systems Thinking in the Design of Landscapes of Conflict

Driving through Flanders' highly urbanised landscape you will be surprised (or shocked) by the mishmash of various land-uses that create one major fragmented landscape. You will find a complex and diffuse pattern of houses, industrial areas, commercial zones, transport infrastructures, farmland, horticulture, recreational areas and nature. By its very nature, this very fragmented territory represents multiple landscapes of conflict; conflicts of various types, between different actors, and on multiple scales. Dealing with such landscapes of conflicts can be considered as dealing with a wicked problem. Wicked problems are defined as problems that are difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. Because of complex interdependencies the effort to solve one aspect of a wicked problem may reveal or create other problems.

When designers are given the challenging task of working with such a wicked problem they need guidance to approach this socio-spatial situation not only in a systematic but also in a systemic way. Throughout this contribution we explore the possibilities of using a Systems Thinking approach in the organisation, planning and design of a complex peri-urban landscape such as Flanders. By using Systems Thinking we not only need to get our

ducks in a row but also in a cyclical and systems perspective. It provokes to look for interactions, feedback mechanisms and loops between different parts of the system in order to get a deeper understanding of the functioning of these complex landscapes of conflict.

We will apply this Systems Thinking approach to two real-life examples of designing in and for fragmented peri-urban landscapes. More specifically we will make a journey to the rural-urban fringe of our capital Brussels. There we will focus on a design for climate adaptation. The principles of systems thinking will help us understand why certain design principles are put forward. Subsequently, we stay in the area of the Brussels rural-urban fringe, but we will work on a much smaller scale, exploring the potential of the concept of an agricultural park. All over Europe agricultural parks are being designed and developed. We take a look at some examples abroad and think about the possibilities to use this concept in the Brussels fringe.

BIOGRAPHY

Elke Rogge graduated as a geographer at Ghent University in 2001. After making a Ph.D. on landscape perception and participation, she started working at the social sciences unit of ILVO. Since 2009 she was the coordinator of the rural development research unit at ILVO. Between 2013 and 2016 she was an associated professor at the geography department of Ghent University. In 2016 she became the scientific director of rural development unit at ILVO.

Her research mainly focusses on spatial transformations and participation within spatial planning processes in rural areas.



4.4. KEYNOTE LECTURE: MATTHEW POWERS

Re-aligning the Roots of Thought

Designing, as well as learning how to design, involves as John Dewey says, ‘... controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole’ (1991, p. 30). In Dewey’s view, this process is essentially problem solving. Therefore, the most common approach to teaching design today is rooted in problem-based learning (PBL). According to Savery and Duffy (1995), effective PBL depends on four key elements including: (1) authentic learning environments, (2) relevant and meaningful projects, (3) teachers that serve as facilitators, and most importantly, (4) students who actively participate in their own learning through self-regulated thinking and behavior. This presentation emphasizes the fourth element – self-regulated learning (SRL).

Self-regulated learning is an important educational concept and predictor of academic achievement. According to Paris and Paris (2001), ‘Self-regulated learning, as the three words imply, emphasizes autonomy and control by the individual who monitors, directs, and regulates actions toward goals of information acquisition, expanding expertise, and self-improvement’ (pg. 89). Over 40 years of research has shown the importance of SRL as a significant factor in learning

and achievement. However, very few studies have examined SRL and its relationship to PBL, especially within design pedagogy. This presentation presents a conceptual framework for understanding the SRL-PBL relationship in design teaching and learning. This framework is called self-regulated design learning (Powers, 2016).

Self-regulated design learning (SRDL) is a methodology for effectively using PBL. It is particularly helpful for those who are teaching and learning how to design. SRDL sits atop a strong theoretical foundation rooted in design education, problem-based learning, constructivism, social cognitive learning theory, and self-regulated learning. Within this context, SRDL posits that meaningful and lasting changes to thinking and behavior occur as individuals pursue design projects and personally relevant goals aimed at learning and developing mastery.

Self-regulated design learning’s assumptions about learning help to structure its pedagogic framework. Key features of this framework include an emphasis on the following: (1) prior knowledge and learning circles, (2) differentiated learning, (3) meaningfulness, (4) learning goal orientation, (5) SRDL learning process, (6) cognitive self-processes, and (7) a studio-based learning environment. These key characteristics give SRDL a unique identity while revealing the beliefs and values that distinguish it from other pedagogic approaches used in design education today.

Among its many characteristics, SRDL’s learning process is particularly helpful in explaining how a student progresses through an event like a project. The SRDL learning process includes three main phases called pro-action, action, and re-action, as well as sub-phases. Through these phases, a learner monitors and adjusts how he or she advances toward learning goals. In doing so, a learner cycles through different phases and sub-phases of the

SRDL process as internal and external factors shape what and how he or she is learning. Through SRDL, educators are able to create learning events and environments that encourage the development of mastery while improving individual achievement and performance on design projects.

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BIOGRAPHY

Matthew 'Matt' Powers, Ph.D., Associate Professor, is the Director of Landscape Architecture and Undergraduate Programs in the School of Architecture at Clemson University.

He holds a Bachelor of Science in Landscape Architecture from West Virginia University and a Master of Landscape Architecture and Ph.D. in Environmental Design and Planning from Virginia Tech. Matt has taught a range of studios and seminars focusing on instructional design, research planning, and environmental design at various scales. He regularly teaches courses at the bachelors, masters, and doctoral levels. His primary research interests include design pedagogy, healthy campuses, and learning landscapes. Prior to entering academia, he worked in landscape architecture and community design studios in West Virginia, South Carolina, and Virginia.

He is the author of the book 'Self-regulated Design Learning: A Foundation and Framework for Teaching and Learning Design'.



4.5. KEYNOTE LECTURE: PETER SWYNGEDAuw

'Over de Rand': A Plea for the Landscape Architect as a Chief Architect

The 21st century is often called the century of the city. For the first time in history more than half of world's population lives in cities. In twenty years' time, this amount will have grown to two thirds. This is not necessarily a bad evolution. As a result of living closer together, our collective ecological footprint is reduced, less and shorter movements are necessary and energy consumption decreases. Moreover, it allows us to rethink our economy in more efficient terms. The city is not the problem, as many think, in fact it has the potential to answer to a myriad of societal, spatial, ecological and economic challenges. Guiding cities in their transition to a durable and resilient model of society is essential to confront the challenges of the 21st century.

What do we mean when we say 'city'? In Flanders 'a city' often signifies the historical center, the compact urban space within the area previously bound by the city walls (who are now generally replaced by a ring road). 'Over de Rand', an independent research project by design office OMGEVING, offers a glance at the space beyond the core city. It formulates proposals on how we can activate the potential of the spatial conditions of the periphery reinstall a symbiotic relation with the city center. Historically city center and the periphery had a clear interplay and mutual interdependency, however this close

connection has been lost in the course of the 20th century. The traditional functions of the periphery are lost in the western world. Most of our food travels half the world before ending up on our plates. Most of our products are being produced in far off countries. To gain time, we would rather take a plane than a bike to reach the periphery. The faded relationship is also translated into spatial conditions. The periphery, or the place where city and countryside meet, grew hard to identify.

The crumbling of the connection between city center and periphery is a product of history. It is a consequence of the fragmentation of the landscape that blemished the whole of Flanders during the 20th century. It seems as if Flanders has become one big, fragmented city. The consumption of space and spatial cluttering has severed the cohesion of ecosystems. Flanders has been filled with scattered urbanization, large parts of the country's surface have been hardened and there is an excess of infrastructure. The asphaltting and hardening of the surface lead to increased danger of flooding in case of heavy rainfall. The different functions such as work, living, and recreation, are strictly separated from each other. By distancing, fragmenting and dispersing, there is barely any connection left between living and working, between production and consumption of food, between agriculture and recreation.

Spatial policy in Flanders is in desperate need of revision. The systematic absorption and further fragmentation of space needs to be restrained. But that alone will not suffice. There is a need for a clear vision which defragments the country, scales down the footprint of the built structures and strengthens the existing urban cores. We will have to collectively live more urban. The transformation of the periphery holds the key to transform our cities into resilient and durable environments that are deemed attractive

by young families. The challenge of this necessary transformation does not lie in a continued building or asphaltting of surfaces, but in the green and permeable. The landscape takes the stage. Green-blue networks have to reconquer terrain and provide guidelines to structure the built environment, in order to ensure fresh air and cooling. To create livable environment the leading framework for urban development should start from the landscape.

'Over de Rand' is not an ideological dream of tabula rasa but is a call for the landscape architect to take up responsibility and start drawing out the lines for infrastructure, new buildings and circular economy. Let's work together to design a 'landscape 3.0'.

BIOGRAPHY

Peter Swyngedaaw is a landscape architect and spatial planner and has been project manager at OMGEVING since 2003.

His career is marked by a constant drive for innovation and improvement. In addition to a pure design attitude, Peter is also highly interested in organizing planning processes for complex assignments.

He shares his fascination for the profession by being present on many juries and by acting as a guest lecturer in many courses concerning public space.



4.6. KEYNOTE LECTURE: BAS SMETS

Augmented Landscapes: In Search of the Resilience of the Territory

As landscape architects we aspire to organise the existing physical reality. Our projects strive at bringing coherence and resilience, based on a thorough understanding of the natural and often hidden logics that condition a site. This requires a meticulous design methodology, where an objective research through cartographic redesign off site is combined with an intuitive approach acquired on site.

This double approach allows us to distill all the elements that make up the best possible landscape, concealed within the existing reality. As a selective inventory of the existing landscape elements, this 'Exemplary Landscape' guides the design proposals to complete, reinforce or re-orient the existing situation. Starting from this reference, we always try to understand how to intervene within the logics in place, to produce unexpected design solutions and new realities. Through this methodology our projects transform a land, or any given terrain, into a landscape, a comprehensible and coherent entity.

Since cities have become metropolises, urbanization has become planetary. The landscape is no longer situated outside of this urbanization, but becomes an essential part of the metropolitan project. With a world population in excess of 7.5 billion, half of whom live in metropolises, with the loss of natural habitats becoming irreversible and humanity still unable to

estimate the impacts of climate change, it is time to redefine the role and the ambition of the landscape project.

Each of our landscape designs is considered as part of an overall research project into the resilience of the territory. According to the Climax Theory, any given site, if left untouched, would naturally evolve to an optimum sustainable vegetation community, based on its latitude and climate. Our projects start with an exploration of the climatic conditions of the site, to understand and unveil this optimum equilibrium. Subsequently we propose to intervene in its development, either to accelerate the process or to alter the outcome.

These new 'Augmented Landscapes' are in phase with their natural development, while adapted to their new functions. We imagine these landscapes to provide ecosystem services, effectively supporting a world that will inevitably become more urbanised.

BIOGRAPHY

Bas Smets has a background in landscape architecture, civil engineering and architecture. He founded his office in Brussels in 2007 and has since constructed projects in more than 12 countries with his team of 17 architects and landscape architects.

Starting from a precise reading of the existing land, his projects reveal a landscape, visible but yet unseen. These projects vary in scale from territorial visions to infrastructural landscapes, from large parks to private gardens, from city centres to film sets. He often teams up with architects, artists, and scientists. His realised projects include the 10 hectare park of Thurn & Taxis in Brussels, the park of the Estonian National Museum in Tartu, the Himara Waterfront in Albania, the landscape along the new motorway between the ports of Antwerp and Zeebruges, the rooftop garden of the PMQ Design Centre in Hong Kong, the Sunken Garden in London, and the memorial for the victims of the attacks in Brussels of 22/3.

In 2008 he was awarded the biennial French prize for young landscape architects 'Les Nouveaux Albums des Jeunes Architectes et des Paysagistes'. In 2013-2014 a first monographic exhibition of his projects was co-produced by the International Arts Campus deSingel in Antwerp and the Arc en Rêve centre for architecture in Bordeaux, and in 2016 he curated the exhibition 'The Invention of Landscape' at the Bozar in Brussels. He was appointed General Commissioner for the Biennial of Architecture of Bordeaux in 2017.



5.

FULL PAPERS AND PECHA KUCHA PAPERS

5.1. HUMAN
AND NATURE

GROUP A, D, E, I & M

5.2. PLANTING
DESIGN AND
ECOLOGY

GROUP B & J

5.3. CONSERVATION
& DEVELOPMENT

GROUP C, K & O

5.4. PARTICIPATION
AND CO-
PRODUCTION

GROUP F

5.5. TEACHING
AND LEARNING

GROUP G

5.6. THEORY
AND PRACTICE

GROUP H, L & P

5.7. EXPERIENCE
AND ECONOMY

GROUP N

5.1. HUMAN AND NATURE

GROUP A

Ontopological Natures

Mick Abbott

The Implications of the 'Umwelt'-Concept
for the Design of 'Green Infrastructure'

Glenn Delière

Crocolilia Urbanis: Co-Existing with
Urban Wildlife

Kareena Kochery

From Conflict to Opportunity: The
Case of the Scheldt River as Potential
Biosphere

Erik Van Daele

Ontopological Natures

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Keywords:

Ontopology, homeland, Conservation, landscape, design

ABSTRACT

Geographer John Wylie (2016) critiques problematic claims of belonging to place which suggest a natural connection between people and topos. Such ontopological beliefs in a homeland rely on environmental determinism or historicization to assert an inextricable link between blood and soil formed over centuries of human occupation and use. In this paper we consider how ontopology operates in New Zealand's protected areas, which as places that have a long history of human inhabitation and activity but are considered 'wild' and thus outside of the presence of people, provide an intriguing contrast for considering this concept and how it may be approached through design. Wylie (2016) identifies two counter-ontopological positions for landscape: one an orientation towards hospitality, welcome, and sanctuary; the other seeking to destabilise homeland thinking through unsettling, dislocating, and distancing such troubling claims of belonging to place. Drawing on these directions, we examine a landscape design project undertaken by Lincoln University's Landscape Designlab at Ararira Wetland in the South Island of New Zealand, which reimagines what protected areas are by expanding the ways people might engage with them via counter-ontopological forms.

INTRODUCTION

Geographer John Wylie (2016) argues that landscapes are often considered to be homelands. He suggests that thinking of a landscape as a place which a particular people come from and are connected to through cultural,

biological, or historical associations is indeed something positive, but which can also be problematic (Wylie, 2016). Wylie (2016: 409) writes, "[ontopology] proceeds from the assumption—or, alternately, sets out to demonstrate—that certain peoples and certain landscapes belong together and are made for each other, if not naturally, or in an environmentally determinist fashion, then at the least historically in a deep sense: they have evolved together, they bear each other's imprint, they are inextricably interwoven". Such links become an issue when a group believes that they are the rightful, authentic, or legitimate occupiers or inheritors of the land, at the expense of others who are considered outsiders that cannot belong to place in the same way or who should even be excluded from it (Wylie, 2016).

In this paper we consider ontopology within the context of New Zealand's protected areas. Wylie's (2016) work on ontopology considers how it operates within a European context, where, throughout history, people have claimed a 'blood and soil' connection to homeland, imagined through the concept of landscape. We argue New Zealand's protected areas, by contrast, are places that have been dominantly imagined as 'untouched' and 'wild'; as devoid of people. Yet, somewhat paradoxically, these landscapes have at the same time been considered through an ontopological logic that sees them as homelands. We suggest that this is reinforced by the practice of conservation, which is underpinned by this logic. For Wylie (2016), ontopology, or homeland thinking, as he also calls it, must be responded to in two ways; firstly, by unsettling claims of homeland, and secondly, by reimagining landscape and practices of place through more invitational terms such as welcome, hospitality, and sanctuary. We consider a landscape design project to show how design may be a useful tool for creating

a counter-ontological practice that responds to the problematic of homeland Wylie (2016) identifies and expands on his suggested responses to it.

ONTOPOLOGY AND PROTECTED AREAS

Since the late nineteenth-century when New Zealand's protected areas were first established, these landscapes have been problematic. One key driver of protected areas in New Zealand was rapid industrialization, which, in causing massive amounts of deforestation and species loss to enable agriculture, resulted in a desire to at least keep some sections of land in a largely natural state (Star and Lochhead, 2013). However, as a use for parts of the country that were considered too 'wild' to be transformed into farmland or towns, protected areas were strongly associated with conservative values of maintaining order by ensuring all parts of the country were under the control of the state (Park, 2006). Indigenous populations' traditional practices of food gathering, hunting, and other customary uses were banned from protected areas and in certain instances they were even forcibly removed from in to make these landscapes appear more natural (Young, 2004). Today indigenous groups and leaders continue to argue that protected areas are exclusionary and devalue traditional practices of ecological and environmental management that precede colonization (Solomon, 2014).

Today this form of protected area thinking continues to act as homeland thinking perpetuating the idea that these places are 'untouched' and without history. This is implied, for instance, in the New Zealand government's current visitor strategy for public conservation land, which states, "the special relationship of the tangata whenua [indigenous people] to the land influenced the ways in which Māori

people *visited* and used these places" (Department of Conservation, 1996: 5, emphasis added). This language suggests an insider/outsider binary, for by situating Māori as visitors, it implies that the Department of Conservation, or more generally, the New Zealand government, is indigenous. Through this lens of homeland thinking, even Māori – who inhabited and cultivated almost all parts of New Zealand centuries before the country was split up between developed lands and protected areas by colonialists – cannot be seen to utilize or understand them in ways that disrupt an Anglocentric view of them as 'wild'. Wylie (2016: 408, emphasis original) writes, "I would argue that 'homeland' epistemologies and presumptions are a difficult feature of many approaches to and understandings of landscape... Almost *per se*, for example, landscape is land that has been *settled*, inhabited – in no way can it be synonymous with 'nature' or 'the wild'. Within the context under discussion, there is a failure by settlers to realize that the protected areas they so deeply consider to be 'untouched' are in fact *a part of* rather than *apart from* the territory of colonial settlement. Furthermore, to consider them as 'wild' relies on a continuing practice of remaking history, through which the enduring presence of Māori in them is erased. Here, ontopology functions not as the explicit claim of a people being intrinsically connected to a landscape through history, but as an implicit denial by one people of another's historic and cultural connections to place.

The process through which the Māori presence in New Zealand's landscapes is erased can be seen as part of a wider act of colonialism through which European settlement is also forgotten from memory. The reconstruction of cultural memory is part of the make-over that the European settlement of New Zealand requires to justify itself (Turner, 2011). As literary scholar Patrick Evans (2002) argues,



Figure 1: Local members of the public gathering to participate in Ararira wetland planting event

this forgetting is part of the colonial population's sense of guilt, and their resulting desire to become indigenous by imagining a time before they stole the land so that they no longer have to be the invaders who carry the burden of history. This desire to return to a time before the signing of New Zealand's foundational document, the Treaty of Waitangi, shapes the approach to conservation in this country, which centers around undoing the effects of ecological imperialism by restoring environments to the pre-colonial condition. As environmental historian James Beattie (2011: 102) writes, "the aim to restore vegetation to its pre-1840 state – a date that marks the colonisation of New Zealand through a formal treaty between Māori chiefs and the British Crown – is a very culturally specific decision that smacks of the colonial fiction of arriving in a primeval undisturbed land."

While ontology is very much about memory, of nostalgically recalling ideal communities and lifeworlds, within the context of New Zealand, however, it is employed to imagine a past that is seen to be entirely without people. This homeland thinking enables European settlers to imagine themselves as original inhabitants like, or even in place of, Māori, and as the rightful inheritors of an uninhabited wilderness which becomes their homeland, and which they know how best to manage (Turner, 1999). As Wylie (2016) suggests, homelands are imaginary in both space and time, their intangibility infusing the idea of them with a strong pull that makes them so alluring despite the fact that they never really exist in reality. Hence, protected areas, as always distant, as out there beyond the city, the town, and the farmland, and as perpetually needing to be recovered from the past and brought



Figure 2: The first shrubs being plants by members of the publication at Ararira wetland

into the present to be preserved, are ideal homelands. Therefore, the intangibility of their spatial and temporal existence makes them appealing to the modern complex of ontopology, as they so neatly yet deeply problematically meld an imaginary of national identity and a corresponding sense of belonging together with a conceptual reconstruction of landscape and history.

COUNTER-ONTOPOLOGY

Wylie (2016) suggests that we should respond to ontopology by unsettling claims of homeland and also by findings new ways of relating to place that are more welcoming and incorporate a sense of hospitality and sanctuary. We take up this challenge through a consideration of a landscape design project at Ararira Wetland in New Zealand's South Island, undertaken by Lincoln University's Landscape Designlab. Here we both utilize Wylie's (2016) approach and also critique it. Our argument is that design is a useful

practice which can expand our ability to imagine counter-ontopology and also to implement it to make protected areas, but also landscapes more generally, more welcoming, inviting, and participatory. Design is useful in this regard, we suggest, because as design theorist Ian Buchanan (2001) suggests, it is inherently forward-thinking, always and necessarily imagining how the future could be different to the present. Therefore, if homeland thinking always looks back to the past as Wylie (2016) suggests, then we argue a counter-ontopological thinking and practice must look forward to the future.

Figure 1 shows locals from the nearby community meeting at Ararira to participate in a public event involving the planting of native shrubs to restore the indigenous ecology of the wetland. This occasion at Ararira entails individuals interacting with one another as a community, with the land, and with the indigenous ecology they are restoring. It expresses a coming together, however temporary and unstable, of people and flora within the landscape through its event-like capacity, which makes it "a constellation of processes rather than a thing" (Massey, 2005: 141).

But the planting also enables an experience of Ararira as the meeting of various pasts. Such pasts include the pre-human time of the thriving wetland ecosystem conservationists seek to recreate, the time of *mahinga kai* (traditional food gathering) Māori remember, and the time of European settlement through which the area was drained, dredged, and infilled to enable Western agricultural practices. Responding to this layered history by suggesting one of these pasts presents a more important, authentic, or legitimate connection between people and place is to make an ontopological claim. In contrast, the planting event holds together these heterogenous layers, as members of the local community, of whom many

are genealogically implicated in these histories of land use and transformation, come together to participate in the regeneration of the area's indigenous ecology amidst the former farmland, perhaps even enabling the return of food gathering in the future.

It could be suggested that a counter-ontological approach might start by looking to the future instead of the past. In this sense individuals and groups need not pick one past, one form of engagement between the land and its inhabitants, but, in contrast, orient themselves to what relation between people and place could arise in the future. Figure 2 shows individuals marking out where the first planting will occur at Ararira, the brown area (sprayed to suppress weeds to allow the planted shrubs to establish) shows the form the regenerated vegetation will take.

The planting could be read as just another mark upon the place, another claim of authentic relation to the locale, but it could equally be interpreted, as we would argue, not an already formed or complete connection, but an interactive process that moves participants towards as yet undetermined ways of belonging and being with this landscape. Here the counter-ontological sense of invitation Wylie (2016) suggests is less between people and more that which landscape affords people and vice versa in an open-ended way. Furthermore, the practice of designing landscape presents itself as a potentially useful tool for undertaking such an exploration, given that design is only and necessarily oriented towards the future. Moreover, design is forced to always imagine the world as different to how it currently exists in the present and to subsequently imagine a future that has yet to arrive.

The patterned planting at Ararira, through its curved shape, is oriented into a yet to be formed future, which suggests movement and growth instead

of fixity and reduction to a perceived 'untouched' state. In this sense movement and growth are inherently counter-ontological, as they suggest generativity and the creation of something new rather than the simplicity of regression to an imaginary past state. Furthermore, the growth and movement represented by the form, synonymous with a meandering river or swimming eel, occurs on multiple levels, as it enables various kinds of new interactions between people and place. Wylie (2016: 411) writes, in his critique of homeland thinking, something he finds himself "particularly attentive to involves the language of 'connection' and 're-connection' with landscape". As he goes on to ask in response, how can we speak of "connections between peoples and landscapes—pragmatically, beneficially and progressively—without necessarily succumbing to essentialism, or subscribing to a belief in some form of autochthony, let alone to any kind of extremist 'blood and soil' ethnocentrism?" Therefore, in our own response to this question through landscape design, we suggest that if claims of homeland are about the reduction of the links between people and place in order to cement one particular connection as authentic and all others as secondary or even illegitimate, then counter-ontology could be seen as a practice of expanding the possible interactions between individuals and a locale to multiply the potential ways of belonging.

Framing landscape as prospective and future-oriented rather than backward-looking and regressive works to strengthen its generative capacity, its ability to produce something new instead of just affirming what already is or was in the past. In this sense, through design "landscape becomes something emergent...It becomes an active generator of identity, localness, belonging and community" (Abbott et al, 2010: 201). When considered in

this way design taps into landscape's generosity, which lies in its ability to always provide us with new connections to place. It could be argued, therefore, that generosity is another term that may be added to the counter-ontological lexicon Wylie (2016) hints at through his reference to welcome, hospitality, and sanctuary, as ways of conceiving of place beyond or without homeland thinking.

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The Implications of the 'Umwelt'-Concept for the Design of 'Green Infrastructure'

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Keywords:

Wildlife networks, Umwelt, Island Theory, Natterjack toad, green infrastructure

ABSTRACT

'Green infrastructures' are designed to allow animals to move between scattered habitat patches, alleviating conflicts between wildlife and urbanisation. However, it is thoroughly anthropomorphic to presuppose that wildlife will use infrastructure in the manner intended by us. This becomes clear when we take the concept of the animal 'Umwelt' into account: all animals live in their own perceptual world, implying that the same landscape-structure can have a variety of meanings for different animals.

While thinking in terms of 'Island Theory' or the 'patch-matrix' model tends to exaggerate the difference between habitat and non-habitat or patch and matrix, the application of the 'Umwelt'-concept softens these distinctions and stresses the continuity of the landscape. As such, the importance of the matrix for animals as a resource base for all kinds of activities is reevaluated. Moreover, the 'Umwelt'-concept makes it clear that we need to take up the viewpoint of the animal in order to avoid further 'anthropomorphic short-circuiting' in future landscape design processes. We will illustrate our findings with the case of the Natterjack toad in the port of Antwerp and end with some general recommendations for the design of green infrastructure.

INTRODUCTION

In landscape architecture, certain types of urban green infrastructure such as wildlife networks are increasingly being proposed as a means to safeguard and increase biodiversity in urban and industrial areas. This line of thought is in

large part due to the 'island metaphor', which is derived from the theory of Island Biogeography (McArthur and Wilson, 1967): remaining undeveloped habitat patches are seen as isolated islands in a hostile sea of urbanized land. As populations on such isolated, small, remnant 'nature-islands' are more likely to succumb to stochastic extinction events and less likely to be recolonized by the same or new species, overall species numbers on those 'nature-islands' is predicted to be low. So, the best way to maintain and increase biodiversity levels, is to make the 'isolated patches' as big as possible and connect them through steppingstones, habitat corridors and the like. Hence, many (urban) green plans focus on creating networks of more or less contiguous green spaces to allow the easy movement of species between green patches.

Island Theory has been one of the central tenets of conservation biology, supposedly explaining the dire consequences of habitat fragmentation on species richness and shaping ideas about the design of reserve networks and indeed green infrastructure. However, this application of Island Theory to continental situations has also been met with some sharp criticism. In this paper, we undertake a selective literary review of criticisms of the Island Theory and highlight some possible implications for the design of reserve networks and green corridors, especially in urban areas. Taking our cue from the unexpected presence of Natterjack toads (*Epidalea calamita*) in an oil refinery, we will show how taking 'animal Umwelten' into account when designing for wildlife can be seen as the red thread weaving these criticisms together. All animals perceive and use the landscape in their own specific way, leading to possible conflicts with our human perception of the landscape. Showing how these conflicts in landscape perception can affect the design and functionality of green

networks, we end by drawing some general recommendation for their future design.

NATTERJACKS IN THE OIL REFINERY

All animals – humans included – live in their own *Umwelt*, a concept derived from the work of the Estonian ethologist Jakob Von Uexcküll (1909). The term *Umwelt* denotes something like the ‘perceptual world’ or the phenomenological ‘self-world’ into which each organism is submerged. According to Von Uexcküll, organisms only perceive whatever has meaning for them, and only those things that afford some type of activity in the daily business of survival have a meaning for that particular organism. As such, only those things show up in its perception. If one was to imagine prime Natterjack habitat for instance, few would think of the Total oil refinery on the right bank of the river Scheldt in the port of Antwerp. Yet inventory work over the last couple of years shows that they established a breeding population in the hearth of the refinery (Vochten et al., 2017). However, once you take the way in which the toad’s *Umwelt* is structured into consideration, it becomes clear that our surprise at their presence is anthropomorphic: it takes the human perception of the landscape for granted.

Natterjacks are a pioneer species: they like habitats with high dynamism, low and scattered vegetation and ample bare soil. Breeding occurs in very shallow and preferably temporary pools as they do not fare well under competition with other amphibians and fish. In order to quickly colonize newly developed pioneer habitats, Natterjacks are a highly mobile species and can disperse over great distances (Cox et al., 2017). With a preference for dynamic habitats, Natterjacks have profited from human disturbance in the past. But even in more stable, industrialized landscapes, the toad seems to find the

dynamic habitat niches it needs. For security reasons, vegetation is kept short around the Total-refinery and the oil-tanks and small scale digging for maintenance of pipelines leaves lots of bare patches of soil. Moreover, all the oil tanks are surrounded by levees in case of leakages and after heavy rain temporary puddles form themselves between these levees, providing spawning opportunities. Hence the presence of Natterjacks in the refinery: they see suitable habitat where we don’t expect it.

The Total-population is situated at the heart a 6500ha industrial area, surrounded by a multitude of docks, warehouses, industrial plants and roads: a seemingly very inhospitable matrix for toads. This might lead one to believe that the Total-toads form a relic population, either from an ‘original’ population in the river dunes or from the time the development of the port provided suitable habitat to migrate into from heathland-populations to the northeast. Yet surprisingly, they could also have migrated there quite recently. Inventory work does show that Natterjacks can actually navigate the industrial matrix: they have been seen in changing locations scattered across other areas of the port as well (Vochten et al., 2017). Indeed, as the port authorities claim: ‘wherever you do a bit of digging, masses of toads appear. Where do they come from? We don’t know. We know what are hard lines on a map, theoretical barriers to dispersal, but if push comes to shove, they are everywhere. They must be able to traverse roads and the like.’ (pers. comm., translation by authors).

The surprise at the presence and dispersal capacities of the Natterjack point to an important deficiency in our theories about the use animals make of the landscape: they often take insufficient note of the animal’s perspective, or ‘*Umwelt*’. For us, drawing a habitat/non-habitat distinction on the basis of a general characteriz-

ation of the land (say, on the basis of it being industrialized versus 'green') makes sense, but to a Natterjack these distinctions mean nothing. It simply sees a suitable type of vegetation, good spawning puddles and feeding opportunities. In the same way, we might believe that an industrial area is high impossible to cross for toads, but to a Natterjacks things appear different.

THE ROLE OF THE UMWELT CONCEPT IN THE CRITIQUE OF ISLAND THEORY

The rediscovery of the importance of including the animal perspective, or animal *Umwelt*, for understanding the way in which animals use the landscape has over the last decade led to a number of criticisms of Island Theory. The inclusion of the concept of 'Umwelt' in our ideas about the functionality of a landscape for animals for instance problematizes one of the central tenets of the Island Theory when it is applied to (continental) landscape planning for wildlife: the hard distinction that it leads us to draw between habitat and non/habitat, or 'patch' and 'matrix'. When we link certain animals to certain habitat types, we tend to identify habitat types on the basis of habitat features that stand out and make sense to us. However, the distinctions we draw in the landscape on the basis of that classification do not necessarily mean anything to the animals involved (Haila, 2002; Manning et al., 2004; Dennis et al., 2006; Van Dyck, 2012). What they perceive, is a range of resources scattered across a single, continuous landscape (Manning et al., 2004; Dennis et al., 2006) and it is the presence of the set of particular resources that explains the presence of a particular species. As such, the binary classification of a landscape into habitat and non-habitat, or patch and matrix, presents us with a far too simplified view of reality (Prugh et al., 2008).

Indeed, as Franklin and

Lindenmayer (2009) claim: 'what humans perceive as a patch may differ significantly from the pattern that is perceived from another species [...]. [C]ritical habitat for many species does not come at the level of landscape, but at the level of individual habitat features, which are not necessarily confined to any single patch type or landscape level condition' (349). This is clearly illustrated by the toads in the refinery: it is because of the presence of very specific landscape features (the temporary puddles and areas of bare sand) that the site was selected, not because the landscape is of some general type. Indeed, in reality, there does not seem to be any patch or matrix for the toads, simply a set of resources, in various assemblages, scattered across a single, continuous landscape.

On this view, the only difference between patch and matrix is that in the matrix: 'resources are in small, often tiny, pockets, and they are disparate' (Dennis et al., 2006). Yet these – often unnoticed -resources scattered throughout the matrix can be crucial for things like dispersal: they can be utilized to move through what on the basis of a coarse landscape typification appears to be hostile matrix, explaining how what we interpret as a barrier to migration might not appear as such to an animal (Mergey, 2014).

CONSEQUENCES FOR THE DESIGN OF (URBAN) WILDLIFE NETWORKS

Now, one might wonder where the critique of Island Theory as a basis for landscape planning for wildlife leaves us. If the distinction between patch and matrix becomes blurred, does this then imply that 'everything goes' as animals will always find their way? Quite the contrary: landscape design on the basis of the *Umwelt*-concept entails that *much more* effort will need to be undertaken in order to create *functional* landscapes for animals. The *Umwelt*-concept shows

how the functionality of a landscape to an animal depends on its perceptual capabilities: its capacity to recognize and use the resources scattered across the landscape for all of its activities. Those needs are different from species to species. Landscape designers should therefore take on the perspective of the specific animal their design is supposed to cater for and ask themselves the question what its needs are at all stages of its life-cycle (Dennis et al., 2006). Any design proposal will need to make clear how the design will provide those necessary resources if it is to succeed in creating a functional landscape for that animal. This might sound like a despairingly complex and daunting task to undertake for any landscape designer (Baguette&Van Dyck, 2007), if only because our knowledge of what constitutes the resource base for a specific animal is often lacking (Dennis et al., 2006). Yet this doesn't mean that we cannot draw any general conclusions that are pertinent to the design of (urban) wildlife networks.

First, it must be clear that the blurring of the habitat/non-habitat or patch/matrix distinction comes with a very important caveat. As Haila (2002) correctly notes in his lucid critique of the 'island metaphor': 'whenever the preserves or fragments are not surrounded by an "inhospitable sea", "the empirical findings of the Island Theory" are not pertinent' (325). This of course entails that the more the matrix resembles an inhospitable sea – which, on our account, means the more the matrix lacks the necessary resources to be a functional landscape for a particular animal – the more the Island Theory *does* become pertinent (see also Manning et al., 2004). Given the enormous amount of environmental modification caused by urbanization and the very peculiarity of the city as a habitat, it is safe to assume that many species are still confronted with an 'isolated island'- like situation in urban areas.

Whenever we are confronted with such a situation, it can however no longer be the case that we simply design a 'green stretch of land' between two 'habitat patches' and contend ourselves that 'connectivity' has been established. Indeed, as Baguette&Van Dyck (2006) note, there is an important difference between establishing functional and structural connectivity: functional connectivity refers to how the behavior of a dispersing individual is affected by landscape structure and elements, whereas structural connectivity depends on the spatial configuration of habitat patches in the landscape (vicinity and presence of barriers)' (1118). It is not because we achieve structural connectivity that we also achieve functional connectivity; neither does an apparent lack of structural connectivity also imply a lack of functional connectivity.

When we take the Umwelt-concept into account, it becomes clear that the very idea that animals will actively and purposefully use corridors between patches to disperse is shot through with anthropomorphic presuppositions. As Mergeay (2014) notes in his study about the (non)sense of ecoducts: 'a smooth snake that moves out of its habitat and bumps into a highway will not actively move along the highway to look for an ecoduct to cross.' (31, translation by authors) Here, the structural connectivity provided by an ecoduct does not provide functional connectivity: the ecoduct does not facilitate dispersal behavior for the smooth snake. From the other side, in their assessment of the biodiversity in urban habitat patches in the city of Bristol; Angold et al. (2006) found that there was no connection between the proximity of a patch to an 'urban greenway' and its biodiversity level, suggesting that 'dispersal for most of our urban species does not seem a limiting factor' (196). Here, a lack of structural connectivity does not seem to entail a lack of functional connectivity. Indeed, the case of the Natterjacks

suggests the same: though there is no apparent structural connectivity, the toads are able to navigate the matrix. Angold et al. do note that there seems to be a limited number of species – such as for instance water voles and other small mammals - for which ‘urban greenways’ do provide a means of dispersal. Moreover, they claim that urban greenways do have a positive effect on biodiversity, not because they are a means for dispersal, but because they provide extra habitat. More than anything else, Angold et al. show that it is the quality of the habitat that seems to determine the species richness.

From all of this, a number of things seem to follow with regards to the design of urban wildlife networks. First, if the goal of the network is only to ensure dispersal, one has to realize that only few species will use these networks for that purpose. Such a network thus only makes sense if it is targeted at and designed specifically for those species. Second, for most species the network will function as habitat. But as we have seen, in order to function as habitat, the design will have to be able to provide the necessary resources at every stage of the life cycle for a particular animal. Since knowledge is often lacking, in many cases there will be a need for experiment and further adaption of the design on the basis of constant monitoring. Given the importance of the presence of specific resources, it is also clear that good maintenance of the design is key.

Crucially however, the blurring of the boundaries between habitat and non-habitat, or patch and matrix, leads us to reevaluate the importance of the matrix. As Franklin and Lindenmayer (2009) note: ‘many conservation biologists have largely overlooked the pivotal importance of the matrix and the habitat that it provides for enhanced biodiversity conservation—or could provide, if it were managed differently’ (349). The danger of the ‘island metaphor’ is precisely that it

overemphasizes the difference between patch and matrix, which might result in the mistaken conclusion that the matrix is not interesting from a wildlife preservation point of view. This is not only problematic because, as Hostetler et al. (2011) note, bad matrix management can have important external negative effects on patch quality, but also because animals might actually make use of resources present in the matrix. Again, the Total Natterjacks here are a case in point: their presence is not premised on the presence of unbroken habitat, but on crucial resource bundles spread throughout the industrial matrix.

At the limit, a neglect of the matrix might become a sort of self-fulfilling prophecy, with animals being locked in a network of island-habitat-patches connected by corridors. As the sole strategy for the conservation, this seems to fall short. As Franklin and Lindenmayer (2009) correctly point out: ‘matrix management matters because formal reserve networks will never cover more than a small fraction of the globe, human modified land – the matrix – covers [...] all of the world’s terrestrial ecosystems (349)’. Formal reserve networks will of course remain crucial for preserving biodiversity, yet this should not lead us to overlook the many opportunities for integrating crucial resources in the design of our urban and industrial areas. In this regard, landscape designers have an important role to play. With the necessary knowledge, care and ingenuity, it must be possible to integrate more opportunities for wildlife into landscape designs. Succeeding in this task is not only necessary from a conservation viewpoint; it will also enable us to make marveling at nature a part of our daily life. Who wouldn’t want his day at the refinery to be soothed by the sweet, late spring chorus of Natterjacks?

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Crocolilia Urbanis: Co-Existing with Urban Wildlife

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ABSTRACT

Animals have inhabited urban areas since the dawn of human settlements (Soulsbury & White, 2015,). Urban areas are created by the urbanization of Nature (Barua and Sinha, 2017) and in species rich countries like India, this entails the urbanization of wild animals. Some populations now find themselves at the heart of major Indian cities. This research in landscape architecture reframes human-wildlife conflict to include effects of urbanization on crocodile habitat and explores how landscape design can enable human-crocodile interactions, in culturally and ecologically sensitive ways. In addition to on site research, relevant perspectives from geography, ethology, urban ecology and ecological design have been married in a new landscape that attempts to recognize the kinship and agency of animals in the formation of the urban (Wolch, 2002). Design models were developed and evaluated both for the city and the selected site. The final design tries to answer “erstwhile calls for animating urban theory” (Barua and Sinha, 2017:15) by showing ways forward for cohabitation.

CITIZENSHIP FOR CROCODILES

Animals have inhabited urban areas since the dawn of human settlements (Soulsbury & White, 2015,). Urban areas are created by the urbanization of Nature (Barua and Sinha, 2017) and in species rich countries like India, this entails the urbanization of wild animals. Some populations now find themselves at the heart of major Indian

cities. Understandably, this can result in human-wildlife conflict. Vadodara, Gujarat, India, (Figure 1) is a city with a longstanding relation between humans and reptiles. The river Vishwamitri passes through the city for a transformational 25 Km journey (Figure 2) and is home to over 250 Mugger crocodiles (*Crocodylus palustris*). The case of the river Vishwamitri presents a unique situation where crocodiles cohabit the city, contained through the agency of the urban river landscape. The rate of urbanization in the city has rapidly increased to become a looming threat to the continued cohabitation of humans and crocodiles (Vyas, 2012). Crocodiles in India have been traditionally associated with having divine agency (Borkar, 2006). The religio-cultural significance of the crocodile is a cultural projection that sits beside a reality far from ideal. The river Vishwamitri, is highly polluted by the dumping of sewage in its waters, garbage and debris along its banks making it a toxic environment by many standards (Mittal et al, 2016). Yet, amazingly this neglected and polluted ecological niche still supports multiple species including the Mugger.

How do animals negotiate and make urban environments their home? (Barua & Sinha, 2017) Animal geographers have tackled issues of the ‘place’ for wild animals in human dominated landscapes. Broadly speaking there “is a matrix of animals who vary with respect to the extent of physical behavioral modification due to human intervention and types of interaction with people (Wolch, 1998:123)”. Kymlicka and Donaldson, engage with the political status of animals and have developed a classification based on the type and degree of interaction with human beings. They propose Sovereignty for wild animals, Citizenship for domestic animals and Denizenship for liminal animals- these, unlike domesticated

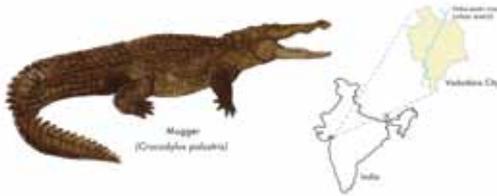


Figure 1: Vadodra and the Mugger crocodile, Figure 1- Source : Generated by author; Base Mugger crocodile illustration retrieved from <http://www.iranicaonline.org/articles/crocodile->

animals are animals living in human dominated landscapes but not entirely dependent on human interaction. In the case of the crocodiles I argue in favour of denizenship, which assures them secure residency in Vadodra (Kymlicka and Donaldson, 2011). In applied urban ecology, the phenomenon of Synurbization, fusing synanthropization which “refers to the adaptation of animal populations to human created conditions in general” and urbanization which “refers to changes in landscape caused by urban development” (Luniak, 2004: 50), is an observation of how nature responds to urbanization and particularly “how sentient creatures negotiate and learn to inhabit complex, dynamic environments, apprehending them according to their own knowledges, speeds and rhythms, with or against the grain of urban design (Barua and Sinha, 2017: 2)”. While the developing world will have most of its human population living in urbanized landscapes (Watson, 2009), synurbic wild populations suggest a chance “for some kind of co-existence between nature and expansion of urban civilization (Luniak, 2005: 54)”.

Conceptions of cities as the sole realm of humans (Wolch, 1998), despite having a stronghold on urban imaginations, is evolving to recognize, retrieve and reimagine



Figure 2: View of Vishwamtri as it flows through the city, Figure 2 – Source: Vadodra Municipal Corporation

spaces for the multiple species that have coevolved with humans over millennia. A transspecies urban planning and design practice (Wolch, 1995) can be extended to “reimagine the role of ‘nature’ – including plants and ecosystems, as well as animals” (Houston et al, 2017:12). This expanded view of transspecies urban planning that deals with ecological systems and their regeneration can be approached adapting the paradigm of natural-novel ecosystems wherein an aesthetically manipulated constructed urban landscape high-lights the role of design within urban areas (Sack, 2013). The ecosystem cannot be reversed back to the historical one, but, having evolved into the current hybrid eco-system, it can, through further designed transformation, emerge as an urban natural-novel ecosystem (Hallett et al, 2013).

Designers and planners have two ways of influencing the autonomy of hybrid ecosystems (Adapted from Pulliam and Johnson, 2002)

1. By influencing the flows into and out of the system - Food
2. By influencing the internal state of the system – Shelter

‘Designed transformation’ is framed as the reversible threshold that pushes the hybrid eco-system

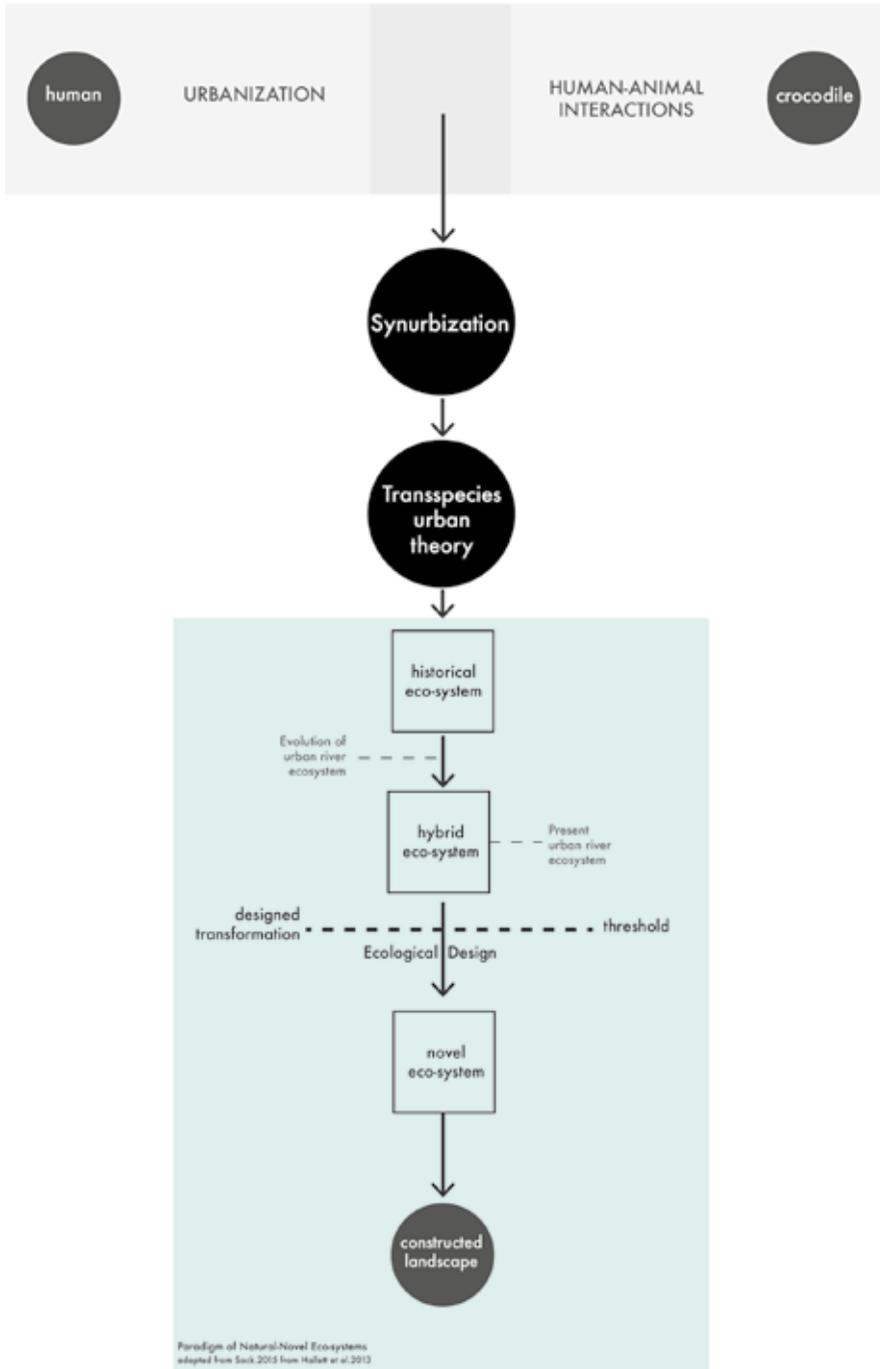


Figure 3: Theoretical framework
Source: Generated by author

into a novel ecosystem (Figure 3). The aim of this research is to conceive novel ways of interacting with the crocodilian through considerate design interventions that extend co-citizenship to the Muggers living in Vadodara's hybrid urban ecosystem.

SYNURBIZATION AND THE AGENCY OF CROCODILIA URBANIS

The design question - Which landscape design interventions, can enable culturally and ecologically sensitive urban human-crocodile interactions? - was the starting point for this research. As part of research for design, methods included expert interviews, sampled by purposive snowballing. The interviews were semi-structured and in depth. Transcribed interviews were then analyzed using first and second cycle coding (Saldaña, 2009). Google earth imagery from the past decade was examined to study the impacts of urbanization on crocodile habitat. In addition to the interviews, non-participatory on site observations were made at multiple locations along the river. A literature review included keywords such as crocodile ethology, animal geography, applied urban ecology and ecological design. Prior design proposals and theses on urban landscape design and planning for the river Vishwamitri in the past decade were scanned for relevant insights and data. The outcomes of this investigation were distilled into two main results relevant to our understanding of the urban ecosystem.

First, the community of mugger crocodiles in the city actively shape and reshape the urban river landscape, displaying an adaptive agency within the hybrid ecosystem. Crocodiles inhabit terrestrial and aquatic habitats but their role as zoogeomorphic agents within the sub-terrestrial layers of the landscape are also significant (Butler, 1995). They are burrowers, making

tunnels as long as 20 meters ending in dens large enough to accommodate one or many crocodiles (Butler, 1995). The mugger is territorial and roams within a defined home range. Site-fidelity, or adherence to chosen spots for basking and nesting, is characteristic (Mittal et al, 2017). Although, interviewees confirmed that the Vishwamitri muggers have been known to shift both basking and nesting spots as a response to disturbances from construction activities and invasive human presence. The degree of commitment to a home range also becomes questionable, as some experts believe that the increasing crocodile population is due to crocodiles migrating from rural parts.

The second and more remarkable result of the two may also be a plausible explanation for the increasing crocodile population in the urban stretch of the river. Embracing an age-old human-animal interaction that paved the way for domestication of animals, this interaction started as a necessity to individually manage urban meat waste by dumping it into the river. This is a common practice in many Indian cities with no meat waste disposal infrastructure, however in Vadodara city the presence of the crocodiles has transformed this into a feeding ritual. Local butchers and fish vendors have taken to dumping offal into the river, some even incorporating the feeding of the crocodile as part of their daily routines. Suitable bridges across the river are the sites where the feeding unfolds (Figure 4). Stopping on their way home at night to feed the crocodiles, one meat vendor describes how the crocodiles have learnt to be there, jaws open, ready to receive their food. Experts also believe that if not for the crocodiles, the river would have been more polluted. Their scavenging processes animal waste in the river. Apart from meat, crocodiles are known to consume fruits and legumes; this means that vegetable organic waste

pegged the population at 250.

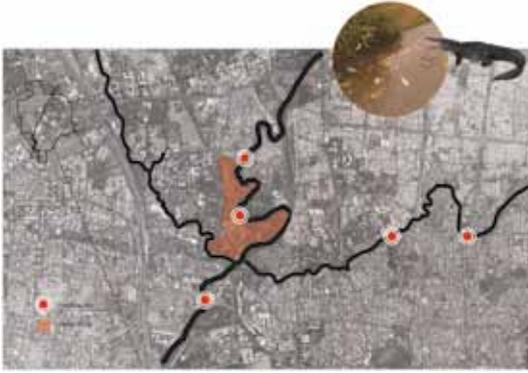


Figure 4: Location of feeding sites

Figure 4 - Source: Generated by author; base map retrieved from Google Earth on 15th April, 2018.11:38 pm; In-set photo credit: Tanvi Choudhari

generated by the city can also be fed. By mapping the feeding sites, a co-relation between the location of feeding sites and the high population of crocodiles in those segments was found. These locations are optimal habitat for undisturbed nesting, basking and burrowing (Ishore, 2017). Conversely, we can make the claim that the presence of crocodiles at those locations elicited the corresponding response to dump meat waste. However it is evident that the combination of food and shelter has contributed to an overall increase in crocodile population.

The urban crocodiles have shifted away from a predominantly predatory lifestyle to one of scavenging and actively being fed. The feeding also alters the crocodiles corporeal dispositions as many of the crocodiles looked overweight (Barua and Sinha, 2017). Apart from these changes in diet and predatory behavior, the crocodiles display a few more typical features of synurbic populations including (adapted from Luniak, 2004: 50):

- **Higher density of population** – the 25km urban stretch of the Vishwamitri has an unusually high number of crocodiles. The last official crocodile count in 2015

- **Threats to migratory behavior** –the increased fragmentation of road networks and human settlements that block migratory routes to city ponds have been fatal for migrating crocodiles.
- **Changes in breeding ecology** – crocodile sex determination is temperature dependent – experts claim that there are a larger number of females in the urban stretch. Studies have shown that for *Crocodylus palustris* extreme temperatures result in an increase in female hatchlings (Lang and Andrews, 1994). This could be the result of urban heat islands and changing urban microclimate.
- **Adaptive towards man** – the crocodiles are both habituated and adaptive to human presence. The data suggests that crocodiles in the urban stretch of the river were shy and less aggressive compared to their rural counterparts.

To Feed Or Be Food? Design For A Synurbic Crocodile Population

Continuing to feed the crocodiles or withdrawing all food from the hybrid ecosystem can have complex implications. Discontinuing the feeding would result in gradual behavioral changes like shifting back to predation and displaying more aggression possibly resulting in greater human-crocodile conflict. These are factors that have a direct influence on urban landscape design for multiple species including humans and crocodiles.

Three scenarios were considered with implications at the city scale:

Ceasing to feed the crocodiles overnight, without the immediate



Figure 5: Crocodile habitat along Sayaji Baug,
Source: Author

introduction of alternative food sources, would require 250 crocodiles to find other sources of food. In order to ensure the replacement of meat waste by the natural food web, ecological restoration to a state, which supported more birds, wild boars, monkeys, and fish that were food for the Muggers would become necessary. Each crocodile would require more space than it presently occupies in order to hunt. Land adjacent to the river would have to be amassed and made available for the crocodiles, difficult to achieve in a burgeoning city like Vadodara, where demand for urbanized land continues to rise.

Another way forward would be to gradually re-wild the synurbic crocodile population by reducing the inflow of food over time, allowing for the amassing of land and the efforts of ecological restoration in the highly polluted landscape to take effect. The morphology of City/Nature would coevolve into the delineation of a sanctuary for urban wilderness. The development of a sanctuary in the middle of the city was a contentious topic amongst experts. Moreover, restoring the ecosystem entails a large investment for the city both spatially and temporally. Acknowledging the hybridity of the current ecosystem could provide solutions for yet another alternative.

The third scenario considers that the synurbic crocodile population is

neither truly wild nor fully domesticated. Scavenging for meat waste dumped on the riverbanks is a passive engagement with the urban dynamic, however the act of feeding transcends this passivity into a ritual that connects the urban and the animal in a more intimate bond. Currently the feeding is unregulated which has a direct impact on both crocodile population and health. It is possible to experiment with and regulate this to give the city some leverage in managing the growing population of crocodiles as well as recycling meat waste. Sensitive zones for crocodiles can be protected from encroachments and sensible urbanization can continue at suitable locations. This scenario was selected, as it allowed for the exploration of designs in which the synurbic crocodile population within the hybrid ecosystem could co-exist in a new City/Nature dynamic, pushing their adaptive capacities beyond what was earlier imagined.

The site (Figure 4), Sayaji Baug, a popular public garden was chosen based on crocodile preference and habitat suitability studies that identified the stretch of the river adjacent to the park as most sensitive and preferred crocodile habitat (Ishore, 2017). The site includes two established feeding sites and the recreational function of the park allows opportunities to encourage human interaction with crocodile habitat (Figure 5). Two spatial models of interaction between human and crocodile habitat were tested and evaluated:

1. Crocodile Island - Exclusive

The model of an exclusive island for crocodile habitat involved the relocation of the present human land use and the recreation of seasonal swamp like habitat. The model attempts to relocate the crocodiles using the newly created habitat and attracts them by establishing new feeding sites thus modifying their habitat preferences.

2. Crocodile Park - Inclusive
Although situated along the Vishwamitri the formal design of the park pays little attention to the river landscape except by way of a cautious dense vegetated buffer along the river. This model attempts to refine the present relationship through re-integrating with crocodile habitat.

Considered least invasive and most suitable to the aim of the research, the inclusive Crocodile Park model was developed into a design. The design tries to engage with the crocodilian presence reinvigorating the experience of the park and encouraging human-crocodile co-existence by managing the degrees and types of interaction. Minimally intrusive novel landscapes, including designed feeding sites, within crocodile habitat ensure respect for the crocodiles perspectival world (Sharpless, 2016) and the ways it adapts its behavior as well as the landscape to make it habitable.

CONCLUSION: TOWARDS ZOOMORPHIC URBANIZATION

Unlike other urban animals, the crocodile is a predator, skilled and highly capable of hunting humans for food compelling us to re-evaluate our relation with the crocodile (Plumwood, 2012). Despite adapting to the urban environment and displaying less aggressive behavior towards humans, we must design to ensure that the crocodile is given the 'place' it is due in the larger scheme of the food web and as humans we are humbled by the realization that we too are food (Plumwood, 2012). Regulated feeding as a tactic for urban meat waste management and crocodile population control is an interaction whose mutuality and codependence (Sharpless, 2016) cannot be over emphasized. This research considers the feeding

of crocodiles to be a remarkable urban human-animal interaction and sets the stage for this interaction to continue. Balancing the synurbization of crocodiles with the zoomorphic urbanization of Vadodara city, the feeding of crocodiles continues as public ritual, playing a role in processes of urbanization (Carballo, 2012).

Hunting had decimated the crocodile population in India, resulting in the crocodile receiving Schedule 1 status of the Wildlife protection act of 1972, this technically means that there can be no external influence in its habitat. However crocodile populations have since then been successfully retrieved and a growing concern is human-crocodile conflict. In the light of this research, the Schedule 1 status can be considered for modification. The synurbic crocodiles now depend on external urban food sources, and naively cutting ties between humans and crocodiles could be dangerous, careful designed changes to the landscape are crucial in the transition to successful cohabitation. Similarly, other urban sites with animals, especially predator species can benefit from understanding the food dynamics of resident animal populations, which can then become a starting point for the designed inclusion of animals as part of the urban metabolic.

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From Conflict to Opportunity: The Case of the Scheldt River as Potential Biosphere

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Keywords:
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ABSTRACT

Large parts of Europe are characterised by dispersed settlements, causing an intermingling of landscape and urbanity, often resulting in conflicts between both. Current research and practice is focused on (re)introducing oppositions between land and city using strategies based on zoning. In this paper we aim to demonstrate that introducing dichotomies through zoning is an obsolete strategy to manage alleged land-city conflicts. In contrast, considering the relation land-city as a complementary instead of a binary dialogue allows designers to imagine new rich and complex relations between both. Rethinking these dialogues is explored in a research by design in the Scheldt valley in South-West Flanders (Van Daele, Gheysen, 2016). The valley's slow process of urbanisation combined with the valuable Scheldt landscape triggered the communities in the valley to obtain the UNESCO biosphere designation. Therefore they need to demonstrate a qualitative relationship between land and city. Although land and city are juxtaposed in consolidated fragments, the territory does not fit the UNESCO zoning diagram. A research by design shows the impossibility to imply this diagram in a context of dispersed settlements, redesigning the diagram as a cut-up dialogue of rich and complex interactions.

INTRODUCTION: THE POTENTIAL QUALITY OF DISPERSED URBANITY

Hybrid and dispersed urbanisation is perceived as an unwanted reality of a non-binary context where land and city are intermingled. The unwanted effects of this spatial pattern on mobility, social

exclusion, sustainability, etc. form the basis of ambitious strategies such as greenbelt policies (Ministry of housing, communities & local governments, 2018) and discourses such as the pleas by the vlaamse bouwmeester to restore a compact urbanity of dichotomies and oppositions, making regions such as Flanders, more urban and rural (Canfyn, 2014; witboek beleidsplan Ruimte Vlaanderen, 2016).

However, this discourse on the compact city is disconnected from reality. Historically, the Flemish territory has always been inhabited in a dispersed way. The absence of topographical or natural constraints combined with a fertile soil allowed a dispersed settlement pattern early in history. This pattern has been adapted and restructured during decades. As a result a majority of inhabitants currently lives outside what is traditionally defined as the city. (unpublished study by Leiedal based on RWO, AGIV, CRAB)

Although the ongoing fragmentation of a dispersed settlement structure needs to be stopped, we need to explore alternative ways to celebrate and value the complexity of the dispersed reality as a new form of land/city dialogue. Several authors and theoreticians, among which Secchi, Vigano (Secchi, Vigano, 2011), see dispersed structures as a new type of metropolis. Others, such as Sven Stremke (RWO, 2013), or Michiel Dehaene (Dehaene, 2013) suggest that dispersed settlements may be a more adaptable and flexible structure than the compact metropolis. As everything is mingled new dialogues can occur between city and land, while future challenges can be addressed at the source and as every infrastructure is doubled a problem in one part of the dispersed infrastructure can be taken over by its double.

**How resilient is a non-binary
dialogue between land and city?
How can it become a biosphere?**

The research unit All City/All Land (AC/AL) at the KU Leuven Sint-Lucas campus Ghent explores the potentials of a non-binary context to address future social challenges. In 2016/17 AC/AL explored by design this potential in the Scheldt Valley between Spiere-Helkijn and Kluisbergen in the South-West of Belgium and the North of France (figure 1).

An area situated in the periphery of larger towns such as Kortrijk, Tournai, and Lille. It is an area in which the dialogue city – land seems to be dominated by landscape. At first glimpse, no major dynamics or challenges are appearing. But up closer, a whole set of dynamics appear: an aging population, refitting of old and new infrastructures, energy issues, public investments and facilities...; in short contemporary urban challenges in the old landscape of the Scheldt valley. Seen the combination of a low dynamic of urbanisation and a valuable landscape, the communities in the valley seek to obtain the UNESCO designation man and biosphere. This designation is a perfect tool to reflect on the potential qualities of dispersed settlements in the valley. After all, to acquire the designation the region needs to demonstrate the quality of the relation between ecology and human activity, between the old landscape of the river and contemporary urban challenges.

UNESCO presents the biosphere as the diagram of a reserve in which an ecosystem consists of three zones:

- The core is a valuable and protected eco-system.
- The second zone is the buffer zone. It surrounds or adjoins the core area and is used for activities compatible with sound ecological practices
- Finally the transition area is the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socio-cultur-

ally and ecologically sustainable.

In some versions of the diagram zones appear in different combinations but the overall image is a diagram of zones that are strictly separated one from the other. A diagram that is applicable to most of the reference biospheres we know, most of them characterised by UNESCO as a defined reserve.

The double asymmetry of the valley

However the Scheldt valley will never become a conventional reserve, it is too shattered to become a constellation of enclosed entities. The complexity of the valley is caused by a double asymmetry (figure 1). The north – south asymmetry of the valley shows in the northern part the urbanised and dispersed structure of Flanders and a more distinct relation between land and city on the southern Walloon side. At the same time the western part of the valley consists of lowlands while the eastern part has an articulated topography. As a result this double asymmetry confronts us with different city/land dialogues. This means that the three envisaged zones of the biosphere and the possible evolution of the zones will appear in different configurations: mixed, entangled, overlapping and colliding. This complexity and the potential of what appears to be a landscape of conflicts is in this paper illustrated with two out of five samples we explored: the river and the soft mobility network. In both cases the current and projected juxtaposition of land and city are turned into a new dialogue.

THE CORE AS COMPLEX DIALOGUE

Current plans see the river as an express waterway with an ecological fringe. We use the economic issue of transport to turn the river into a dynamic landscape liberating it from the envisaged



Figure 1: The asymmetry of the Scheldt valley. D'Haene, R. (2016) in Van Daele, E. and Gheysen, M. (2016). *Old Landscapes and new urbanities; implementing a man&biosphere label in the Scheldt valley*. Ghent: Faculty of architecture KULeuven, pp 16-17



Figure 2: Ferraris map (1771) in *De grote atlas van Ferraris. De eerste atlas van België*. Tielt, Lannoo. (2007) Maps 20/29/37

linear configuration of opposing strips. As urbanists we use this new landscape to influence the quality of life in the surrounding settlements.

As the river is the natural centre of the valley, the lowest assembling point, one conventionally considers it as the linear core of the biosphere. The Ferraris map (1771-78) (figure 2) is the oldest map documenting the area.

The map shows the river as a distinct landscape figure: a water structure accompanied by green floodable zones and some sparse creeks. Early settlements are positioned close to but outside of these zones. The overall image of the river comes close to the UNESCO biosphere diagram with clear zones and separations. However this wide green corridor no longer exists. Currently the river is a dynamic, dual mechanism: a natural element turned into a man made machine. Through the years the water system has been under constant change, adapted to human activities and needs, rationalised to make transport over water more efficient and faster by cutting off meanders, building locks; thus changing the dynamic river into a

controlled infrastructure. Therefore the river should be considered in separate segments perpendicular to the river, not as a structure dominated by the length of the river. These segments are characterised by the double asymmetry of the valley: a different topography, morphology, urbanisation and spatial policy on either side of the river results in different spatial configurations of the river valley. The southern, Walloon bank of the river is composed of perpendicular creeks that create a direct drainage system to the river for agricultural needs. Old meanders have been disconnected and filled, in function of agriculture. On the northern Flemish bank many of the old meanders were preserved, the topography is less steep creating a system of creeks parallel to the river. This combination in the north of old meanders and parallel creeks forms the largest floodable area along the river making it perfect for wildlife. It shows isolated fragments of the river as a thickness.

The east-west asymmetry is less pronounced: the contrast between the articulated topography in the east and the lowlands in the west results in a fine network in the east as opposed to a

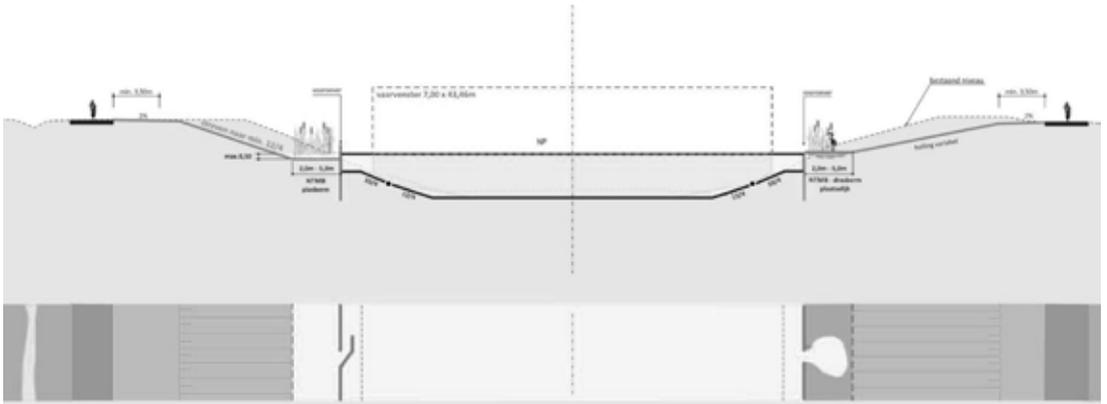


Figure 3: Re-profiling the river as water expressway with ecological rims into a new topography (2016) in Van Daele, E. and Gheysen, M. (2016). *Old Landscapes and new urbanities; implementing a man&biosphere label in the Scheldt valley*. Ghent: Faculty of architecture KULeuven.pp41

coarse network in the west.

Adding the next layer

This rational perpendicular system allows us to focus on the water core as a thickness, as a tangled framework that determines the evolution of the region.

The process to adjust the river to human activities continues. Currently an ambitious project is the construction of a Benelux-Seine axis that would become the economic driving force of the transnational region. Therefore the river needs to be deepened within the current profile (figure 3).

Separate ecological rims along the banks will compensate this rationalisation, turning the river into a bundle of conflicting natural and urban strips. However the rationalisation of the river into a water express way is an opportunity to further reedit the dialogue between land and city, to rethink current potentials and problems and to explore breaking solutions for the combinations of land and city.

Re-profiling the river into a water-expressway produces tons of sludge. This sludge will be removed and dumped in Londerzeel, 100 km away from the area. We opt to keep the sludge, using it to create a new micro-topography around the river (figure 4). Thus creating new flood zones and water related habitats. As a result we

liberate the river from its confinement to a line. It allows us to explore the river as a dynamic thickness perpendicular to the Scheldt, pp 42-43

In the design experiment the core becomes a tangled structure, penetrating the valley, accompanied with patches of low (buffer) and high (transition) urban activities. The clear distinctions between core, transition and buffer are blurred and the zones are mingled. Thus creating more interesting alliances and confrontations between man and nature than the zoned organisation in the original diagram. It allows for new types of open spaces in which the three envisaged zones of the biosphere overlap. (figure 5).

The way we manage to manipulate planned regional projects to reedit the dialogue city and land is what will make the biosphere in this region stand out and will change our reflection on the biosphere designation.

INTRODUCING A NEW MESH

Completing the soft mobility network in the valley changes the permeability of the valley, enhancing a new dialogue between land and city. Dealing with the urban question of permeability allows the core of the biosphere to be extended as an



Figure 4: The river as a tangled thickness of micro topographies (red/yellow) and new biotopes (animal logo's) (2016) in Van Daele, E. and Gheysen, M. (2016). *Old Landscapes and new urbanities; implementing a man&biosphere label in the Scheldt valley*. Ghent: Faculty of architecture KULeuven.

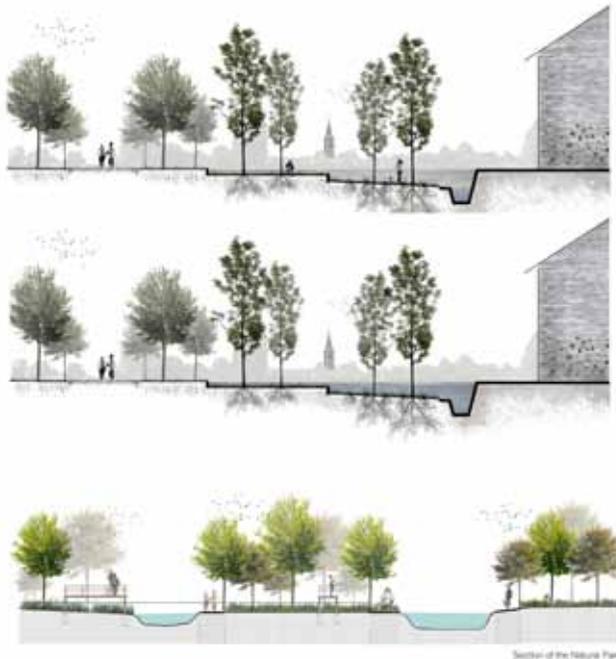


Figure 5: A water basin as new type of collective space (2017). Studio collective, shared, public, private, fall 2017, KULeuven campus Ghent, Erik Van Daele and Maarten Gheysen

entangled structure surrounding and invading the urban areas.

If a dispersed constellation has one quality it is the overall availability of open space in whatever configuration or scale it is. Inhabitants enjoy, on walking distance, a wide range of different types of open space. Secchi, Vignato (2011) calculated that in Flanders the contact zone between city and land is the largest in metres linear, compared to compact urban systems such as Paris or configurations of dispersed settlements such as the Randstad.

However the accessibility of

this landscape is limited, caused by a discontinuous network of dead ends and rough impassable paths. The only continuous network is a car-based infrastructure, ignoring the landscape and leaving no option than to move through the valley by car. Yet the average distance to urban destinations and work is moderate: about 15km. So for a large number of people it is feasible to reach destinations by bike on condition that they can travel safely and in a comfortable way. An inventory of the soft infrastructural network shows an incomplete network of fast tracks, local roads and rural paths. Introducing

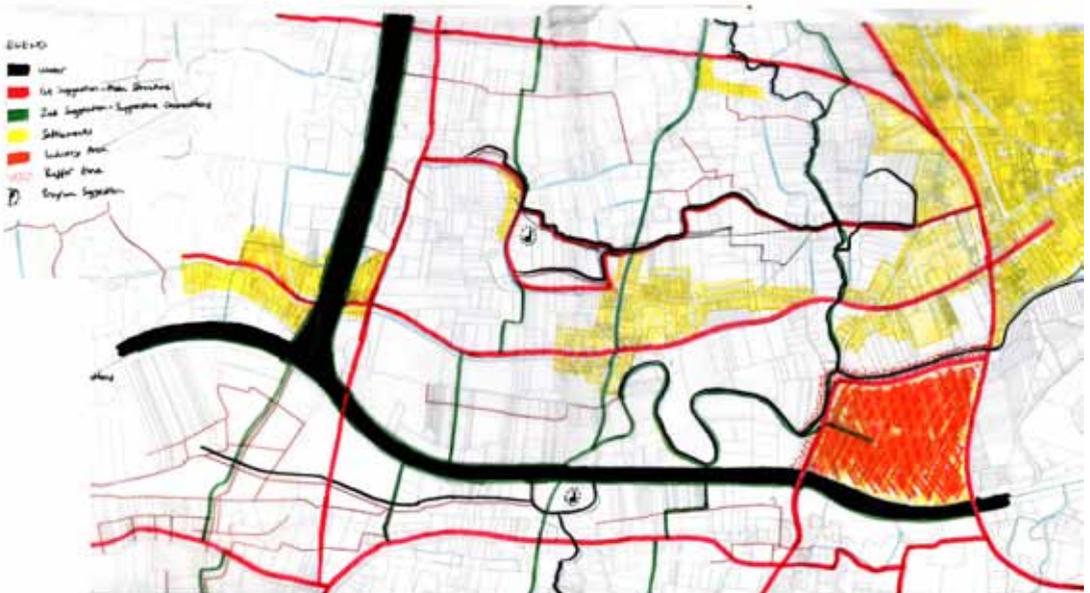


Figure 6: Completing the slow network, introducing a new mesh, Labatista, M. (2016) in Van Daele, E. and Gheysen, M. (2016). Old Landscapes and new urbanities; implementing a man&biosphere label in the Scheldt valley. Ghent: Faculty of architecture KULeuven. pp 79

a new mesh in the soft mobility network will offer an alternative for the car. (figure 6).

On top of that the new mesh will have a social impact. To most of the inhabitants the surrounding landscape is a blind spot. By changing its permeability they can appropriate the landscape as part of their habitat.

Constructing the verge, the ditch and the chamber

Completing the mesh

complements the tangled water core with green tentacles, using the verges and ditches of the roads. To relate the new paths to the biosphere the verges are seen as fauna- and herbal borders that function as food source and nesting places for farmland birds (figure 7). In the construction of the verge the ditch plays an important role as water buffer.

Apart from that, existing large-scale landscape elements such as forests become connected landscape chambers. As designers our focus was on the spatial impact of these systems worked out by ecologists and

landscape designers. By redesigning the verges the vegetation of the paths increases in height, which we use to subtly redirect the view from the road (figure 8). Combinations of high and low vegetation accentuate remarkable elements and landscape features.

DESIGNS THAT REVEAL AND ADD

The projects were not the objective of the design experiments. They served a reflection on the spatial impact of land- city confrontations. A positive interpretation of dispersed urbanity in the form of a readymade cut-up turned seemingly conflicts into opportunities.

It is not a conflict, it is a cut-up dialogue

Regional projects often have a technical focus in which space appears as the by-product of a regional logic. As a result the local dialogue between land and city is not necessarily a

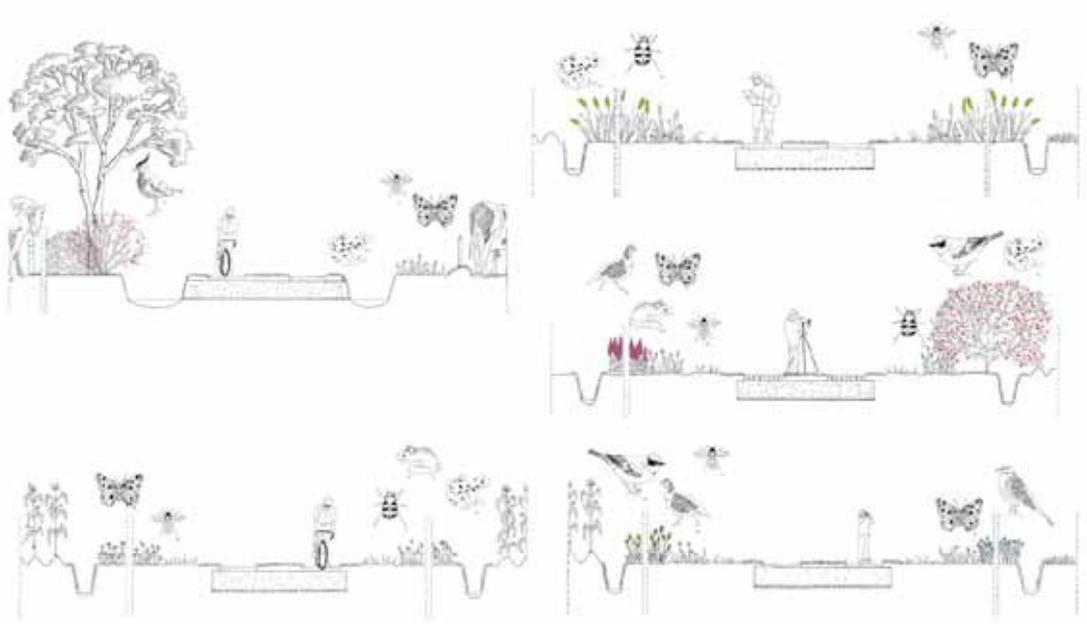


Figure 7: The verges of the slow network, Vancaeyzele, R. & Vandenbrande, A. (2016) Studio old landscapes and new urbanities, fall 2016, KULeuven campus Ghent, Erik Van Daele and Maarten Gheysen

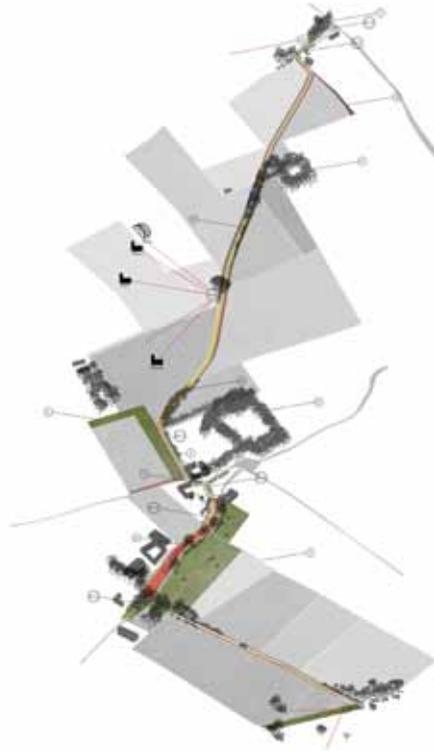


Figure 8: Redirecting the view of and on the slow roads, Vancaeyzele, R. & Vandenbrande, A. (2016) Studio old landscapes and new urbanities, fall 2016, KULeuven campus Ghent, Erik Van Daele and Maarten Gheysen

harmonious construction and does not lead to obvious synthesis. The dialogue is brutal and rough and reads like a cut-up novel: (Burroughs & Gysin, 1976) an assemblage of fragments, creating a new text. At first glance, the cut-up AC/AL construction seems nonsensical and absurd. Meaning only appears when the reader starts to make new associations and connections between the fragments. Similar to the novel, the quality of the dialogue land-city does not depend on the words themselves, but on the images they evoke and associations the observer makes. (Van Daele, 2014).

However designers fail to make these associations. They seem to suffer from dyslexia and agraphia (Gheysen, Van Daele, Scheerlinck, 2017). Designers solve AC/AL conflicts by zoning on a regional scale and by mimicking conventional urban or landscape types on the local scale. In both strategies designers do not value the potential richness of the cut-up dialogue. Hardly ever conflicts are reinvented as opportunities by introducing new associations between land and city.

Opportunity = reediting

Designers should consider Flanders as a readymade cut-up, as an open text waiting to be (re)edited and reorganised to reveal its qualities and strengths. It's a design attitude, familiar to the as found approach by Alison and Peter Smithson in which the results largely depend on the act of selection: "the art lies in the picking up, turning over and putting with" (Lichtenstein & Scheregenberge 2001: 40). An attitude that makes design into a small affair, where the designer must be careful about conceptualising what already exists and what is planned. On the one hand the designer should be a site-seer to become a site maker (Marot, 2003). He should identify and reedit the weak qualities of a site (Van Daele, 2014). These elements are weak because they are hard to identify in the

complexity of the cut-up dialogue but essential to the vocation of a space. On the other hand there are new regional projects such as the water expressway where the problem of the sludge is turned into a new landscape layer. Like an archaeologist, the designer must dig out and reveal potentials and vocations. And in a process of reversed archaeology new layers initiate new associations in the AC/AL dialogue.

Opportunity = accumulation of small projects

A territory of dispersed settlements is not a territory of large gestures or figures. It is the territory of interstitial spaces and small fragments. (OSA, 2007). All the design experiments operate on a local scale. They show that regional structures in AC/AL can be incomplete as the separate elements may function on themselves or in collaboration without disturbing the regional strategy. Like a pointillism painting the value of the dialogue land-city is characterised by an addition or multiplication of small interventions gradually forming envisaged regional strategies. Designing AC/AL is an exercise in finding the right balance between the robustness of regional projects and the fragility of local qualities and initiatives.

Clearly, designing AC/AL depends on a positive, almost naive, perspective that interprets alleged conflicts as opportunities. It demands reading the absurd and ordinary as an asset. It replaces the binary model of zoning with an exploration of the potential richness of complexity and multi-layering.

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5.1. HUMAN AND NATURE

GROUP D

Design and an Ethic of Care
Maggie Hansen

Landscape Architecture as a Catalyst for
Improving the Quality of Life for Patients
in Mental Health Institutions
Zvika Kanonich
PECHA KUCHA PAPER

Body Conflict: Tools for Visualizing the
Complexity of Sensory Space
Suzanne Mathew
PECHA KUCHA PAPER

Accessible Nature Experience: Inclusive
Design Fostered by Conflicts in
Semi-Natural Landscapes
Gabriella Szaszak & Tibor Kecskes

Analyzing the Landscape Visibility in
Lushan National Park for Holistic
Protection of Cultural Landscape
Heritage and Spatial Planning
Diechuan Yang

Design and an Ethic of Care

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Keywords:

landscape maintenance, ethics of care, design process, design activism, resilience

ABSTRACT

Joan Tronto's ethics of care describes a moral theory based in the centrality of care for human lives and notes that cultural norms suppress care's importance (Tronto 1993). Theorists in the fields of technology and geography have used care theory as a tool to critique the unequal power structures that shape our social boundaries, and to outline actions that "enhance mutuality and well-being" in response to rising inequity and privatization (Lawson 2007: 1). Landscape design is concerned with the care of ecological and social systems, but our public spaces rarely celebrate the human labor of caretaking. This paper explores landscape design through the lens of the ethics of care to show how revealing the actions of care-taking could create public spaces that help the public understand the importance of stewardship. The actions of landscape care can be the very acts of cultivation that ensure fulfillment of the designers' vision. Engaging with care (through maintenance actions and budgets) as part of the creative process could help create more socially and ecologically resilient landscapes. Furthermore, with carework in mind, design can integrate change that reveals and revalues the significance of human action in sustaining the environment.

LANDSCAPE DESIGN AS CAREWORK

In her 1993 book, *Moral Boundaries*, Joan Tronto defines care-work as "a species activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live in it as well as possible. That world includes our bodies, our selves [sic] and our environment, all of which we

seek to interweave in a complex, life sustaining web." An ethic of care, she argues, offers a way to work toward a more just and caring society by approaching issues in context, through true cooperation and understanding, and with acknowledgement of the continuous actions of care that support everyday life.

Care involves taking the concerns and needs of others as a basis for action, Tronto notes it is a "habit of mind" as well as particular actions. According to Tronto, true care can be described through four phases: caring about (attentiveness), taking care of (responsibility), care-giving (competence), and care-receiving (responsiveness). 'Caring about' is the recognition that care is needed. 'Taking care of' is when we assume some responsibility for that need and determine our response. This phase challenges us to consider specific obligations and broader responsibilities as members of a just society. 'Care-giving' involves the "direct meeting of needs for care" (Tronto 1993: 107). Tronto stipulates that this phase involves the labor of care, not providing resources like money or instructions. For us, care-giving might describe the construction, maintenance and operation of the spaces we design. 'Care-receiving' recognizes that the object of care responds (the patient gets better, the plants grow). This assessment of care response, requires attentiveness, and demonstrates how these phases of caring are always intertwined. Our approach to care must, therefore, consider the care process holistically.

"Caring is by its very nature a challenge to the notion that individuals are entirely autonomous and self-supporting" (Tronto 1993: 134). Recognizing this interdependence - that our fates are linked - forms the basis of resilient design, as Randy Hester noted, "Resilient urbanity has the internal ability to persist, to recover easily



Figure 1: The Brooklyn Naval Cemetery site plan shows a boardwalk framing a pollinator meadow, credit: Nelson Byrd Woltz Landscape Architects

without significant loss from illness, misfortune, attack, natural or social disaster, or other dramatic disturbance. . Resilient form maintains itself efficiently and seamlessly with both the landscape and the cultural networks of which it is a part” (Hester 2006: 139). Maintaining connection to cultural and ecological systems is essential to allow the actions of care to continue.

Many designers are already sensitive to the issues Tronto’s ethic of care raises. The discourse within community-based design practice has highlighted the importance of engagement to determine the true needs of the communities our design will impact. Dan Pitera summarizes this approach, “civic engagement is a crucial component in building relationships and knowledge exchange to move us to a place where communities can face their future” (Pitera 2015: 185). Pitera emphasizes that civic engagement should be an ongoing exchange. Liz Ogbu and Barbara Brown Wilson take this further

noting that “thoughtful understanding of the systemic issues that projects intend to address, along with specific metrics co-created between communities and design partners, can foster cultures of accountability and equitable levels of commitment on all sides” (Wilson 2015). These dialogues inform design processes that engage community concerns in a holistic design process, and address Tronto’s elements of attentiveness, responsibility, and responsiveness.

But how does landscape design address the element of competence, or the acts of care? Care of our designs, as maintenance or aftercare, is rarely part of a design brief, and designers typically assume that aftercare will be carried out carefully and competently. Maintenance is often viewed as a financial constraint not a generative process of landscape creation. These assumptions overlook the opportunities to engage care as a set of generative actions essential to producing landscape forms and as a social practice that draws on the history



Figure 2: The meadow was planted in geometric monoculture blocks, credit: Brooklyn Greenway Initiative

of gardening and cultivation.

Tronto notes, “Care’s absence from our core social and political values reflects many choices our society has made about what to honor” (Tronto 1993: 179). For landscape designers, honoring the importance of care in constructing and maintaining our public spaces means creating designs where the characteristics of care are celebrated. The following examples offer tactics for designers to reveal care: by engaging dynamics of change, by holding up care labor as skilled, or by demonstrating traditions of care through collective actions. Landscapes have a long lifespan. Considering care can allow us to create designs that evolve. The experience of these spaces can contribute to a public understanding of the importance of human stewardship of the environment and of the dynamics of natural systems.

ENGAGING VULNERABILITY AND CHANGE

The Brooklyn Naval Cemetery is an example of a memorial landscape that reveals the constant change in a landscape, as a metaphor for human vulnerability and the cycle of life (figure 1). The site was used for

agriculture, until the 1830s when it became a cemetery for the Brooklyn Naval Hospital. Around 2000 service members and civilian family members were buried there. Though the navy relocated the bodies in 1926, the site is still considered sacred ground and lay fallow. The Brooklyn Greenway Initiative (BGI) proposed the site as a quiet rest stop along the Greenway’s commuter bike route. To honor the lives of those once buried there, Nelson Byrd Woltz Landscape Architects designed a pollinator meadow full of life framed by an elevated boardwalk. Plant species were selected primarily for their habitat qualities for bees, birds, butterflies and moths, with species like echinacea and rudbeckia included as visual cues to help visitors see the beauty of a variety of native flowers (Nassauer 1995).

The process of design engaged issues of health and education alongside ecology and history. The nearby Brooklyn Green School developed science and art curricula using the site as a classroom, to explore issues pollinator habitat loss, invasive species, urban nature, and landscape design. These lessons began as field trips and workshops during design and construction and have continued to evolve to include internships on

gardening and green infrastructure through the Horticultural Society of New York.

Change and regeneration are key themes of the design and stewardship is a critical programmatic component. Over time, cherry trees will form a memorial grove at one end of the park, and the meadow, initially planted in a strict geometry, will self-seed and mix, creating new patterns (figure 2). These changes honor the constancy of change in our world and are palpable for the students and volunteers who continue to use the site as a classroom. Martin Puryear, founder of BGI, noted “The resiliency of the site, the annual renewal each spring, the life activity of insects and birds chasing insects – we believe those experiences will provide metaphors for the possibilities in one’s own life.” The resiliency of the site is dependent on targeted carework. After decades of lying fallow, the site’s non-native invasive plants, such as mugwort and mulberry, need to be monitored and removed for the meadow to succeed. Larry Weaner and Associates designed a maintenance regime that outlines what to look for (as well as the actions to take) for specific times of the year. This detailed aftercare plan is used to train the BGI workers,

volunteers and interns. It provides a narrative and actions that highlight the importance of attentiveness and human action in stewarding a landscape that may appear self-sufficient. As a memorial, the Brooklyn Naval Cemetery demonstrates the constancy of change alongside the interconnectedness of human communities to their environments.

Engaging change and human action in planting design requires that we “value plant form as it is at any time, reveling in the specificity that [a] project has due to a constant state of material uniqueness of plants” (Raxworthy 2011: 19). In order to value these dynamic qualities, landscape designers need to be familiar with them. Landscape courses on planting design could foster a sensitivity to the changes of plants over time, and as a result of human manipulation. David Hill’s Plant Phenology seminar at Auburn University offers a model (Hill 2014). This multi-year research seminar challenges students to observe and document the dynamic seasonal qualities of plants through weekly photographs. The students test their observations by designing and implementing a design that celebrates those seasonal transformations. Through observation and



Figure 3: Over time the meadow will mix through self-seeding as an honor to change and the passing of time, credit: Max Touhey



Figure 4: Big Mud proposed that vacant New Orleans lots become sites for a new industry of cleaning contaminated city soil, credit: DIRT Studio

experimentation students learn the nuances of plant growth in response to human action and site conditions. Similarly, landscape laboratories like SLU's Alnarp West Forest offer students the opportunity to explore planted forms through physical 1:1 installations in an experimental forest (Cowles 2017). Engagement with on-campus learning gardens allows students to put new technical and horticultural knowledge into action, and to experience the role (and design potential) of carework in shaping our environment.

REVALUING CARE LABOR AS SKILLED

Carework is ongoing, but iterative, not just repetitive. The caregiver notices and accounts for changes in context, needs, and response. Gardeners are well aware of this process of gaining relational knowledge. Sven-Ingvar Andersson used his Marnas garden in Sweden to test ideas of pruning and manipulation of plant morphology against his initial plan for the landscape design. As the garden's designer and caretaker, he could take advantage of emergent qualities that arose during the garden's growth. Julian Raxworthy's study of Marnas reveals the opportunities for form generation when landscape designers remain engaged in their projects after installation, and use the observations gained through hands-on care to inform the "cultivation

of experiential or perceptual effects" (Raxworthy 2011: 19). Raxworthy calls for designers to return to the gardening roots of our discipline and to use the experience of observing and manipulating plant growth to enliven design practice. But the Marnas garden also speaks to the importance of an attentive, skilled caretaker, who is consistently observing and responding to changes at the same site.

Recently scholars in science, technology, and architecture have argued that narratives of individual innovators and disruption omit the invisible labor that keeps innovations working and fixes problems. The project, *Who builds your Architecture?*, interrogated the systems of labor within architecture's current globalized and fragmented system, and called for architects to recognize their role in perpetuating inequities within this system (Dixit 2016). This is an issue of equity and often of race: in the United States, the workers who build and maintain our designs are disproportionately minorities, with median wages at or below the poverty line (Bureau of Labor Statistics 2015). Perhaps it is time landscape designers also assess our role in valuing the labor of caring for the public spaces we design and build. Within an ethic of care, Tronto notes, the caretakers are also cared for and valued.

Models of designed entrepreneurship can help to build value around



Figure 5: October Harvest on Shenyang Architectural Campus, credit: Kongjian Yu/ Turenscape

care practices, while addressing environmental justice concerns. In 2009, social artist Mel Chin began Operation Paydirt, which brings together public health experts, scientists and artists to address the lead contamination in New Orleans neighborhoods. Julie Bargman's contributed the design, Big Mud, which proposes a method for addressing lead contamination and the development of specialized, green jobs to clean the contaminated city soil and bring it to market (figure 4). Big Mud explores new economic opportunities that enliven the vacant lots, while addressing contamination and the need for jobs. Within an ethic of care, landscape designers can help others to 'see' the landscape as 'full' of opportunities, resources, and stories, and can redefine the role of design in leveraging existing assets.

CELEBRATING OUR INTERDEPENDENCE

Mierle Ukeles's Manifesto for Maintenance Art 1969 began with the provocation "after the revolution, who's going to pick up the garbage on Monday morning?" Over the last forty years, her maintenance art has revealed the everyday labor of cleaning, repair

and care, often by performing these tasks herself as art. For example, the 1983 performance, Ceremonial Sweep, cleaned the route of the first New York City Art Parade, with executives from sanitation, labor unions, and cultural institutions pushing brooms alongside Ukeles. Ukeles's work reconnects viewers and participants to the human bodies present within the processes of maintenance, but Ukeles notes these performances also critique the language of Process Art and Minimalism for "lifting industrial process and forgetting the whole culture that they come out of. . . They didn't have workers, they didn't have people, they had objects – or they had results" (Ryan 2009). Similarly, landscape design can use events and performance to celebrate the culture and traditions embedded within productive landscapes.

Turenscape's design for the Shenyang Architectural University Campus engages issues of sustainable land use and food production in China, by creating a fully functional rice paddy as the primary landscape feature. Students and faculty learn the rhythm of production first-hand through seasonal rituals of rice planting and harvest (figure 5). The landscape, visually and physically, embeds the

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campus community in dialogue around food production (Turenscape 2005). These events recall lost traditions of shared labor, such as construction and harvest once essential to community livelihoods. Reviving such traditions through ritual creates significant moments that demonstrate our ongoing vital connection to landscape process and the social connections once embedded within them. Care-work is grounded in an understanding of human interdependence. Collective actions that remind communities of our dependence on human care of our environment encourage participants to see their own role within larger systems of care.

CONCLUSION

Landscape design is grounded in the human history of cultivation, construction, gardening and settlement. The ethic of care reminds us that actions that have shaped our world are the very actions of care that maintain it. This care is an ongoing, continuous practice, and our public spaces can be animated by the human care-work that shapes our shared environment. Skilled care-taking can support bold design aspirations across longer time scales and can reveal the beauty in the cycles of plant growth, death and regeneration. Designers can work within an ethic of care by collaborating more closely with landscape maintenance workers and horticulturalists, by educating young designers to explore plant growth and maintenance as design tools, and by creating spaces that celebrate care-taking. It will take more than good landscape design to address the pressing issues of climate change and social inequity, however design can help the public better understand the natural and social systems. Perhaps if our public spaces demonstrate the importance of human care in maintaining our shared environment, citizens will be inspired to contribute to stewardship in their everyday lives.

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Landscape Architecture as a Catalyst for Improving the Quality of Life for Patients in Mental Health Institutions

PECHA KUCHA PAPER

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ABSTRACT

How should one plan outdoor environments that will contribute to the quality of life of patients in mental health institutions? This research question, based on the paradigm of nature as rehabilitative, arose from encounters with outdoor environments in mental health institutions throughout the country. The understanding that spending time in nature or an environment that resembles nature improves humans' health and mental state was prevalent thousands of years ago, but only in 1984 was the first empirical study published proving that exposure to a garden environment has a real effect on physiological parameters (Ulrich, 1984). The current research study is based on a combination of three schools of thought: the healing garden school, the horticultural therapy school and the cognitive school. Within the framework of these three schools, diverse theories have been developed to connect the physical and mental state of humans to the environment, from those that assume the connection is based on 'evolutionary memory', psychological theories that consider the garden to be an inclusive environment, and theories that place importance on physical activities in the garden.

INTRODUCTION

Mentally-ill people must deal with difficulties arising from mental disorders – a general name for a group of disorders that cause disruptions in

thought processes, emotions and communication, and make it difficult for sufferers to deal with routine life situations.

How can outdoor environments be designed to ensure they contribute to the quality of life of patients in mental health institutions? The present study explores this question, which is based on the notion of nature as rehabilitative, in light of encounters with outdoor environments in mental health institutions throughout Israel. These encounters left the author with a harsh impression of deficient planning vision and an understanding that a well-planned outdoor environment can improve the quality of life of the mentally ill patients in these institutions.

RESEARCH METHOD

This research study is based on the Research by Design (Deming & Swaffield, 2011) method in which planning is an essential stage in the research process, as described below (Table 1).

In order to plan an outdoor environment that will contribute to the quality of life of the patients in a mental health institution, one must study their life under hospitalization. Toward this end, the author reviewed both research literature as well as theoretical and historical literature (Figure 1), conducted interviews and discussions with the target audience – mental health workers, patients and their families – and conducted observations, planned a case study and had it evaluated by experts. Three roundtable discussions were held at Maale Hacarmel Hospital with three groups of stakeholders. Based on all of these, ways are proposed to bring nature into outdoor environments in mental health institutions and to strengthen the connection to nature.

THE EFFECT OF THE ENVIRONMENT ON THE MENTAL AND PHYSICAL STATE OF THE PATIENT

A person's natural attraction to nature, particularly during times of sickness and stress, is explained by different theories that connect his physical and mental state to the environment. Some theories explain this connection on the basis of evolutionary memory, some via psychological theories that consider the garden environment to be inclusive, while others assign importance to actual physical activity in the garden (Ulrich, 1984). Three schools of thought try to answer the question: the healing garden school of thought, the horticultural therapy school of thought and the cognitive school of thought. All three consider the influence of the environment on human health in general and do not focus necessarily on the mentally ill; they differ in the way they perceive the involvement of humans in the environment.

Healing Garden school of thought

This school of thought assigns importance to the experience of spending time in the garden space, while considering garden design and components, and the ability of this environment to be healing, stemming from its capacity to reduce stress and rehabilitate (Cooper-Marcus & Barnes 1995). It proposes a few theories that describe how the environment influences a patient's physical and mental state: The Biophilia Theory – "biophilia, if it exists, and I believe that it does exist, is the congenital emotional connection between man and the animal world" (Kellert & Wilson, 1995); the Stress Reduction Theory – the garden environment is known to relieve feelings of stress in both patients and the attending staff and to encourage a feeling of control, social support, an opportunity for movement and activity,

and leisure in a natural environment; the Inclusion Theory – the garden provides an environment that considers the capabilities of a patient in a state of despair or poor state of mind; the Relaxation Response Theory – certain diseases become more severe when a patient is in a state of pressure or stress (Carpman & Grant, 1986).

Horticultural Therapy school of thought

This school of thought assumes that physical work in the garden is safe, enjoyable and provides meaning. A working person feels compensated, particularly when there is harmony and a good match between the challenge facing him and his abilities (Simon & Straus, 1998). Work in the garden creates a feeling of physical and mental well-being, commitment, and disregard for time and identity. It has been proven that there is a human response to plants – *phyto-resonance* (Neuberger, 2007) (phyto=plant-related). Plants are very similar to humans and reflect processes taking place in humans.

Cognitive school of thought

This school of thought developed among researchers in environmental psychology, landscape architecture, medicine and horticultural therapy. According to the cognitive school of thought, a garden or wild nature provide the patient with shapes, colors, smells and activities that remind him of his active life, particularly the periods of childhood and youth, which are usually connected to these stimuli. These experiences strengthen the patient's feeling of self-identity and his self-concept as part of a meaningful world (Garlach-Spriggs et al., 1998). This school of thought includes the Attention Restoration Theory, which claims that the human brain has been endowed with two types of attention: spontaneous attention that is unconscious, does not require classification or filtering, and thus is not

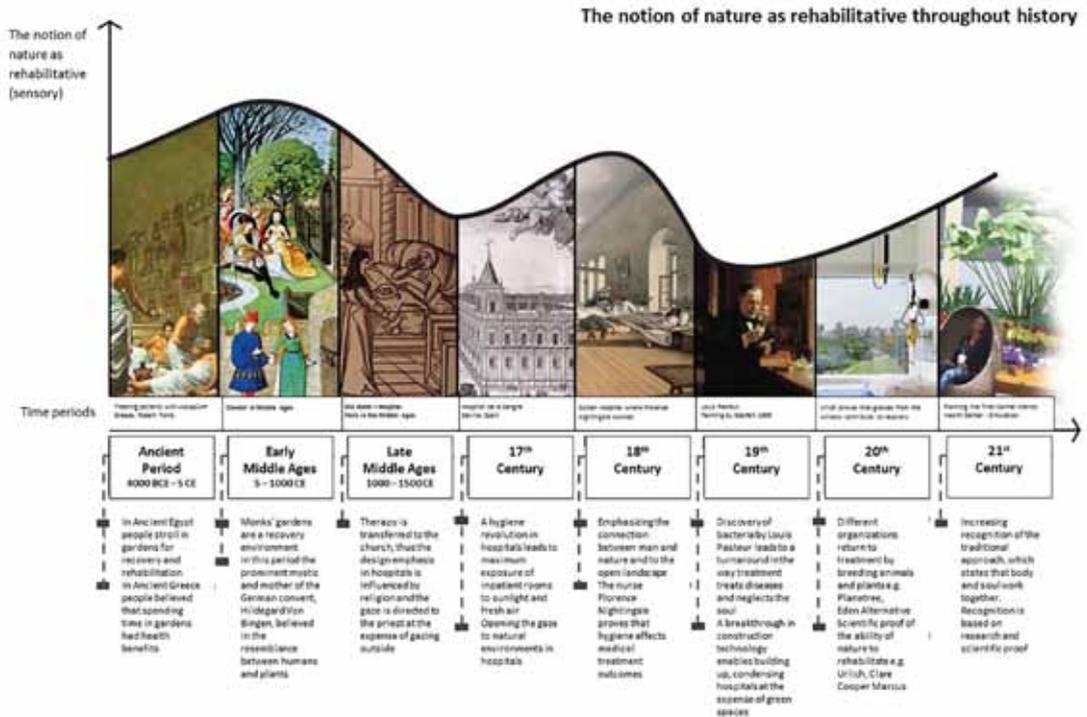


Figure 1: The notion of nature as rehabilitative throughout history

ting, and attention that requires direct concentration (Kaplan & Kaplan, 1989).

ENCOUNTERS IN THE OUT DOOR ENVIRONMENT

The round table discussions held at Maale Hacarmel Hospital with three groups of stakeholders – mentally ill inpatients, attending staff, and family members – produced interesting results that reveal their needs. It appears that patients sometimes prefer to be alone, and other times to spend time in a group, according to their mood. In a group they prefer to meet up in accessible places, near the ward, with comfortable furniture. The choice of sitting in a group may be planned or spontaneous when there is a gathering in a meeting place. Their preferred places to spend time alone are diverse. In general, they prefer to be alone in places where nature is present, far from buildings, meeting places and primary movement routes.

Families prefer to conduct their meetings outside the building, in a place that offers privacy, and a feeling of security, without interactions with other families. The meeting place should be shady on hot days and protected on rainy days, with comfortable furniture and a pleasant, respectful atmosphere.

Staff members themselves also need places to spend time in the outdoor environment, away from their patients (and possibly also from other staff members), in order to refresh themselves and replenish their energy during their work day.

CONVERTING THE FINDINGS TO PLANNING INSIGHTS

Insights were reached by combining and analyzing the elements of the process over two years of research in Maale Hacarmel hospital, which included: personal interviews with all stakeholders, family members and patients in hospitalization;



Figure 2: Hospital master plan



Figure 3: Ward 6A main entrance & courtyard

close observation by three researchers at different times of day; and three roundtable sessions. The roundtable sessions included medical and administrative staff of the ward and hospital, patients' family members, and, most importantly, the patients themselves.

The functional level

Creating order and boundaries: Some patients tend to lose track of time, thus the seasons of the year and hours of the day must be emphasized using vegetation and inanimate objects.

Personal security: The hospital environment of the mentally ill necessitates caution when planning for



Figure 4: Ward 6A Courtyard View of patients' gathering area

safety issues. It is necessary to create spaces bordered by vegetation, use soft materials, and avoid harmful vegetation.

Comfort and accessibility: The arrangement of hospital spaces and activity areas on different levels harms the quality of treatment and negatively affects the patients' condition. Operating on one level has a significant and positive effect. Similarly, accessibility to all hospital spaces and activity areas must be ensured.

Movement: Patients tend to stay near the ward due to fatigue, weakness, a lack of self-confidence and indifference. Therefore, their confidence must be strengthened by a system of paths: a hierarchy and clear identity must be defined for different movement routes; movement routes must never lead to a dead end; the main route must be wide and clearly visible.

Maintenance and service buildings: Maintenance buildings may be used by patients as part of their occupational therapy, on condition that the work environment is hygienic and safe. Therefore, maintenance buildings must be accessible to patients and well-designed.

Therapeutic level

Strengthening the feeling of closeness to nature: Exposure to the natural environment must be provided in leisure areas within the buildings, in terms of both gazing at nature and accessibility. Nature must be brought

into the outdoor environment in a range of ways (distance landscape, close vegetation).

Encouraging a feeling of vitality and a connection to reality: The cognitive school of thought attaches high rehabilitative value to encouraging a feeling of vitality and connection to reality. For employment, it is very important to dissipate the atmosphere of boredom, reduce levels of smoking, rehabilitate patients, prepare them for their return to community life and improve the institution's reputation. Due to the patients' tendency to stay close to the ward and to lose track of time, the outdoor environment must offer a range of places and means that encourage and allow employment, in both central, exposed places and at different distances from the ward, in order to encourage movement and a feeling of being busy. Seasons of the year and hours of the day should be emphasized using vegetation and inanimate objects.

Strengthening personal identity and self-confidence: Both the horticultural therapy and cognitive schools of thought consider strengthening of self-confidence to be an important component of the rehabilitative process. Losing personal identity is part of the unbalanced state in which the mentally-ill patient finds himself. Clarifying personal identity is part of the treatment process. Both patients and staff members place great importance on personal space and



Figure 5: Ward 6 Patio General plan

a feeling of personal identity in the hospital. The outdoor environment must offer a range of places and means that encourage and allow different types of employment, including horticultural therapy. Places and means must be provided for self-expression, including spatial creation such as graffiti, corners for displaying patients' creations, temporary exhibitions, etc.

Diversity: The need for diversity in the outdoor environment arose from both the theoretical background and public discussions. Visual and functional diversity is critical for encouraging a feeling of vitality and a connection to reality. According to the relaxation response theory, functional diversity encourages rehabilitation by strengthening the ability for personal choice and control. According to the cognitive school of thought, sensory diversity encourages rehabilitation by honing the senses and cognitive abilities. The outdoor environment needs to offer a range of places and means that encourage and allow

different types of employment. A design balance should be maintained between diversity and uniformity, for example, by maintaining a common denominator among different elements and by avoiding excess amounts of materials, shapes and colors. Diversity must be expressed mainly by distinct design of each different area and movement route, such that the choice itself will be meaningful. Intelligent use should be made of color; there is a need to soften 'freedom' and the multiple stimuli offered by the outdoor environment by deterministic design and by creating an outdoor environment with order and boundaries.

Creating a place for assistance and diagnosis: Although this issue is not connected directly to the theoretical background, proven experience has been reported in the literature (Cooper Marcus, 2007). Within the framework of the public discussion, staff members reinforced the claim that the outdoor environment may be used as a diagnosis space by



Figure 6: Ward 6A Patio Cross-section

observing patients' behavior in different challenging environments, as is done from time to time in the dining room or as part of occupational therapy. It is reasonable to assume that the outdoor environment may be used as a diagnostic environment since it invites social gatherings and environments that simulate reality. The outdoor environment needs to offer a range of places and means that encourage social gatherings and experiences at different coping levels.

Providing solutions for different clinical needs: Patients prefer to be alone in places where nature is present, far from buildings, meeting places and main movement routes. According to the cognitive school, a garden environment helps patients to overcome different cognitive deficiencies by honing the senses and offering diverse activities that improve cognitive abilities.

A feeling of protection and security: It is difficult to prevent suicide

attempts. The term 'security' in the context of the patients' feelings includes providing solutions, treatment and protection from fears associated with the disease, such as suicidal thoughts, paranoia and conflicts related to daily coping with reality. Closeness to the ward gives patients a feeling of homeliness, which is identified with feeling secure. The feeling of homeliness is important for creating a feeling of security and comfort; however, it must be spatially and quantitatively limited. A feeling of homeliness should be provided on a gradation with distance, from the intimate environment of the bed, through the patient's room, the lobby, and the ward's courtyard, to the entire hospital environment. To provide a feeling of homeliness it is necessary to use spaces with boundaries, comfortable, homely furniture, flowering vegetation, beneficial plants and soft materials.

Preparation for returning to



Figure 7: Ward 6 Patio Therapeutic work post with green wall and view to Mt. Carmel

the community: The main purpose of hospitalization is rehabilitation, i.e., preparation for community life. The outdoor environment should offer a range of places and means that encourage social meetings and experiences at different coping levels. In sanatoriums of the 1950s-1970s lawns played an important role as meeting areas that combine spending time in group conversation with exposure to the sun, fresh air and natural landscape.

Meetings with family members: Family visits provide satisfaction to both patients and staff members. Therefore, appropriate meeting places for small groups of two to four people should be created near the ward, distanced or separated from each other to allow privacy, and some should be protected from the rain.

Meetings between patients and staff members in the outdoor environment: Maintaining privacy is a necessary condition for the likelihood of meetings between patients and staff members. These meeting places should be bounded and isolated from background noise. Some of them need to be suitable for group therapy while others for one-on-one conversations.

A few one-on-one meeting places should be planned as 'way stations' along walking trails and should include the presence of nature. The close landscape is more meaningful for treatment in comparison to the distant landscape.

METHODOLOGICAL APPROACH

Maale Hacarmel in Tirat Hacarmel is a government-run psychiatric hospital affiliated with the Faculty of Medicine at the Technion. It provides treatment for a range of mental disorders to youth, adults and the elderly.

One of the central guiding principles in writing the master plan (Figure 2) for Maale Hacarmel Hospital is *emphasizing the presence of nature*; this principle generates and facilitates other important principles, such as creating a range of leisure spaces for different needs and communities, activity and strolling in the outdoor environment. The aim of planning is to correct the current situation in which the magnificent nature surrounding the location is hardly noticed, and to strengthen the feeling of closeness to



Figure 8: Ward 6 Patio View of range of sitting areas

the sea and to Mt. Carmel (Figure 7).

Therefore, the plan for the Ward 6A courtyard (Figure 3, Figure 4) implements the principle of expanding the view to Mt. Carmel by removing the concrete shelters along the nearby main walking route, as well as setting up a new movement route from west to east that ascends the stairs and turns one's gaze toward the mountain. The plan creates a separate bordered space for staff members, and two distinctly different spaces for patients that allow choice. The first space, in the lower courtyard, is designed with soft lines and offers a wide, accessible wooden space with a range of sitting corners, deciduous trees that mark the seasons, and an artificial watercourse that culminates in an ecological pond. The second space, in the upper courtyard, designed with clear geometric lines, offers a *bustan* (agricultural garden) rich in aromatic and beneficial plants that allows horticultural therapy, and provides an intimate sitting corner. The plan creates diverse leisure and activity spaces, significantly increases the amount of vegetation, integrates water elements, and provides a stage for patients' creativity, including niches

sunken into the wall that supports the stairs. A narrow, meandering circular path made from small pebbles allows meditative walking, barefoot, throughout the courtyard (Figure 4).

CONCLUSIONS

It is necessary and possible to bring about change.

This study has proposed tools for examining and planning outdoor environments for psychiatric hospitals, so that they can help patients reach the most stable mental state possible, and prepare them for integration into community life. Landscape architecture is not a replacement for medical treatment, but can certainly be a catalyst for improving the quality of life of mentally ill patients.

The other central guiding principles included a range of planning tools for encouraging a feeling of vitality and connection to reality, including: encouraging a feeling of vitality and a connection to reality and strengthening the relationship with the community and the city; encouraging regular daily activities, strengthening spatial orientation (Figure 3) and creating a feeling of ownership and belonging (Figure 4).

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TABLES

Table 1.
Stages in the research methodology

Description of stage	Sources of information	Work method	Product
<p>1. Theoretical background:</p> <ul style="list-style-type: none"> - the history of planning outdoor areas in recovery environments - review of theories that explain the connection between the environment and physical and mental health 	Research literature	Comprehensive literature review	Summary
<p>2. Public participation:</p> <ul style="list-style-type: none"> - initial familiarization - public participation with staff members, patients and family members 	<p>Interviews with:</p> <p>8 staff members¹</p> <p>A round table with:</p> <p>10 staff members</p> <p>5 patients</p> <p>5 family members</p>	<p>A round table discussion:</p> <ul style="list-style-type: none"> - documentation by filming and transcription <p>Formulating insights classified in a table according to the subjects that arose</p>	Planning guidelines
<p>3. Observations:</p>	Behavioral observations of patients, visitors and staff members in defined outdoor areas at Maale Hacarmel	In three selected observation areas. Each observation is divided into a morning observation and an evening observation on two separate days	Written formulation of insights
4. Initial planning principles document	Based on all the insights		A written document
5. Case study planning	Master plan and detailed plan for the patio and entrance to Ward 6A based on the initial planning principles document	Planning	A 1:1000 scale plan, a 1:250 plan of a selected section, 1:250 and 1:100 scale cross-sections, typical details at various scales, simulations
6. Planning assessment and evaluation	Architectural experts and representatives of the Maale Hacarmel staff (total of 10 participants)	Presenting the planning products, discussion and completion of evaluation questionnaires	Feedback pages
7. Creating a planning tool for a designated planning principles document	Updating the original document based on the planning evaluation		Written document

Body Conflict: Tools for Visualizing the Complexity of Sensory Space

PECHA KUCHA PAPER

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Microclimate, phenomena, sensory spatial perception, measurement and survey

ABSTRACT

The purpose of this presentation is to briefly discuss the role sensory phenomena play in defining landscape space, and to present tools and methods that have been created to measure and visualize the spatial dimensions of the sensory environment. Specifically, this paper will discuss the impact that using weather instruments and site survey techniques can have on an observer's ability to notice microclimatic transitions in space.

SENSORY PERCEPTION AND LANDSCAPE SPACE

Climatic phenomena interact with physical forms in the environment and create volumes of space that are dynamic, and that influence human and non-human ecologies. Elements such as light, wind, and humidity move around solid objects and forms and create pockets of space that are defined by gradual changes in the air and on material surfaces, and that envelop our bodies as we move through space. These pockets of microclimatic space are fluid and connective; they create intangible volumes that are associated with the solid frame, but project beyond it, and move and shift as vectors of the animate environment. Within landscape architecture, this dynamic between environmental phenomena and form shapes the spaces we design, and yet it is often treated as an ambiguous or ineffable spatial quality. Recent

research practices have begun to incorporate environmental data sets--gathered through the use of sensors and responsive technologies'---to map invisible flows and systems in the environment. This data can be useful in isolating environmental phenomena that usually form complex, multi-sensory spatial experiences². However, visualizations of environmental data are often closely tied to the method of collection and nature of the data to represent space, and the results are often more technological than sensuous³.

The body plays a key role in even recognizing the spatiality of climatic elements, and we may need tools that allow for both human and instrumental observation so that the sensory aspects of spatial comprehension can be teased out of data and represented. Juhani Pallasmaa has written extensively on the role of the body in recognizing the sensory dimension of architecture and space. As he states 'we behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organized and articulated around the centre of the body...we are in constant dialogue and interaction with the environment'⁴. It may be then that the key to unpacking and translating the sensory environment resides in this dialogue between the body and the environment; that we need to look to more closely relate the body to environmental data *in-situ*, as it is collected, and that the visualization of the data should be able to invoke a visceral response.

BODY-INSTRUMENT METHODS

This research is situated between the complexity of the human interaction with the environment, and the potential of technology to tease out the gradients and envelopes of atmospheric space that we sense but cannot see, much less visualize. The focus here will



Figure 1. Phenomenal Transitions at Piazza della Rotonda. Photographic manipulations of Piazza della Rotonda convey the sensory edges that move across the square during the day. In the montage, masses of people can be seen aggregating within phenomenal edges as much as they do the architectural boundaries of space.

be on survey methods that facilitate a dialogue between the body and real-time microclimatic data readings, in order to elucidate spatiotemporal and sensory experiences as they happen. These methods were used on 2 sites: Piazza della Rotonda in Rome, and the Tillinghast Farm in Barrington Rhode Island. Piazza della Rotonda is in the historic core of Rome, surrounded by narrow streets that feed into an open piazza that faces the Pantheon. When traversing across the piazza and into the Pantheon, it is typical to cross a number of microclimatic changes as you move from the dense and narrow streets into the open square, across volumes of shade projected from the Pantheon, across bright areas that radiate heat off stone and concrete, and into the cool, dark cavern of the domed building. The second site, the Tillinghast Farm, is a coastal landscape in southern Rhode Island, which transitions from an upland farm to a woodland, marsh, and beach, within the short distance of 500 meters. Walking a transect from the northern high ground down to the beach brings one through a series of microclimatic shifts that correspond to changes in vegetation, aspect, topographic form, elevation, humidity, and coastal exposure. This second site was primary studied by students in an introductory graduate studio.



Figure 2. Wind Pockets at the Tillinghast Farm Upland . This drawing by MLA student Cornelia Overton was created as an overlay to multiple wind and temperature data measurements taken at the Tillinghast Farm summit during the fall. The drawing incorporates readings over multiple time points as wind levels fluctuated periodically. Solid structures are not shown, though they are implied in the shift in phenomenal thickness.

The survey methods used at both sites are based in incremental and linear data collection (along a path or transect) with hand-held weather instruments, all of which interface through an app with a phone to deliver real-time data readings such as temperature, wind speed, wind direction, barometric pressure, humidity, etc. In each of the sites used, data was recorded digitally and manually, so that as microclimatic shifts were felt and measured, the observer was in constant dialogue with the instruments and the surroundings.

What the Body Notices

Through these studies it became clear that the body and the instruments had differing levels of sensitivity to changes in the environment. The body was particularly good at remaining stable and acclimating to small, incremental changes in the atmosphere. For this reason, fine gradients in the attenuation of light, temperature, humidity, can be difficult to pick up, particularly if the observer was not paying attention. Instead, the body tended more to quickly sense contrast: the difference between adjacent conditions, or sudden changes in a place. As the body moved through



Figure 3. Projected Shade and Wind Buffer at the Tillinghast Farm Upland. This drawing by MLA student Momo Kong depicts the phenomenal effects of a sculptural landform placed along a ridge line in the upland area of the farm. The landform creates both pockets of shade and windbreak during the summer months.

space, it was particularly good at sensing sensory edges: the boundary of a volume of shade where sudden changes in light as it hits your eye and skin, where temperature may change by a few degrees, and where an impression of interiority/exteriority begins.

What the Instrument Notices, and What This Tells the Body

The range of weather and sensory instruments used were more sensitive to incremental shifts, and able to measure and record gradual changes in the environment (temperature, for instance could be measured with changes to the tenth of a degree). However, the sensitivity of these instruments created two distinct differences in behavior from the body: for one, they were slower to respond to sudden changes, and two, they would often over-respond to climatic changes before they would

calibrate and deliver an accurate, stable reading. These differences in behavior created a dialogue between the body (the observer) and the instruments that allowed the observer to make more frequent and more sensitive observations by comparing what *the body felt* to what *the instrument displayed*. Data collection was in this way subjective: the observer had to decide if significant climatic transitions were occurring, if the instrument was reflecting accurate data or needed more time to acclimate, or if the observer herself was not noticing something in the atmosphere that the instrument was able to measure. Additionally, this dialogue with the instrument allowed the observer to identify which climatic elements (or which combination of elements) were defining a spatial volume. For instance, in moments when the weather instrument would not show the large fluctuations in temperature that the observer's body experienced, it became clear that a combination of factors (air temperature and wind, or radiant surfaces and direct sunlight) was causing the body to feel cooler or warmer than the instrument. In these circumstances, the body-instrument dialogue allowed the observer to begin to decipher their multi-sensory experience.

Data-Observation Translations

The human reaction to in-situ data output was embedded in these method of data collection, and as a result the surveys were related to the corporeal, the perceptual, or embodied feeling of space, and the recorded observations and spatial memories were deeper, more detailed, and more attuned to the dynamics of the phenomenal environment. The realization of contrast or agreement between the observer and instrument became the primary point of recognition of the form, gradients, and bodily influences of sensory space.

These environmental-sensory readings became the basis for a

series of drawing translations of the two sites that explored the *physical dimensions* of microclimatic volumes in the landscape (Figures 1-3). These drawings begin to convey the comprehension of an atmosphere that has thickness, boundary, gradient, and volume. These drawings also negotiate between impressions of the visceral and the recognizably spatial. While the experiments in visualization after body-instrument data collection need further study, the potential of using these surveys to create a deeper awareness of the sensory environment has begun to emerge from the drawings. As this research moves forward, it will continue to explore how body-instrument methods and data translations can help designers shape both the phenomenal and physical environment.

NOTES

(Endnotes)

- 1 For examples, see recent publications (2016). *LA+ Interdisciplinary Journal of Landscape Architecture: Simulation*. and Cantrell, B. & Holzman, J. (2017). *Responsive Landscapes*. New York, Routledge.
- 2 For a discussion of the difficulty diagramming the experiential and 'multi-sensate' aspects of landscape space, see: Bowring, J. & Swaffield, S. (2012) Diagrams in Landscape Architecture. In: *The Diagrams of Architecture*. London, Wiley.
- 3 Elizabeth Meyer discusses the role of sensuous experience in connecting humans to the environment in: Meyer, E.K. (2008) Sustaining beauty. The performance of appearance. *Journal of Landscape Architecture*. [Online] 3 (1), 6–23.
- 4 Juhani, P. (2014) *The eyes of the skin: architecture and the senses*. Chichester, Wiley, 69.

Accessible Nature Experience: Inclusive Design Fostered by Conflicts in Semi-Natural Landscapes

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ABSTRACT

Semi-natural landscapes, modified by human influence, but characterized mainly by natural features are of cultural and natural value. Access to these landscapes benefits people through experiencing nature, but the balance between ecological and social needs is very fragile: human disturbance can cause the loss of biodiversity, and degraded areas are not so inviting any more. Moreover, it is challenging task to provide equal access to important ecological areas where nature conservation is a priority, as the physical obstacles could be the natural features themselves. And, as the ecological and the human-experienced naturalness are crucial for every agent concerned, the principle of minimal intervention is often applied - but from the designers' side it can be used as a mask against the very visible technical solutions of inclusive design, resulting in social exclusion. We assume that there is a fine border between conflict and symbiosis concerning natural and conscious creation, biodiversity and human presence, naturalness and design, visible and gentle technical solutions, disability and ability. Via critically evaluating literature and classifying related design guidelines supported with examples, our aim is to provide inspiration and develop a strong basis for universal landscape design that is also capable to fulfil landscape protection's interests.

INTRODUCTION

In this paper universal landscape design's principles for semi-natural landscapes will be examined. Semi-natural landscapes as important ecological areas are characterized by near-natural conditions, which means „the conditions of habitats, landscapes and communities whose evolution has been slightly influenced by human (creating conditions similar to natural ones), but the processes that take place in them are mostly self-preserving and they are able to survive without direct human manipulation” (Act LIII 1996: Article 4d).

In significant ecological areas ecosystem preservation, maintaining and rehabilitation are priorities. At the same time in those parts where protection is not so strict and therefore public human activities can be included another important objective is to promote the understanding and enjoyment of the qualities of the natural areas, which are place for education and recreational outdoor activities, too (Act LIII 1996). Demonstration of natural values has ecological purpose via enhancing environmental awareness. In order to be able to protect, research and demonstrate significant ecological sites, possibilities for access to the areas and to relevant information must be provided.

Important ecological areas can contact individuals with nature, which plays a basic role in people's mental and physical health and well-being. As the European Landscape Convention puts it: “the landscape contributes to the formation of local cultures and that it is a basic component of the European natural and cultural heritage, contributing to human well-being and consolidation of the European identity” (ELC 2000). Besides the physical benefits accessing natural sites can contribute to a more complete experience of nature and space and make positive effect on the quality of

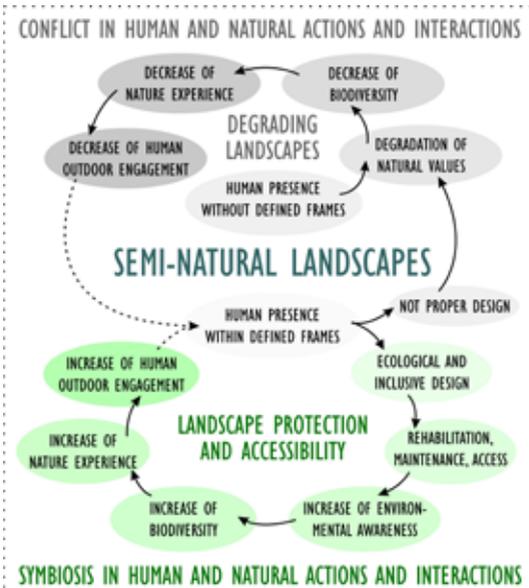


Figure 1: Human and natural connections and interactions in semi-natural landscapes

people's life (Lundell 2005, Maller et al. 2005, Ottoson 2007, Ward Thompson and Travlou 2007, Ward Thompson et al. 2010). The level of biodiversity – and important ecological areas usually are of a high biodiversity - influences the level of use in green areas: the more biodiverse the site is, the more physical outdoor activities will be encouraged (Bird 2004). So the higher the biodiversity and naturalness is, the more visitors are invited to be active in the “wilderness”. A good balance between allowing people to enjoy contact with nature and conserving and maintaining sensitive ecosystems excluding recreational activities can contribute to sustaining the natural environment benefitting all ecological communities.

METHODOLOGY AND OBJECTIVES

We have been researching accessibility issues for several years, reviewing literature, developing design guidelines for universal landscape design and doing site-visits and analysis. We have been in continuous consultation with disability organizations and professionals in the related fields.

In our research, we have classified and critically evaluated the design principles concerning semi-natural landscapes, supported our findings with the international examples from our 56 site-visits in six European countries, and investigated their applicability in our design practice.

Our objectives were to classify design guidelines concerning semi-natural landscapes, and through their evaluation developing the technical and theoretical basis for universal landscape architecture in order to be able to provide access for disabled people who can get a more complete travelling, participation and nature experience. We aim to show how our findings could be used in our design practice, and we also would like to invite designers to explore whether and how the different and often disparate needs and intentions concerning semi-natural landscapes can be harmonized, manifesting in an accessible and ecologically sensitive landscape design.

Our findings are shown in Table 1, where universal design's principles sorted into six chapters are evaluated by 5 criteria showed with colour codes. The criteria show the result of applying the certain principle, and are arranged in five columns. If the certain criterion is supported by the principle given in the certain row, colour codes shown in the key table near the five criteria are used. If the principle is neutral concerning the certain criterion, the cell remains unfilled. And in case the principle may raise potential threatening factors to be avoided, the colour code is light red. The supporting colour coding (which occurs the most frequently) uses different colours for each criterion in order to make the table more legible.

RESULTS

Access, experience and preserve

According to Hungarian act on Nature Conservation „in the areas suitable for visiting and in compliance



Picture 1: Trails made of wood preserve the sensitive soil and flora. By adapting these constructions to accessibility requirements (wider tracks, meeting points) on the routes of moderate different in level the forest can be visited by a broader range of individuals. The construction of the wooden trail allows animals to go through. (Skuleskogen National Park, Sweden)

with the interests of conservation, the possibility of visiting protected natural areas shall be ensured, as a part of information propagation, education, scientific research and tourism. To this end the Directorate shall maintain



Picture 2: Tracks with different level of challenge and marked wheelchair-route. (Råshult, Sweden)

educational and demonstrational facilities.” (act LIII 1996: 64.§ 2.) At the same time, the planning and design

of national parks and protected or ecologically sensitive areas is a rather challenging task due to the terrain conditions, hydrological characteristics, vegetation and special features, which in many cases cannot be altered.

It must also be considered if the restriction or absence of access to a natural or semi-natural site is really originated from ecological interest or more from the concept of nature as organic space excluding social (cultural) context (Mels 2002). Planning and management of natural areas should not treat every site as empty space of pure ecosystems and/or optical space of unmediated naturalness, but rather should support the social mediation of the natural (Mels 2002) in order to be able to sustain ecosystems and to provide access to the experience of nature at the same time.

Minimal disturbing when opening up access to the natural environment therefore is essential not only because of ecological aspects, but also because of preserving the potential for an enjoyable nature experience. Some built facilities and equipment might be needed, but powerful natural processes are able to domesticate and naturalize artificial objects, features and facilities if design is careful, adequate and understands the main aspects regarding the natural environment (Kecskés 2012:46). (Figure 1)

Inclusive and ecological design principles and solutions

In this chapter design guidelines concerning the natural environment (Parks Canada 1994, Lundell 2005, AWARD 2009) will be analysed and assessed. While dealing with important ecological areas, it is fundamental to preserve (or recover damaged) ecosystems during the whole process. Using the tools of a careful and adequate spatial design the visitors' experience of landscape (nature and space) can be supported by promoting the impression of being in the



Picture 3: The contrast of the local materials and the vegetation helps the orientation, and at the same time fits in the landscape using local and natural materials. (Skrylle Nature Reserve, Stockholm, Sweden)



Picture 5: Wheelchair-accessible wooden construction with meeting points. Furniture is outside the track. (Söderåsen National Park, Sweden)



Picture 4: Curbs are necessary where the original ground is not accessible (sandy seaside) (but can also be obstacles if the ground surface can be adapted to accessibility requirements) (Umeå, Sweden)

wilderness. For the same reason, when building in natural areas or adapting objects and features to the needs of people with disabilities, a good balance between built and natural elements must be reached (Lundell 2005). As we have noted, modifying natural elements and features is not always possible, and therefore info-communication accessibility is of high importance concerning the natural environment: add information in different ways to complete or replace physical (natural or built) objects or facilities which must not be adapted.

In Table 1, universal landscape design's principles for semi-natural landscapes are characterized by the main results of their application. In the table potential threatening factors to be

avoided are also shown. Our starting point is that the interests of nature and landscape protection are taken into consideration, and the possibly greater access is provided to a certain site. It can be observed that out of 42 technical solutions, 38 (90,5%) serve the aim of human access, and 4 (9,5%) are applied for ecologic interest at the first place. From 38 guidelines providing access, 14 (36,8%) support naturalness and nature experience, 10 (26,3%) can endanger it, and only one has the potential to threaten disabled access. Among the 42 items in all, 16 (38,1%) make maintenance even easier and sustainable, and 17 (40,5%) contribute directly to nature conservational interests. The 11+6 design tools shown under Materials and Information support nature conservation and/or maintenance directly by 9 (81,8%) and 5 (83,3%) solutions. 100% of the potentially threatening factors occur in the case of physical construction in the semi-natural environment, namely in categories Materials, Trails, Approaching and parking and Rest areas and outdoor recreation facilities.

Evaluating these findings it can be concluded, that more than one third of the solutions can support naturalness and natural atmosphere, which is basic to humans' nature experience. At the same time, a quarter of these solutions must be applied very carefully



Picture 6: Using terrain conditions carefully can make it possible to create watching and outlook points for visitors using wheelchair. (Gullåkra, Sweden)

to be able to avoid the decrease of naturalness. The generality (97,4%) of guidelines providing general access can enhance equal access also for visitors living with disabilities. It also can be stated, that a proper, ecologically sensitive, sustainable and inclusive design can even directly support nature conservation and maintenance, and do not lead to the degradation of the sites. The most effective toolkits for inclusive design while supporting nature conservation and maintenance are the careful choose of materials, and providing proper info-communication, which in addition requires minimal interventions in the physical environment. Design tools working with spatial arrangement and information do not endanger the manifestation of any results, moreover, they support protection interests while providing access and nature experience at the same time, so it can be summarized that while designing semi-natural landscapes, the focus should be on the proper spatial organization and on the clear, legible and integrated information system, using digital technologies.

CONCLUSION

Studying and understanding ecosystems is of scientific and educational interest. At the same time on-site surveys and observations

are two of the most effective tools of information propagation and education. Moreover the tourism and outdoor recreational destinations shall be accessible for everyone in important ecological areas as well. The landscape and open space design tools offer many possibilities to create natural or nature-close technical solutions without damaging the high ecological values of the areas, offering access for a wider range of visitors. Applying universal design principles to natural sites is not always possible, so the understanding and the use of the principles and tools of other professions is also of great importance in order to be able to provide access on alternative ways. The principle of the minimal intervention during the design process – fitting the objectives in the landscape, using adequate constructions and materials – assure the accessibility and the presentation of those important ecological areas and through this the opportunity to have an enjoyable nature experience.

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TABLES

Table 1: Assessment of universal landscape design's principles for semi-natural landscapes

KEY TABLE: RESULT OF APPLYING THE PRINCIPLE	RESULT			
1 Providing general access, guiding visitors	■			
2 Providing access for people with disabilities		■		
3 Supporting naturalness and nature experience			■	
4 Supporting nature conservation				■
5 Supporting maintaining and storm-water management				■
SUPPORTING: The principle supports the certain criterion	■	■	■	■
NEUTRAL: The principle is neutral regarding the certain criterion				
THREATENING: The principle may raise potential threatening factors to be avoided	■	■	■	■

UNIVERSAL LANDSCAPE DESIGN'S PRINCIPLES FOR SEMI-NATURAL LANDSCAPES	RESULT	PICTURE
Materials		
Use materials which preferably can be found on the certain location (e.g. stone, wood, soil)		3
Use materials for ground surfaces which fulfil the function of the route		1,3,4,5,6
Use concrete or asphalt for motorized traffic and in the need of stable and even surface		6
Consider the use of concrete or stone pavers near buildings		
Consider the use of rubber pavements in the need of accessibility and shock-absorption		
Use stabilized crushed aggregate screening, gravel or soil from local materials where possible		3
Use wood decking when the original surface must be protected (e.g. sensitive soil, water)		1,5,
Design good and stabile foundation and proper storm-water management		1,2,3,4,5,6
Consider the use of non-stabilized, natural ground surfaces on alternative loops of high challenge		3
Use colours and forms which fit to the certain location and function		1,2,3,4,5,6
Replant seedlings from the original plants		
Trails		
Design accessible ground surfaces firm, stable, level and slip-resistant		1,3,4,5,6
Consider using contrast in colour, light and texture to separate the trail clearly from its environment, but mind the atmosphere of naturalness		3
Provide tracks less wide than 140 cm with meeting points after every 50-30 meters		1
Consider using curbs to help orientation, but avoid curbs where they make obstacles		4
Approaching and parking		
Place accessible parking places for cars, vans and buses at the entrance of destination sites		
Provide accessible parking place for people using wheelchair		
Provide access preferable also by public transport, and design stops accessible		
Provide access to the accessible destinations from the stops and the accessible parking place		
Rest areas and outdoor recreation facilities		
Place rest areas along accessible design routes after every 25-30m, or even denser on slopes		3,5,6
Preferably place rest areas on the ground level of the adjoining trail, but outside the track		1,5,6
Design outdoor recreation facilities to be accessible also for disabled visitors		3,4,5,6
Take advantage of the terrain conditions when designing outlook or watching points		6
Provide wheelchair-accessible entrances with wheelchair-accessible toilets		
Network of tracks		
Connect destinations		1,3,4,5,6
Surround (avoid) conserved areas where access must be spatially limited		1,3,4,5,6
Do not fragment habitats crossed by tracks		1,3,4,5,6
Form loops offering different level of challenge in length, width, surface, slopes, curbs, starting and landing points, etc. (Include min. one easy route)		2
Prefer tracks with moderate slopes		1,6
Avoid stairs if possible		1,3,4,5,6
Provide guards and handrails on trails with low level of challenge and at big level differences		1,4,5
Prefer winding routes to straight ones		3,1
Offer discovery of aesthetical natural values stimulating different senses (e.g. rocks, barks of trees, flowers, berries, streams, lakes, views)		1,3,4,5
Provide information at entrances, starting points and crossings		2
Design starting and landing points of slopes visible from each other		
If there are buildings on the site, show values and processes which cannot be watched outdoors because of physical barrier		
Make information understood via at least two senses simultaneously		
Provide access for nature near the building if accessing the site itself is not possible		
Mark demonstration sites and study paths on shorter and easier routes		2
Place information boards at destinations, and guiding signs at entrances and crossings		2

Analyzing the Landscape Visibility in Lushan National Park for Holistic Protection of Cultural Landscape Heritage and Spatial Planning

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Keywords:

Landscape planning, Viewshed analysis, Mountain landscape, Integrated protection and management

ABSTRACT

Landscape visibility enables us to understand the interaction between human and nature. This understanding can contribute to the integrated and holistic protection of a specific landscape. These will be tested in the Lushan national park (China) where the cultural landscape heritage suffers from the landscape fragmentation and the degradation of the landscape qualities and values. The four scales of landscape visibility are mapped using both of the multiple viewshed analyses and accumulate viewshed analyses in a GIS. The visual sensitive areas and types are identified by the analytical hierarchy process in the YAAHP software. By comparing the distribution of the four visual landscape sensitive types with the land use map, three typical layer structures and three key sensitive areas are defined and discussed. The suggestions of the future spatial planning are given. The landscape visibility and the visual sensitivity analyses will help to enhance the consideration of integrated vision of the protection.

INTRODUCTION

Cultural landscapes are the result of the consecutive reorganization of the land, presenting the combined works of nature and of man (Antrop, 2005; UNESCO, 2008), which need comprehensive protection and

management to enable it to be passed on to future generations. However, the historical environment and the ancient landscape structures were rapidly damaged since the last century because of the urbanization, industrialization etc. (Plieninger et al., 2016; Roe, 2007; Van Eetvelde and Antrop, 2005). As a result, landscape changes have a negative impact on diversity, coherence and identity, which are characteristic of the cultural landscape (Antrop, 2005). The national parks of China are the most representative of their natural and cultural resources containing high landscape values. With the rapid urbanization and industrialization in recent decades, the majority of national parks became separate, fragmented areas and were confronted with inadequate protection management. Traditionally, landscape protection focuses on the individual objective, lacking a more holistic consideration of the environment and context of the protected area.

The visual landscape character provides the transparent information on landscape structure and strengthen the interaction between specific places within their wider territory (Tveit, Ode and Fry, 2006; Robert, 2018), which is increasingly researched in terms of environment protection and management (Fry et al., 2009; Tveit, 2009; Nijhuis et al., 2011; Martín et al., 2016). As one of the indicators of visual landscape character (Tveit, Ode and Fry, 2006; Ode, Tveit and Fry, 2008;), landscape visibility enables us to understand the interaction between human and nature (Sevenant and Antrop, 2007). Meanwhile, anticipating the future for territories that suffer from a variety of challenges (Robert, 2018), plays an important role in assessing the visual landscape character by using properties of the viewshed and different viewpoint (Antrop and Van Eetvelde, 2017).

This paper aims to study how a visual landscape assessment of a

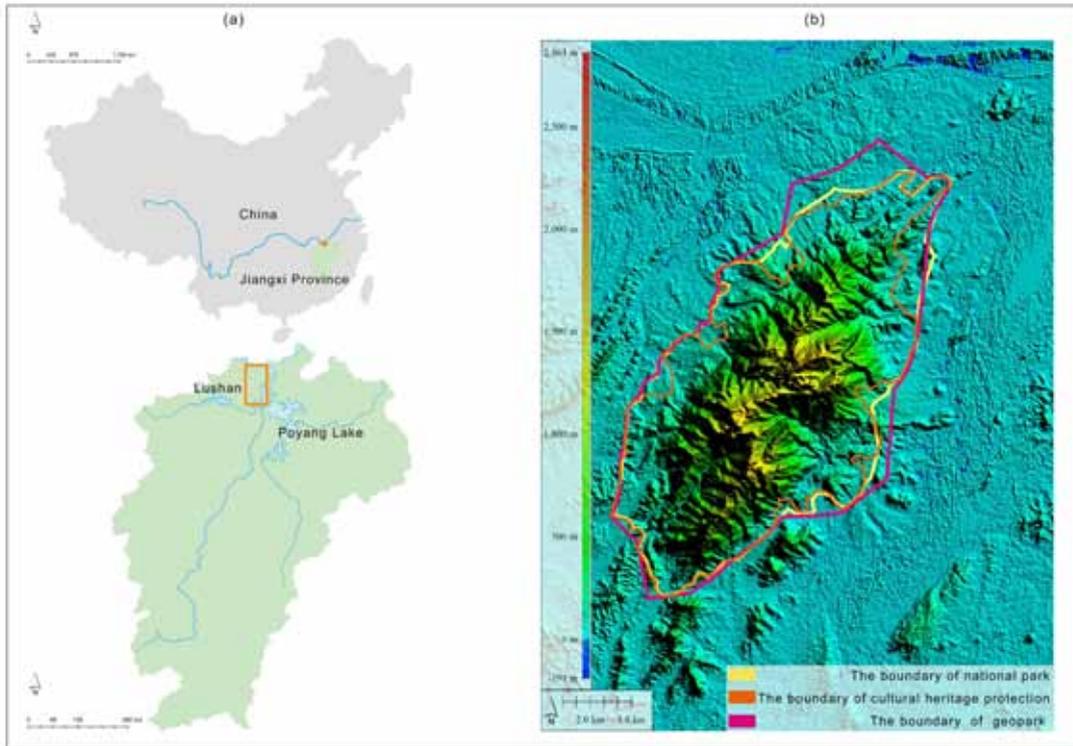


Figure 1: (a) The location of the Lushan national park, (b) Topography (Digital Elevation Model) of Lushan national park, and the Multiple boundaries of Mount Lushan.

(source: DEM from <http://www.gscloud.cn/>, boundary from Lushan planning Council).

protected landscape can contribute to a more integrated and holistic (protection and management) strategy, also taking into account the surrounding areas. The landscape visibility is mapped in different radius scales. For each of the radius scales, landscape metrics are calculated based on the viewshed to classify the visibility. Based on the results of the analysis, a critical reflection of the delimitation of protected areas are discussed and modification of the boundary and buffer zones are formulated.

MATERIALS AND METHODS

Study areas

The research will be executed in the Lushan National Park of China, covering an area of approximately 300km². Mount Lushan is located in the intersection of Poyang Lake and the Yangtze River (Figure 1a). It was evaluated as the first batch of Chinese

National Parks and the first Class National Nature Reserves in 1982, and issued as world heritage as a Cultural Landscape in 1994 and as a Global Geopark in 2004 by UNESCO (UNESCO, 1994; UNESCO 2004). Mount Lushan presents the integral landscape containing the rivers, hills, lakes and a number of historical buildings, which attracted Chinese scholar, artists and writers for over 2000 years (UNESCO, 1996). However, due to the different relevant stakeholders' management from various protection and management perspectives, Lushan was protected by inconsistent boundaries such as the boundary of the national park, the boundary of the Geopark, the boundary of the cultural heritage protection (Figure 1b). Considering the primary usage, we select the boundary of the national park as the baseline for this study. The purpose of the protection generally focuses on the objectives inside the park, which cause the apart trends of



Figure 2. The panorama view of Lushan national park and surrounding areas.

Lushan and its fringe area. Moreover, the fringe areas also suffer from the issues of urban sprawl and industrial production such as mining (Figure 2).

Method

In mountainous areas, landforms have a signal relief amplitude, which shapes various visual height, perspective and visual experience. The visual dimension should be taken into account when designing an integrating protection and management. The method of this study is based on the landscape visibility analysis that is one of the indicators of visual landscape character. Firstly, we choose the 30x30 raster DEM data of Lushan and fringe areas and ninety-seven essential viewpoints for reflecting the visual properties of the landscape (Antrop and Van Eetvelde, 2017). The landscape visibility is mapped in a GIS, the default value of eye-height is estimated at 1.6 m. The multiple viewshed analysis and cumulative viewshed analysis are performed within a radius of 5, 10, 15, 20 km based on

the ninety-seven viewpoints (Murgante, Borruso and Lapucci, 2011; Robert, 2018). Secondly, the variables of the visibility factor, distance factor and angle factor are selected for identifying the landscape sensitive areas and types and the analytical hierarchy process (AHP) is used for weighting the value and calculated in YAAHP software. Subsequently, the composed views are analyzed and the spatial patterns of the visibility are assessed. The Lushan and fringe areas will be classified into four types; the contain the high visual sensitive type, middle visual sensitive type, low visual sensitive type and no direct impact type. Based these types, the modification of the boundary and buffer zones will be formulated as well as suggestions for more holistic protection of the cultural landscape. Lastly, the comparison between the sensitive types and the land use types are discussed by overlaying these two maps. The structure of the sensitive areas of the visual landscape is described, which helps to enhance the consideration of landscape in the

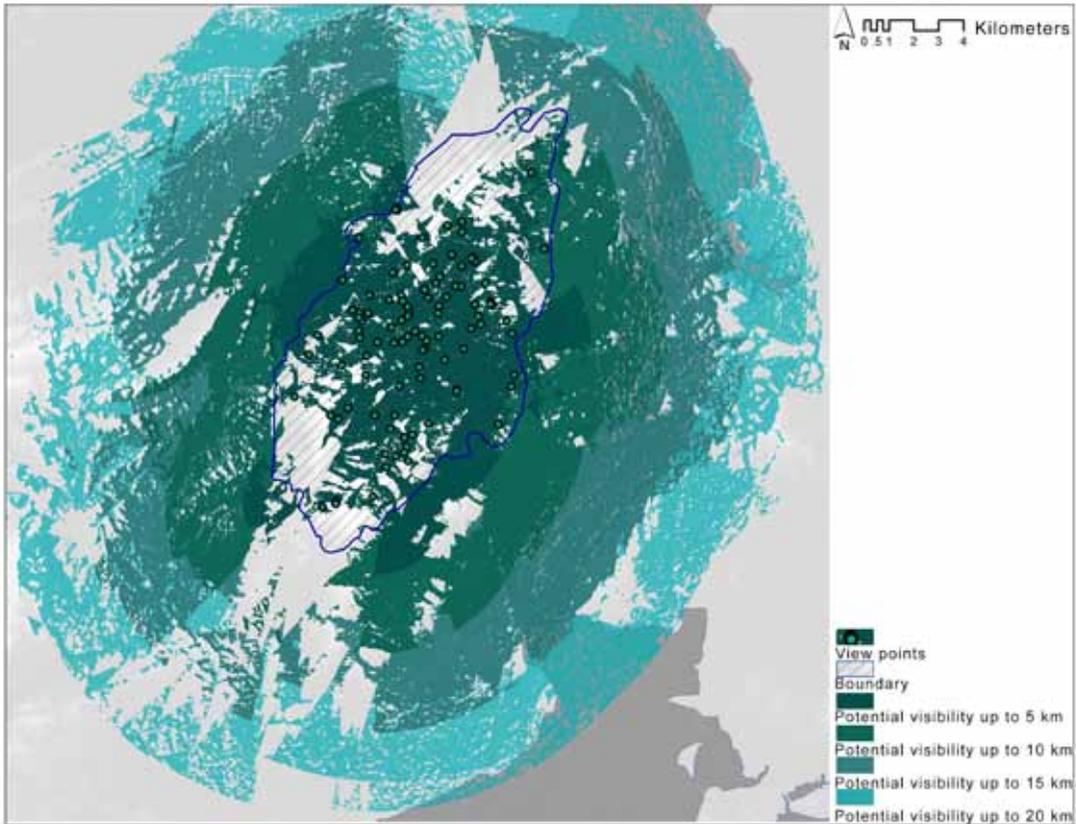


Figure 3. The multiple viewshed up to 5, 10, 15 and 20 km from the ninety-seven viewpoints.

integrated spatial planning.

RESULTS

Mapping the landscape visibility in four radius scales

To determine the visible areas, we map the multiple viewsheds (Figure 3) by the viewpoints in 5km, 10km, 15km, 20km radius scales. In the 5 km scale (571.72 km²), the proportion of 43.78% is covered by visible areas. In the 10 km scale (1112.82 km²), the proportion is 52.69%. In the 15 km scale (1804.56 km²) and 20 km scale (2651.66 km²), the proportion is up to 57.94% and 60.09%. It indicates the proportion of visible areas increase with the growth of distances. Likewise, the cumulative viewshed is determined in the same four radius scales. Numbers of the cumulative viewpoints are 14,

19, 21 and 25 for 5km to 20 km (Figure 4). In the 5km scale, the map shows an aggregation of viewshed in the southeastern zone of the protected area. The viewshed is obstructed in the north and south zones compared with the west and east zones. The build areas are not overlapped at this scale. In the 10km scale, the aggregation got a continuation in the southeastern zone. It forms a second aggregated zone in the northwest. The visible range extends to the northern built areas of Jiujiang City. In the 15km scale, the two aggregative zones can still be detected and the overlap of the southeastern zone is at the Poyang Lake. The overlapping contains the half part of Jiujiang City and extends to the opposite of the lake. The structure of viewshed displays two fan-shaped along the direction of the Lushan Mountain. In the 20km scale, the entire Jiujiang City is nearly covered; the viewshed is close to the circular

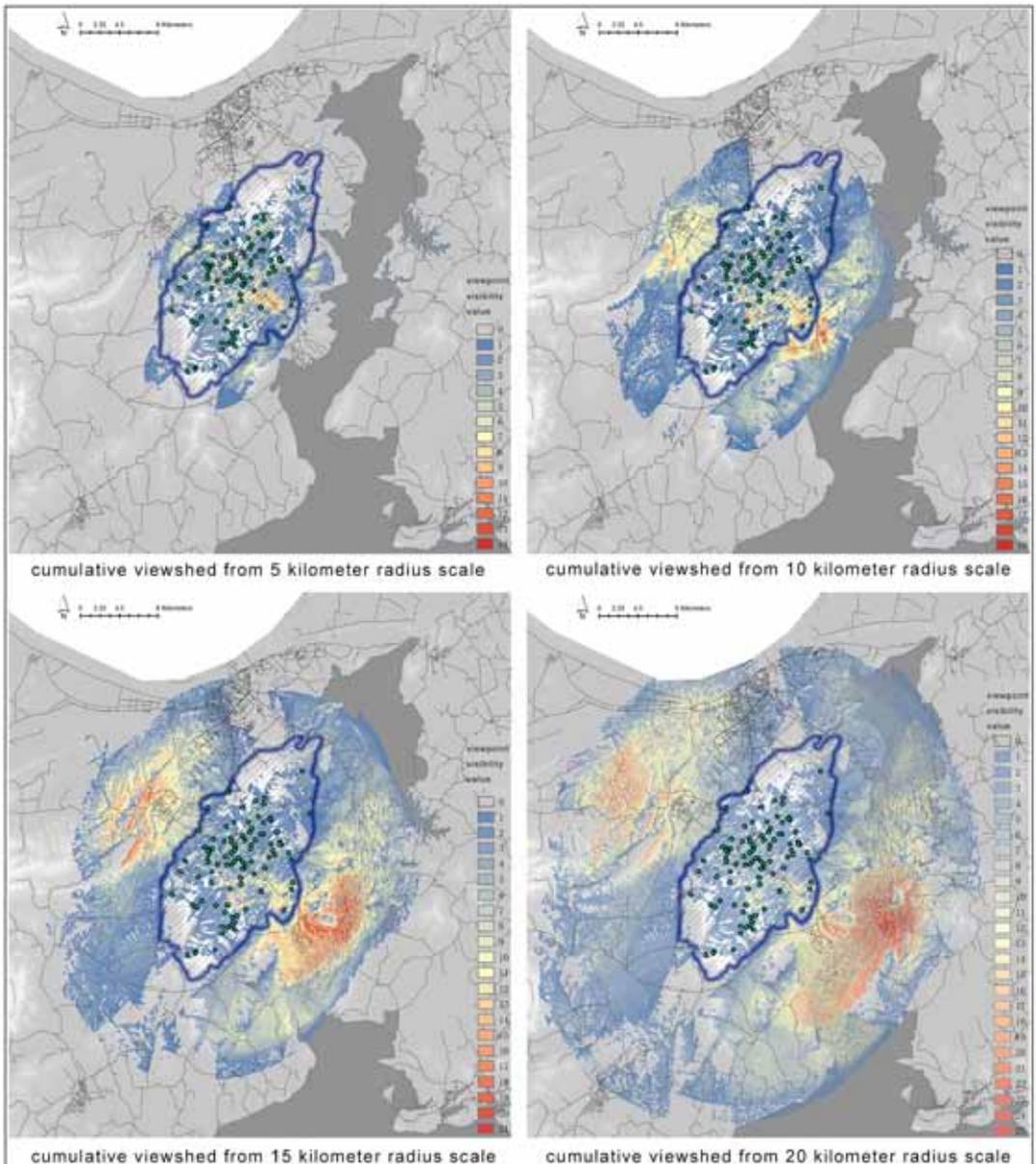


Figure 4. The cumulative viewshed up to 5, 10, 15, 20 km from the ninety-seven viewpoints.

structure. It is the maximum cumulative values of potential visibility in this scale.

Identifying the visual sensitive areas and types

The evaluative factors are selected by considering the major characteristic of visual sensitiveness and the limitation of data. Three factors are selected for identifying the visual landscape sensitive area and types (Table 1). The factor of visibility plays a decisive role in

getting access to a visible sensitiveness. According to the landscape visibility map, it is divided into five categories. The more cumulative viewshed gets a higher score in this evaluative framework. The factor of distance has an essential influence, which means the closer distance receives a more precise vision. It is also divided into five categories based on the mapping result. The factor of the slope is of secondary importance. The results of

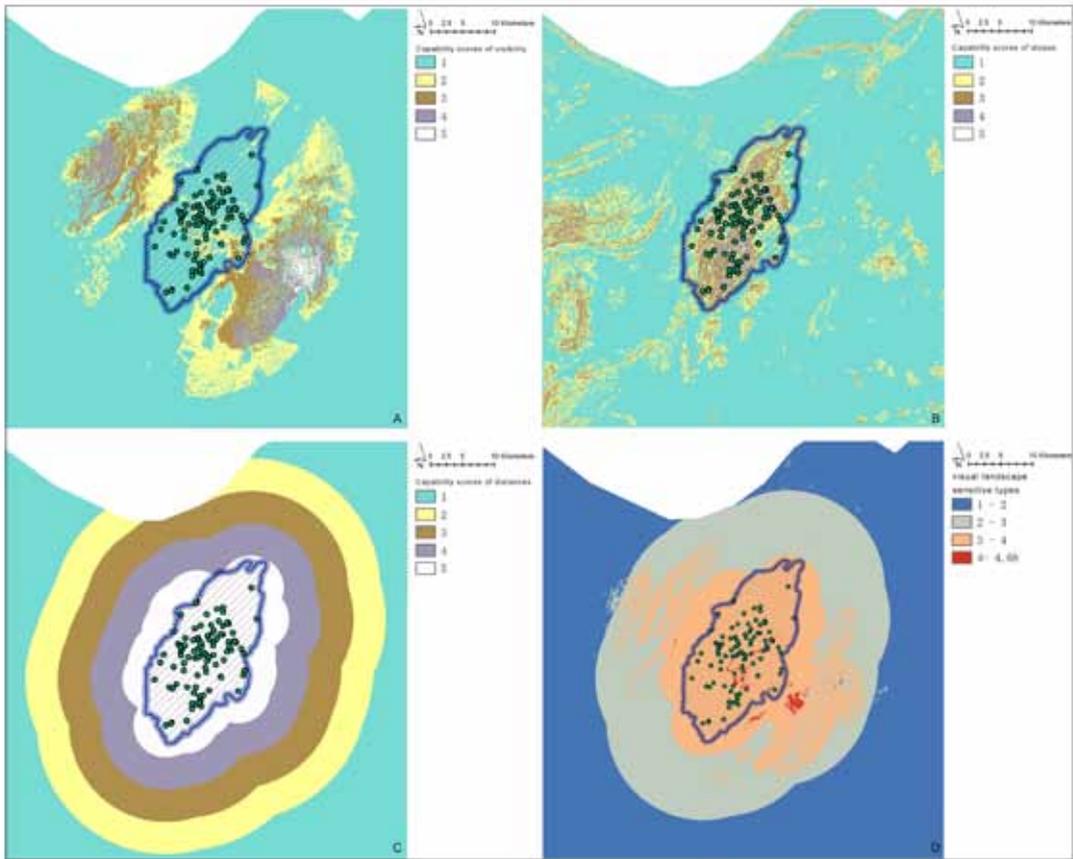


Figure 5. (A) The capability scores of landscape visibility, (B) The capability of slopes, (C) The capability of distances, (D) The Visual landscape sensitive areas and types after weighted sum analysis.

pairwise comparisons shows that the visibility has slight importance than the distance and has comparative importance than the slope; the distance has slight importance than the slope. The judgement matrix is built-in the YAAHP software. After the conformance testing, an analytical result shows the weighted values of the visibility, distance and slope are 0.5584, 0.3196 and 0.122. In a GIS environment, the distribution of distance and slope is mapped (Figure 5B and 5C) and overlying the three factors with a weighted sum analysis. The visual sensitive areas are carried out (Figure. 5D). The visual sensitive values range from 1 to 4.68. For assessing the visual sensitive types, four thresholds are defined. The values from 1 to 2 means they have no direct visual impact, the values from 2 to 3 are the low visual sensitive types, from 3-4

are the middle visual sensitive types, and from 4-4.68 are the high visual sensitive types.

CONCLUSION AND DISCUSSION

By comparing the distribution of the four visual sensitive types with the land use map (Figure 6), three typical layer structures and three key sensitive areas are identified and discussed. The low sensitive areas have one continuous structure containing the landscape of Mount Lushan, which can give a suggestion to delimitate the buffer zone in spatial planning and promoting a more integrated and holistic management. The middle sensitive areas contain two kinds of structures. One is the continuous type regarded as a northeast-southwest elliptical

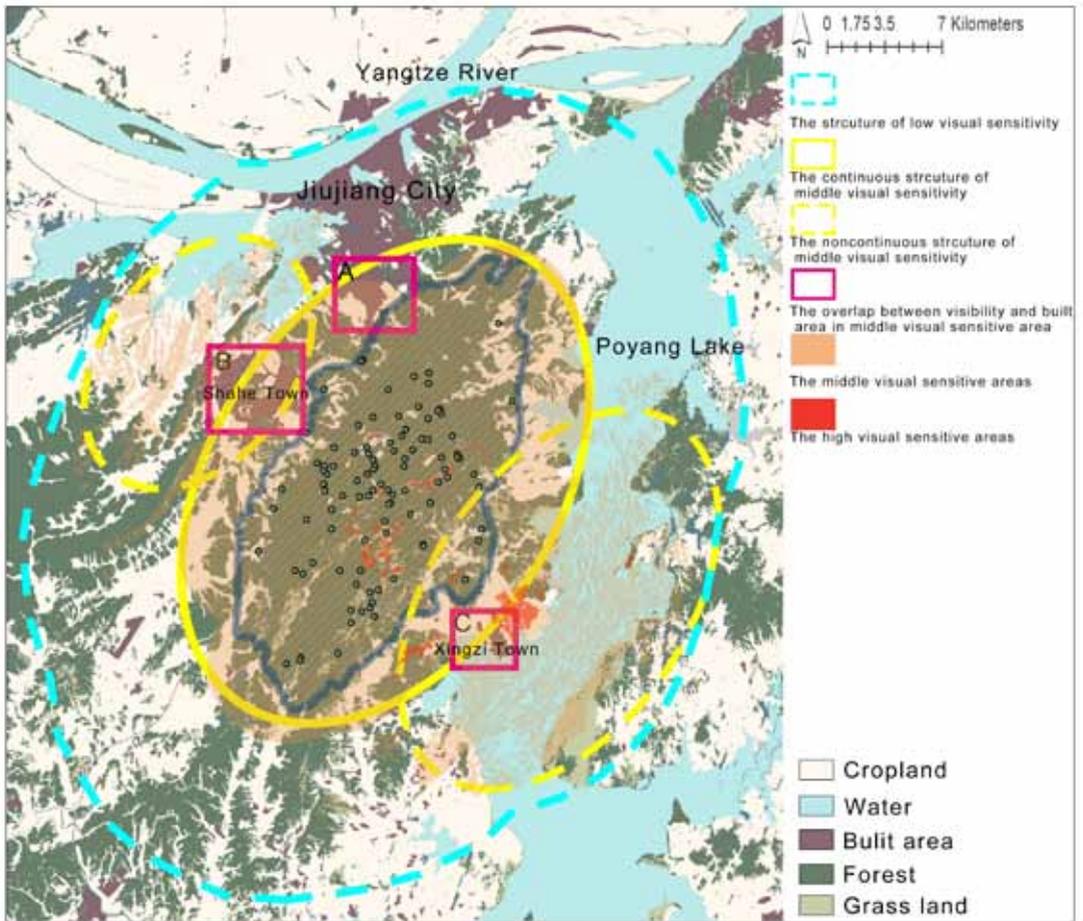


Figure 6. The comparison between the land use and the visual landscape sensitivity.

structure which likes the expansion of the boundary of Lushan national park. The other is the discontinuous type with the smaller northeast-southwest elliptical structure distributing on both sides of the mountain. As the high sensitive areas have not a significant feature which spread over the center of the mountain and some parts near the Xingzi Town. The continuous and discontinuous boundaries can suggest to formulate the modification of the boundary and buffer zones. The spatial planning needs to integrate Poyang Lake and Mount Lushan into the holistic protection and management. The three key areas (A Jiujiang City, B Shahe Town, C Xingzi Town) are defined by overlapping the visibility as well as built area in the middle and high sensitive areas, where it urgently need to control

the blind expansion of built areas and take administrative measures for reconciling the conflicts of protected areas and city expanding areas.

There are also some insufficiencies of this paper. A visual landscape assessment is a complex synthesis that could not ignore the aesthetic and perceptual dimensions. And at the same time, the colour, texture, pattern, and form will also influence the visual assessment (Christine Tudor, 2014). These attributes will be added to the standards of evaluation in the following study. Based on the case study, the spatial distribution of the visual sensitive types provides the basis for space division. The modification of the boundary and buffer zones will be formulated as well as a suggestion for a more holistic protection of the cultural

landscape. Analyses of the landscape visibility will inspire the protection and spatial planning and reserve for the overall visual landscape character assessment.

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TABLE

Table 1

The categories and the weighted values of three factors

Factors	Weighted values	Capability-descriptions	Capability Scores
DISTANCE	0.3196	0 -5km	5
		5-10 km	4
		10-15 km	3
		15-20 km	2
		20 km	1
VISIBILITY	0.5584	20-25 viewpoint	5
		15-20 viewpoint	4
		10-15 viewpoint	3
		5-10 viewpoint	2
		0-5 viewpoint	1
SLOPE	0.1220	40 degree	5
		30-40 degree	4
		20-30 degree	3
		10-20 degree	2
		0-10 degree	1

Sponge Landscapes to Mitigate Flood Conflicts. The case of Asprela Parks, Porto - Portugal

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sustainable urban drainage systems, storm water management, flood mitigation, park design

ABSTRACT

Storm water management, particularly in the urban context, is becoming one the focus of planning, design and land governance processes. In Portugal, municipalities are starting the implementation of strategies to reduce peak flows and facilitate water retention and infiltration. Research and monitoring practices have been demonstrating that green infrastructure investments are cost-effective to tackle flood problems heightened by climate change. This paper addresses two recently designed parks in the city of Porto, Portugal, envisioned to relieve storm water problems, and simultaneously create opportunities for recreation and biodiversity. By assessing several design components and decisions it is possible to estimate some of the forthcoming contributions gained with both parks, regarding storm water retention and surface permeability. The relevance of park design focused on perviousness, water retention and infiltration, is further discussed as a central issue of present and future landscape design projects.

INTRODUCTION

Densely populated areas such as metropolitan regions face severe challenges due to the effects of climate change, such as flood draughts,

heat waves and wild fires. The need for adaptation is vital and demands significant transformation in urban land cover. To address these issues, increasing attention has been given to the role of green and blue structures (Demuzere et al. 2014).

Green spaces such as parks, gardens, urban forests, wetlands, green roofs and green walls can contribute to ecosystem resilience (Pauleit et al. 2011) and reduce the adverse effects of climate change by regulating water flows, aiding at storm water management and providing thermal comfort through the presence of vegetation with its unique physiology and shading effects (Demuzere et al. 2014).

Parks can play a significant role, in contributing to air quality, water storage, mitigating urban heat island effect (Klemm et al. 2017; Tzoulas et al. 2007). Storm water management techniques, based on natural hydrological processes and vegetated surfaces help to attenuate flood impacts by “temporarily storing water, often filtering the pollutants at source and encouraging infiltration of storm water into the ground” (Hoang, 2016).

Parks with high vegetation cover participate very positively in the urban green infrastructure, by influencing the circulation of water and minimizing the risk of flooding (Fletcher et al. 2015). Through the implementation of sustainable urban drainage system (SuDS) the natural drainage processes are replicated, normally using nature based interventions such as storm water detention basins, swales, rain gardens, and green roofs, which increase local infiltration and lessening storm water peak flows (Ossa-Moreno, Smith, and Mijic 2017).

Because the majority of SuDS are vegetation based solutions they also contribute significantly to mitigate heat island effect, to improve water and air quality, to stimulate biodiversity and facilitate human contact and proximity



Figure 1. Location of Eastern and West-Central Asprela Parks at the university of campus. The orange polygon outlines the park intervention areas.

with nature (Ashley et al. 2010).

From all the vegetation cover types, the use of trees seems to be to most effective one. According to ACT (2011) a single tree retains approximately between 0.2 to 0.4 m³ of water during a large storm event and reduces water runoff in approximately 3.2 m³ of water.

The role of parks in climate change adaptation, particularly by adopting efficient and low-cost strategies are relevant to minimize the expected main threats. The best design solutions must be identified and quantified such as the ones followed in two recently designed park case studies of the city of Porto. The selected case studies are situated in one of the campus of the University of Porto (Asprela campus). Both parks were designed according to a multipurpose program regarding the environmental, social and aesthetical improvement of the area; they are particularly focused on maximizing soil permeability, flood management, microclimate improvement and biodiversity promotion, by exercising the rehabilitation of the existing watercourses as a main driving force of the intervention strategy.

MATERIALS AND METHODS

Eastern and West-Central Asprela Parks (Figure 1) sit on 8.5 hectares of permeable land located in a highly urbanized area in the city of Porto – Portugal. Both parks were designed according to ecological, social, economic and aesthetic principles.

The design approach develops an array of solutions centred on the conservation of existing natural and cultural values, the management of peak water flows, the creation of opportunities for a variety of human activities, the promotion of green and blue connectivity, the enhancement of biodiversity and micro-climate improvement.

The outdoor space was therefore laid out as a continuous green system of open and closed woodlands, borders and clearings, entwined by a pedestrian and cycling network, connecting the parks with the surrounding urban fabric.

The design style of both parks followed a naturalistic and minimalist trend based on the combination of straight and gently curved lines, and a



Figure 2. Landscape master plan of Eastern Asprela Park.



Figure 3. Landscape master plan of West-Central Asprela Park.

contrasting spatial pattern of open and closed spaces. Hard materials were to be inexpensive, easy to construct and of local significance; plant materials were mainly of autochthonous species with a few non-invasive exotic ones, evocative of Porto cultural landscape character.

Asprela Eastern Park (Parque da Quinta de Lamas – 2,3 ha) completed in 2015 (Figure 2), is located between the Faculty of Engineering and the Faculty of Economy of the University of Porto. The design process and the construction of the park was led by the University of Porto. The existing

site comprised abandoned fields, rural buildings, university buildings, vacant lots, informal car parking spaces a tube water course. The program intended to create an integrated green structure that would promote the environmental and landscape quality throughout the space linking two main university buildings , Economics and Engineering (Farinha-Marques et al. 2013).

Asprela West-Central Park (6 ha), is located near several faculties of the University of Porto (Engineering, Sports, Psychology, Medicine); schools of the Polytechnic of Porto; I3S research



Figure 4. (left) The watercourse currently flows in the open air. The section is able to store water during a storm event.

center; UPTECH, the science and technology park of the University of Porto. The design proposal was commissioned by a consortium of partners, the University of Porto, the Polytechnic School of Porto and the Municipality of Porto. The design phase is finished and the project waits for funding to be implemented (master plan Figure 3). Until the late 1990s this area kept its agricultural character, with fields of ryegrass, vegetable gardens, and watercourses bordered by alder and willow. The succeeding urban transformations, particularly the construction of the metro line and associated road network, altered significantly this pre-industrial agricultural landscape. Such transformations drastically changed landform, the course of the streams, vegetation cover and habitats. The decrease of water permeability of the surrounding urban space, the underground channelling of the western stretch of Asprela stream and the decrease of the flow capacity after heavy rain, may cause serious flooding problems for the subway tunnel which reaches the area at its southern corner (Farinha-Marques et al. 2016).

To assess the parks potential for storm water management using landscape design strategies, a methodology was developed as follows:

- a) identification of most effective design solutions for storm water mitigation;
- b) selection of measurable parameters aiding at better understanding the relevance of the implemented strategies (ex.;



Figure 4. (right) Water retention basins that were made designing the landform

- permeability and storm water runoff);
- c) measurement of the parameters in each park and associate them with specific design solutions (ex. land grading; water circulation and retention; materials perviousness; green area expansion and proportion; type of vegetation cover; number of trees);
- d) assessment and discussion of the adopted design solutions efficiency.

RESULTS AND DISCUSSION

Examining each park, it is possible to estimate the contributions that each one will have towards storm water management.

Asprela Eastern Park

The intervention area features 398 m of a forced tubed watercourse (box culvert). It was possible to bring to surface and naturalize 108 m. The remaining section could not be naturalized due to grading and land use restrictions. The open-air section behaves like a small reservoir, with a slow flow velocity. The channel bed is cast in irregular stone all the way up to the maximum flood height; banks are planted with riparian trees (such as *Populus nigra* and *Fraxinus angustifolia*) and patches of water margin plants (*Salix atrocinerea*, *Typha latifolia* and *Juncus effusus*) that also contribute to clean random and illegal occurrence of organic wastewaters.

All rainwater is managed onsite as no water is sent to artificial drainage



Figure 5. Simulation of the water level at the event of a 100 year storm

systems. This was possible due to terrain modelling of water retention basins that receive the surface runoff. The retention basins are connected through the use of hydraulic bypasses that allow water to flow between them and expand the water retention capacity in the event of a huge storm. The site is able to retain the storm water volume that is expected to flow to this area during a one-hundred-year flood event. This volume will be primarily accumulated in the section of the naturalized watercourse (figure 4-right), and retention basins (figure 4-left) but in face of extreme events, it is still possible to extra flows use the existing box culvert system that has been preserved and connected through a hydraulic bypass.

The total area of the park is 22886 m², from which 19938 m² are green areas, 2526 m² are permeable pavements and 422 m² are impervious surfaces, which grants 98% of permeability across the park. This high permeability index assures that most water that falls in the park area will be infiltrated on site. Furthermore, in extreme events, the park will also receive waters from the supplying watershed and will be able to store, retain and infiltrate a large percentage of that water. The synergies between site permeability and water retention

capacity reduce the negative effects caused by extreme flood events.

Asprela West-Central Park

In this intervention park two intersecting watercourses with 594 meters total will be requalified. Through terrain modelling it was possible to preserve the path of the stream and consolidate the eroding slopes. In the downstream section it was necessary to guarantee the minimum slopes for water flow. In the upstream section, it was necessary to ensure a smooth transition between the different levels along the stream; this was achieved with a system of weirs and small waterfalls.

The designed landform is expected to accommodate a volume of water equivalent to a rainfall with a return period of 100 years. According to the hydraulic calculations, the expected retention volume is 10.000 m³. This storage capacity was achieved by building an embankment (a small earth dam 1.8 m high); during a hazard flood event this structure retains the peaks flows, slowly releasing the water downstream, avoiding the flooding of the metro line. In figure 5, a simulation of the maximum flood elevation is presented. Likewise, to the Eastern Park, all rain water is managed onsite, which means no artificial drainage systems will be built.

The total area of the park is 60591 m², 54712 m² are green areas, 6879 m² are permeable pavements and 5879 m² are impervious surfaces, which also grants 91% of permeability in the intervention area. When compared to the Eastern Park, the expected lower permeability of this park is mainly due to pre-existing paved entrance to the electricity substation of the metro line, and the new soccer field conceived with a traditional constructed drainage system. The permeability index is still above the majority of urban parks of Porto (Farinha-Marques et al. 2014) and since the majority of water runoff is drained towards retention basins and the existing watercourse, all rain water will have good usage, being either infiltrated on site or guided to a natural drainage system.

The role of trees

Data provided by the Arbour Day Foundation 2018, estimates that during a storm event, one tree retains on average 0,3 m³ of rain water; one tree absorbs about 5 m³ of water per year. When both parks are fully developed (in 20 years' time), the expected number of trees will be 1913 (654 existing + 1259 planted), this means that during a storm event, the total water retained by the population of trees in both parks will be approximately 550 m³ of water; the total number of trees in the park is expected to absorb 9.065 m³ water per year.

CONCLUSION

Green spaces and green infrastructures, particularly urban parks have an important function in making cities more resilient to the negative effects of climate change. The two analysed parks were planned and designed to protect some areas of the city and the metro line from the hazards caused by extreme storm water events, aiming at preventing major ecological and economical problems. It was possible to measure and estimate the

beneficial effects of landscape design solutions mainly supported by the water permeable areas and a robust vegetation structure. These are cost effective solutions, endorsing that terrain modelling and planting design are highly efficient answers. The prospect and objective of this paper is to encourage the increase of green areas in cities, particularly those that can promote landscape connectivity (blue and green connectivity). The design of parks and the overall green infrastructure should regain motivation and inspiration to propose new spaces with a metabolism once again more oriented by the functioning of the natural ecosystems in the proximity of human users. These mean larger pervious areas and materials, wider wooded spaces, multi-layered planting schemes, enough space to accommodate large trees developing their natural sizes and shapes. Breathing bodies of life, spaciousness, perviousness and social inclusion. Storm water management is one of many benefits, a central moto to turn new urban green areas into fundamental places for people to contact nature, to recreate, and grow a citizenship of health and well-being.

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Informal Settlements and Disasters: Coping with Floods

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ABSTRACT

Informal settlements are present in many hazardous locations around the globe, concentrating some of the most vulnerable citizens, in a disaster-prone configuration. Their vulnerability can be understood in terms of high risk-exposure, hindered community resilience and capacity to face disasters, limited by their lack of resources and their sense of uncertainty. In addition, when informal settlements are part of a low-resilient landscape, their inhabitants' vulnerability increases. Chilean Norte Chico, has an environmentally vulnerable desert landscape under intensive anthropogenic pressures, with ecosystems that are very sensitive to external disruptions, rendering it as a low-resilient landscape. Recent floods in the area in 2015 and 2017 evinced existing risks that had not been adequately managed. While there have been several flood-mitigation initiatives, informal settlers are often not directly involved because of confronting political issues. Taking into consideration their proliferation and how its inhabitants cope and adapt to floods in spite of their vulnerability, it is relevant to reflect on the knowledge they can produce. This research aims to explore design interventions for flood mitigation on the Copiapó River valley based on local knowledge from informal settlers, retrieved by means of semi-structured interviews and non-participant observation.

INTRODUCTION

In the desert landscape of Chilean Norte Chico, disasters such as floods and mudflows are rare, so for many inhabitants - especially the young

and the foreigners -, this are not part of their collective imagination and shared experience. For informal settlers in the area, this unawareness towards flood risk, along with their limited resources, led them to settle in hazardous locations, and contributed to a hindered capacity to cope with floods, rendering them particularly vulnerable. Nevertheless, the temporary and improvised actions of informal settlers have been shaping cities and towns along the coast and the *riverscape* for decades in an environmentally vulnerable desert landscape. Recent floods in the area and their devastating effects have shaken inhabitants perception of risk, and enriched their local knowledge. They have also posed the concern about informal settlements (locally called *tomas*) within a *hazardscape*, and the need for a resilient approach for desert landscape design.

THEORETICAL FRAMEWORK

“[A disaster is] a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” (UN/ISDR, 2009)

Disasters and local knowledge

There is a “society-environment misfit: people settle in exposed environments” (Warner, 2017) conforming *hazardscapes*. When vulnerability is also involved, the result is the production of a disaster (Blaikie et al. 2014). Oliver-Smith (2004) adds to this understanding, by pointing out that disasters are socially produced: power relations shape social processes producing inequalities and different degrees of exposure to risk, rendering some people more vulnerable to disasters than others. Vulnerability to is then understood in the context of socio-political and economic systems

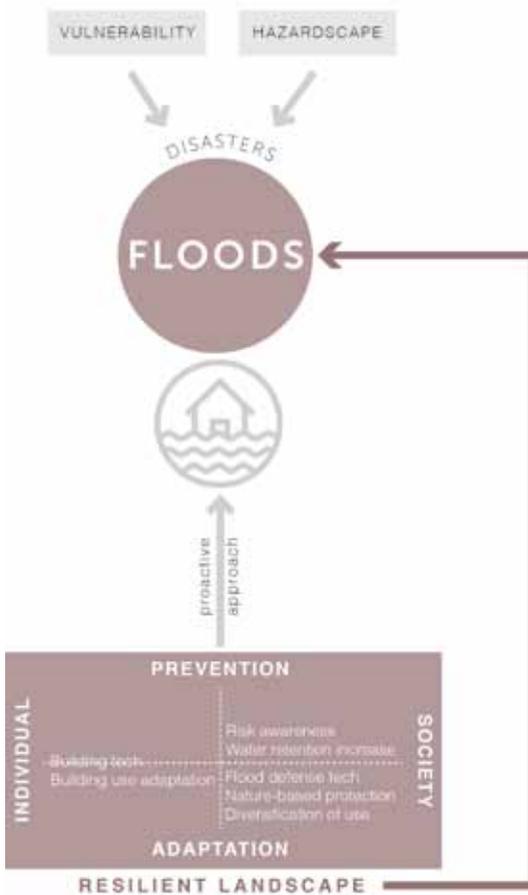


Figure 1. Theoretical and conceptual frameworks. Generated by the author.

rather than as a result of natural forces (Blaikie et al., 2014). Nevertheless, individuals within this system are not passive actors reacting to external provocations. On the contrary, they have what Hilhorst calls human agency or “the capacity to process social experience and to respond accordingly” (Hilhorst 2004:56), conforming a body of knowledge. In this research, this experience-based and geographically bounded knowledge is defined as local knowledge. Vulnerable inhabitants are in a unique position regarding the production of local knowledge. They are highly exposed to risks, have limited resources to face those risks, and an overall sense of uncertainty, constrains that only emphasize their need to adapt (Chambers, 1989) so the local knowledge produced by them is a

reflection of that capacity.

Resilience capacities

In addition, a disaster can be conceptualized in phases where it is possible to identify a pre-event, event/shock, and post-event phases (Houston, 2014), involving the activities of preparedness, response, recovery and mitigation, respectively (Lin Moe & Pathranarakul, 2006). The pre-event phase of disasters entails a proactive approach, with disaster-coping strategies that aim to increase the resilience of the community and the landscape by constantly dealing with complex system dynamics and uncertainty (Folke, 2016). Drawing on Few’s theory (2003) that focuses on the resilience towards floods, I identify two proactive approaches: prevention and adaptation. The first refers to the prevention of the spread and penetration of floodwaters through physical means, while the second refers to the adaptation by reducing negative effects from floodwaters. Additional literature (Thomas et al., 2007; Disse et al., 2001; Thielen et al., 2007; Thielen et al., 2005; Mukheibir et al., 2006; Bubeck et al., 2013; Lin Moe et al., 2006) provides specific coping strategies that are grouped in coping typologies, conforming a set of resilience capacities. They define a particular relationship with a proactive flood approach (preventive or adaptive) and who implements it (individual or society). This set of agents, concepts and relationships defines the conceptual framework for this research (Figure 1).

The design question that this research explores is:

Which design interventions derived from the knowledge of informal settlers can mitigate the impact of floods? In order to answer that, the following research questions are addressed: Why do informal settlers dwell in hazardous locations? How are informal settlers coping with flood risk in desert areas?

are consistent with prior assumptions, theories, or hypotheses identified or constructed” (Thomas 2006:238). Firstly, a research-for-design process is used to retrieve local knowledge through semi-structured interviews to informal settlers in their respective homes (Tierra Amarilla and Los Loros). Key actors (i.e. local water board, regional planners) are interviewed in their work place. Additionally, non-participant observation of the informal settlement and surroundings, provides confirmation of the strategies mentioned during the interviews, and also adds observations on a landscape scale. This way, both direct and indirect strategies to cope with floods are identified. Literature review is used to provide base knowledge regarding strategies to cope with floods. This information is analyzed, resulting in a series of qualitative resilience models. The models are analyzed according to their contribution to flood safety and their socio-economic and nature value, resulting in design principles that are the base for a site design along a ravine. Secondly, a research-through-design process sets out to test the site design in relation to the production of local knowledge, while speculating about the growth or shrinkage of informal settlements. The site design is refined through an iterative process, covering from the local *ravinescape* to the regional riverscape. Then, its impact is evaluated in relation to the previously defined flood safety, and socio-economic and nature value. Finally, the results from this process are translated into flood safety recommendations for both informal settlers and key actors involved in planning. Through this process, the knowledge is given back to the community.

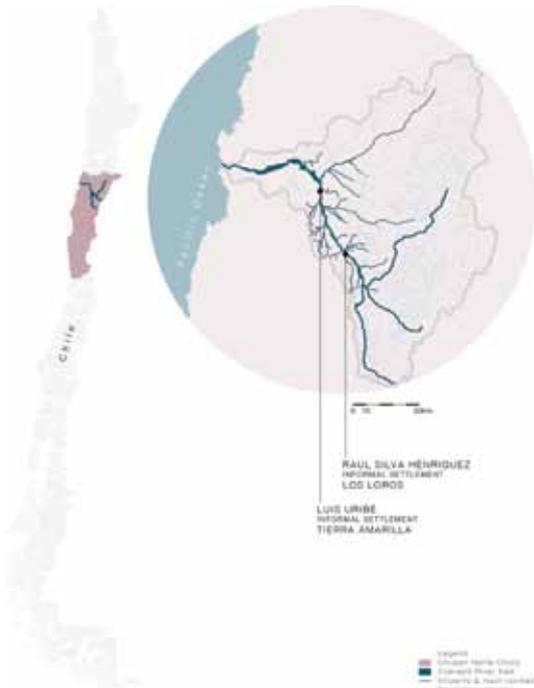


Figure 2. Location of Norte Chico in Chile, zoom in on Copiapó River valley and potentially hazardous locations. Generated by the author.

METHODOLOGY

The case study is the Copiapó River valley, located in Chilean Norte Chico, with emphasis in the township of Tierra Amarilla, which currently harbors the most shortcomings in terms of planning and the largest problems regarding water scarcity. Within Tierra Amarilla, two potentially hazardous locations were identified, where an informal settlement, a ravine, and a river meet (Figure 2). The chosen case study reflects the lack of local knowledge use for flood mitigation in landscape design, and the limited research about flood mitigation in desert landscapes in a local scale. Moreover, local knowledge from informal settlers is particularly undervalued and disregarded, even though the actions of informal settlers are one of the main forces that shape urban growth in Chilean Norte Chico.

The research comprises both a research and a design aspect, following a deductive approach in which the researcher “sets out to test whether data

LEARNING FROM THE LOCALS

The analysis of the retrieved data (Figure 3) serves to break down local knowledge into vulnerabilities,



Figure 3. Data analysis summary. Generated by the author.

hazardscape, utopias and resilience capacities. This sheds some light into the understanding of the locals regarding their strengths and weaknesses when it comes to flood safety, and also about their views on future scenarios.

On a landscape scale, there are several problems that were both mentioned in interviews and observed. The main ones were: landscape fragmentation, improvised urban growth, negative externalities of mining, private claim over the *riverscape*, climate change, desertification, and lack of identity. The lack of planning in this region is crucial to understand these problems. While the effects of climate change can impact the landscape, the main driving force for the region's landscape problems has been anthropogenic action. The privatization of the water resource and the intensification of agriculture since the 1980's, alongside the originally unregulated mining activities since the early 1990's (Calderón et al., 2016), and the population migrations that these activities caused, contributed to increase pressures over the water resources. In some degree, these activities have also contributed to one or more of the abovementioned problems.

On a community level, results

from the analysis process clearly show that different personal experiences influence one's production of local knowledge. Informal settlers had different perceptions towards flood risk, and therefore different flood-coping strategies, but overall, given their shared vulnerability, some generalizations can be drawn. Informal settlers, aware of their limitations, make use of their agency during disasters, trying to adapt to adverse situations, through the smart use of their limited resources, of which the social capital fostered in their community is one of their main assets. When it comes to resilience capacities, there is a clear focus on preventive strategies with the coping typologies of risk awareness and building technology (Figure 1). Even though their hazardous location is something they cannot change in the short-term, they resort to practices such as developing an informal flood-alert network, provide shelter for the neighbors in need, or make home improvements based on available local resources, in order to cope with floods. Two aspects of particular interest for many interviewees were the need for quality public spaces, and the concern about the future impact of their actions for the community. Despite the fact that data retrieved from key actors reflected their expert formal knowledge, it corresponded with the learning from informal settlers. In this research, both sources of knowledge were combined to create a more robust body of knowledge, emphasizing that the main producer of local knowledge for this case is the informal settler.

Resilience models

Resilience models, based on local knowledge, were used to explore different approaches in both locations using resilience capacities as the base for the models, and vulnerabilities, *hazardscape* and utopias as the forces shaping those models. Connectivity improvement, landscape defragmentation and readability, community-based

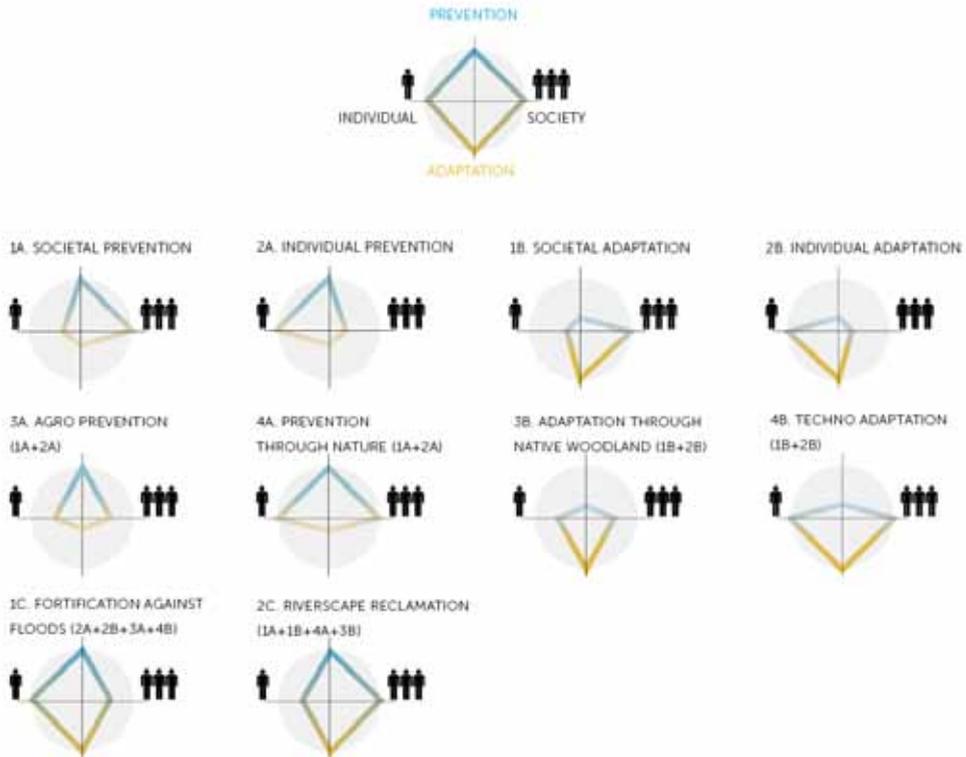


Figure 4. Overview of each model's approach. Generated by the author.

processes, and identity strengthening were the overarching design decisions. The first four models are radical approaches that focus either on prevention or adaption, and individual or society. The second four models are focused on prevention or adaptation, with some variation of individual or societal engagement. Finally the last two models are a combination of the above (Figure 4).

According to the evaluation of the resilience models, models 3b-Adaptation through native woodlands, and 2c-Riverscape reclamation were the most resilient (Figure 5), since they contribute in a higher degree to every aspect of flood safety, and socio-economic and nature values.

The combination of the most resilient models serves as the basis for the design principles of connectivity, dynamism, flexibility and diversity, as it follows:

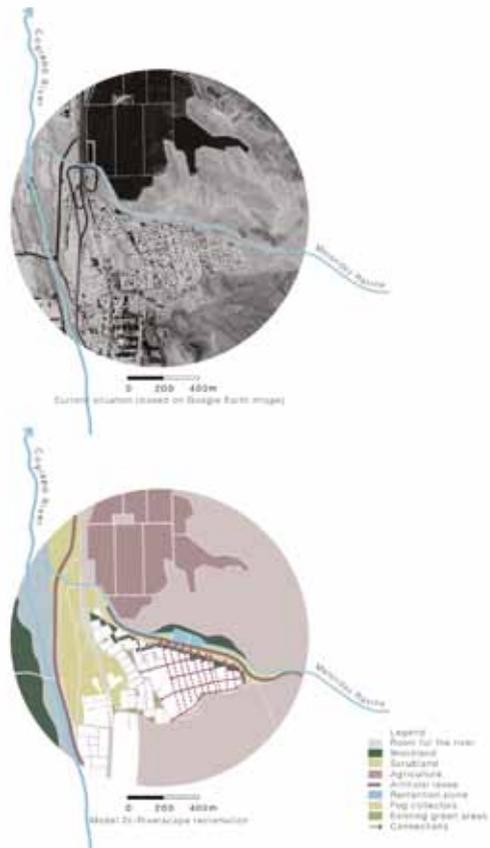


Figure 5. Tierra Amarilla case study: current situation, model 2c-Riverscape reclamation. Generated by the author.

RECLAIMING THE RAVINESCAPE

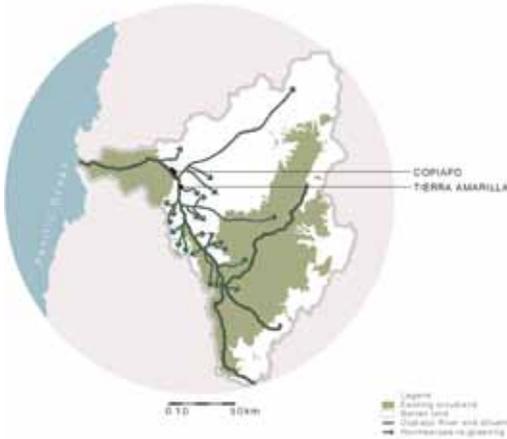


Figure 6. Regional strategy. Generated by the author.

- Connectivity: defragmentation of the landscape by using the river and ravines as central elements for spatial configuration, improving the readability of the *riverscape*, with emphasis on the *ravinescape*.
- Dynamism: respond to growth or shrinkage of informal settlements, and contribute to the revitalization of local economy through diversification
- Flexibility: respond to the variability of the landscape product of anthropogenic action, through a community-based process with long-term flood mitigation strategies that reclaims former informal settlements for public use.
- Diversity: both cultural, through the reinterpretation of local identity; and ecological, through the restoration of the desert scrubland, improvement of riparian ecosystem, introduction of native woodlands, and the overall increase of biodiversity.

The previous research-for-design revealed the importance of ravines within the *riverscape*. Drawing on the design principles, a regional approach was defined, focused on improving the readability of the *ravinescape* by intervening the ravines to increase water retention (Figure 6). This contributes to both create awareness regarding the existence of flood-risk along the *ravinescape*, and decrease the risks of floods downstream.

The final site design (Figure 7) combines both local knowledge with the designer's own experience, reflecting on the utopias that were posed by the people. In concrete, a double retention pond is used as a first flood-safety measure. The first pond functions as a filter for flood debris, while letting the finer sediments pass, while the second pond stores water in case of floods. It also allows for a controlled areal flood into the floodplain woodland made of *Geoffroea decorticans*, a native species that works decelerating the flood flow. In addition, the woodland provides for a series of traditional sub-products that contribute to diversify local economy and improve the relationship of the inhabitants with their landscape. The last safety measure is the levee that also functions as an urban-rural border, an edge for the informal settlement, stirring its growth in the less hazardous direction. In addition, it provides spaces for public community use, responding to the needs of the settlers. The re-greening of the ravine, contributes to increase water retention while providing aesthetical and nature values. All the species used are native, predominantly desert scrubs, with low hydric requirements and low maintenance.



Figure 7. Site design, Melendez Ravine in Tierra Amarilla. Generated by the author.

DISCUSSION AND CONCLUSIONS

There are multiple approaches for flood safety. Some rely on technology, others in nature, in the individual, in authorities, in the community, or in a combination of all of them. Because no approach is safe from failing, the more robust it is the more effective might be against floods. In this respect, a resilient approach recognizes the dynamism of the landscape, while understanding that is part of a larger and more complex system. It also deals with uncertainties, being able to respond to informality without necessarily making it formal.

The design resulting from the research-for-design process, explores resilience in a desert landscape through a circular landscape design that provides for and also feeds from its surroundings: flood sediments provide nutrients for the forest; the forest provides food for the neighbors, etc. While the main function of the design is to improve flood safety, additional functions related to socio-economic

and nature values are also present, strengthening the design and securing its functioning in the long-term.

ACKNOWLEDGMENTS

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Landscape of Power. Water as a Political Ecology and the Influence on Forms of Power

PECHA KUCHA PAPER

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ABSTRACT

Recent times have seen the rise of claims about the overuse land and water and unsuitable productive processes that provoke emerging crisis, leading to increasing competition over environmental resources, therefore instability, large-scale migrations and human conflicts. Wheatear we talk about lack of water, desertification, air pollution, housing crisis or refugees, these conditions can all be explained as the outcome of specific processes of appropriation whose consequences unfold within our present social and political order.

This paper focuses on the relation between the modification of nature, more specifically the appropriation and exploitation of water resources, the construction of dams and it consequences in terms of socio-spatial structures. Taking two case studies, it aims at debating the interplay between the control over flows of water and territorial spatial configurations in the floodplain of the Veneto and Navarre regions, respectively in Italy and Spain. Examples of the growing tendency at the beginning of the twentieth century of taming nature through engineering marvels, they remain some of the most engineered hydro basins in Europe.

The aim of this paper would be to tease out the multiple relations of power through which water have been enrolled, transformed and distributed and its current embedded structures across these territories and within Europe.

INTRODUCTION

Recent times have seen the rise of claims about the overuse of water, land and unsuitable productive processes that provoke emerging environmental crisis, leading to increasing competition over environmental resources. Given the current ongoing urbanization, climate change, food and energy scarcity we are facing emergent instability, large-scale migrations and human conflicts. Rather than being a natural consequential condition, scarcity is mostly designed (Goodbun, Klein, Rumpfhuber & Till, 2014) and «planned and organized in and through social production» (Deleuze, Guattari, 1928:28). Whether we talk about lack of water and desertification, pollution or housing' crisis, all these conditions can be explained as the outcome of specific processes of appropriation and exploitation of resources whose consequences unfold within our present social and political order (Aureli, 2016). With the current reality of water scarcity, our call is therefore to engage design with its condition and-question «the role of spatial practices in envisioning resilient hydropolitical landscapes» (Lokman, 2016:6).

HYDROPOWER AND DAMS CONSTRUCTION

Over the time we have come to realize that complex infrastructural systems, triggering river and coastal ecologies, have profoundly altered landscape dynamics, as well as the built environment (Lokman, 2016). From the appropriation of lands and water, the creation of reservoirs and tourism infrastructural development, to the capacity to irrigate large scale of territories, dams have been part of a “political economy of power” (Swyngedow, 2004) which consequences have spatially reshaped even the most remote urban landscapes. The twentieth century saw the completion of more than 45,000

WATER EXPLOITATION IN THE PIAVE RIVER BASIN



Figure 1: Map of the European water basin and the location of the Spanish's Ebro and Italy's Eastern-Alps basins. Elaborated by the author. Data from: European catchments and Rivers network system (Ecrins), European Environmental Agency, 2012.

large-scale dams' projects, which, «arguably like any other large-scale infrastructure, transformed landscapes across the world» (Kaika, 2010:105). Heralded as symbols of power, utility and modernity as exquisite banners of the ability of humankind to tame nature (Illich, 1989), whilst providing wide range of benefits, such as contributing to land irrigation, flood control, re-forestation and industrial water supply, dams also triggered political power relationships both upstream and downstream from their developments.

Even though many historians have neglected the interest of the Fascism for the environment, Europe in the twentieth century saw the emergence of specific policies and land management practices that belonged to a deliberate fascist environmental narrative (Armiero, 2013:15). The absence of stable ownership rights upon land and water lead to river inclusion within the capitalistic system of industrial production (Barca, 2010). The riparian territories of the Italian Piave's and the Spanish Ebro's basin (Figure 1), faced debates over the appropriation of water rights and irrigation demands, which turned rivers into the most contested terrains.

Located within the Eastern-Alps region of Italy, Piave river in Veneto region is one of the most exploited rivers in Europe, whose development came to halt only with the disaster of the Vajont dam in 1963, when a landslide from the Toc Mountain caused the overflow of 263 million of cubic metres causing a tremendous wave as height as 260-270 metres that killed 1910 people. The engineering works which transformed the territory since the end of the 18th Century were all manifestation of the gradual process of appropriation of water rights by competitive electric companies, and mainly by the Adriatic Society of Electricity (SADE).

Differently from Switzerland, where dams were seen as the sublime expression of the bound between engineering command and mountain nature (Briffaud, Ferrario, 2015), in Veneto region dams were located mainly on less visible and attractive places, often even hidden or somehow domesticated. Seemingly, hydro-electric power plants projects were displayed as the great occasion of progress and, through *greenwashing*, reservoirs as perfect embellishments for tourism advancement. This ideology was SADE's argument to persuade inhabitants to sell or just leave their lands (Armiero, 2013; Ferrario, Castiglioni, 2015).

In the mountain regions the vast array of dams erected through history left behind obsolete infrastructures, engineering relics and empty rivers. The consequent modification of river flows has accelerated the loss of cultivable lands and diverting labour from the fields to constructions sites and hydropower related infrastructures.

THE ELECTRIFYING PROJECT OF SPANISH EBRO BASIN

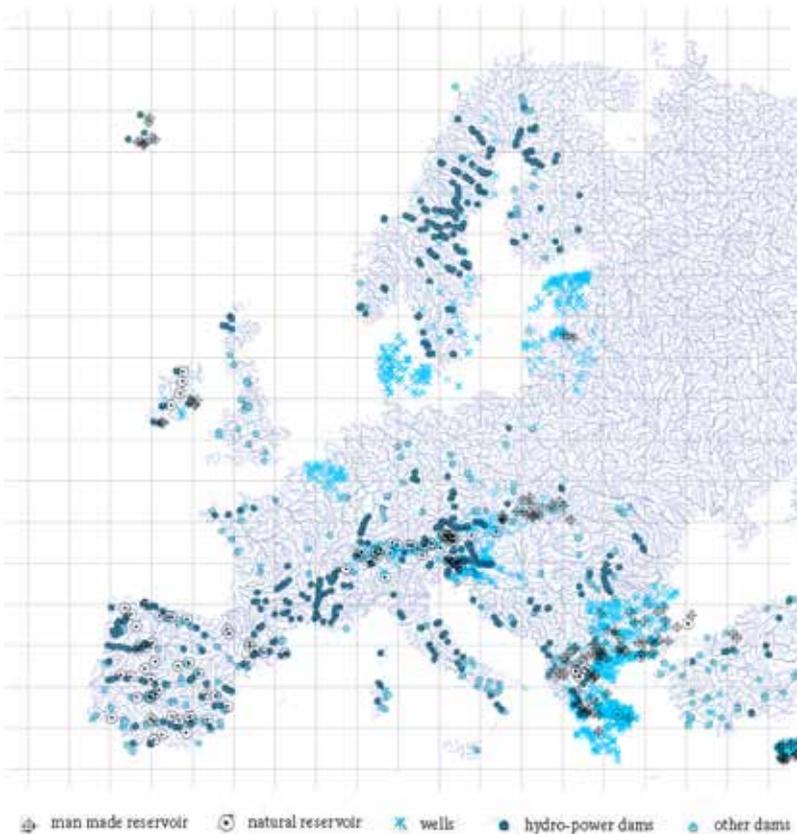


Figure 2: European water extraction and distribution of dams, artificial reservoirs and wells. Map elaborated by the author.

In Spain the hydraulic mission was seen as the solution to the social and political problems at the turn of the nineteenth century. After the *Disastre* period that followed the 1898, Spain was forced to turn in where and look for a new geographical configuration to escape the social economic stagnation. In the period of the “hydraulic regenerationism” (Costa, 1981) this shift implied a change in geography, the production of new space: a new waterscape, a progress that embodied physical, social, technological and aesthetic elements (Swyngedouwn, 2015).

The intensification of land use and its fractionalization into smaller plots were both used as methods to undermine the continues rural exodus to raise the value of the land, and to increase productivity in order to raise competitiveness production. Lack of water and hydraulic interventions were the kernel around which the possibility

for a national rebirth was articulated. Even though most urgent irrigation needs where in the South, a significant part of dams were directly related to energy production to serve the interests of the oligarchic elites around the larger fascist national project (Swyngedouwn, 2015).

Severe financial and economic problems together with recurrent droughts and intensifying social conflicts, were the obstacles through which a torturous process to design an integrated territorial policy, namely the formation of river basin authorities. Seemingly, Navarre region today is facing similar dynamics on the way in which water is used, distributed and used across the territory.

CONCLUSIONS

In the western world, the production of techno-natures has left the space

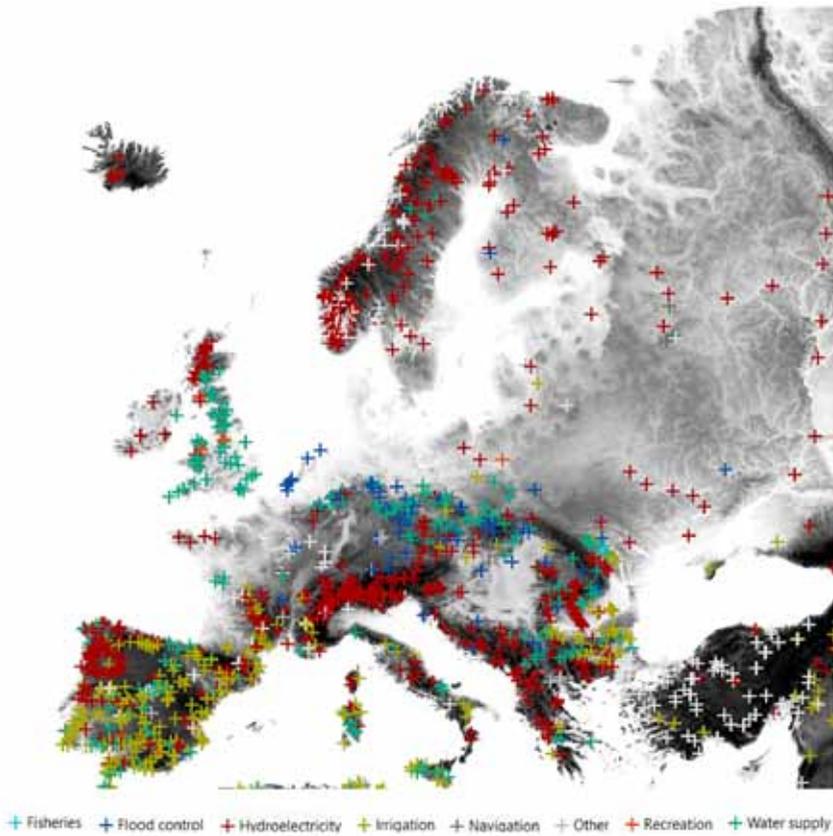


Figure 3: Map of the European types and distribution of hydropower (elaborated by the author). The varied geography of Europe has allowed for a broad range of hydropower types across different parts of the region, including pumped storage, run-of-river, and reservoir facilities at all scales. There is a high concentration of reservoir dams in mountains and glaciated areas, including the Alps, the Pyrenees, and Norway. [map/Spanish_National_Hydrological_Plan.pdf](http://theecologist.org/2018/mar/27/rise-and-future-degrowth-movement)
 Ecologist. Setting the environmental agenda since 1970
[http:// theecologist.org/2018/mar/27/rise-and-future-degrowth-movement](http://theecologist.org/2018/mar/27/rise-and-future-degrowth-movement)

to retro-natures, namely the dams de-commissioning phase, which aimed at 'restoring' nature status. After the 1970s dams started to be seen as symbols of ecological disaster and the unfulfilled promise of modernity (Kaika, 2010), as many failures and catastrophes started to occur more frequently across continents. Today the Veneto region is still trying to overcome this legacy: conflicts between competing needs, generation of power and tourist activities are in contrast with irrigation demands in the floodplain. In the Ebro basin current debates revolve around the loss of agriculture specificity and plots scales, which affects the land production qualities and job opportunities. The political role of landscape call for a reflection

on distribution of land resources as architectural and urban questions (Figure 2).

Recent debates over climate change, oil crisis and the pressing search for alternative resources in the western world have led many organization to promote hydropower again as a sustainable resource. Nowadays, either through small scale interventions or large-scale, long-term interventions landscape continues to be ceaselessly altered as much as in the past two centuries. The European Commission support to small-scales hydropower plants, like those in the Veneto region. In the larger scale, the Spanish National Plan, recently termed the Ebro River Basin Management Plan, calls for the re-routing of 35 rivers and

the building of 14 canals, embracing a total of 889 projects. The Balkan dam boom constitutes another currently debated case: 2,700 hydropower plants are under construction or proposed in the region, and particularly in Albania where, accordingly to the National Agency of Environmental Resources 500 private projects are under implementation. State subsidies in the Balkan region constitutes the fundamental problem of a very lucrative process, because while granting any private investor's project proposal for channelling rivers or dam construction for energy production, the State allows free choice on transboundary energy sells to nearby countries and renewable long-term water use rights (typically of 35 years).

Energy production is still being considered as an engine of prosperity linked to the real economy and to the development of the territory (Figure 3) although in strong contrast to with the emerging idea of degrowth in the EU Parliament (a scenario soon to be debated at the Post-growth conference in the European parliament of Brussels this 2018, 18th-19th September), which, despite having originally supported hydropower in the name of zero-carbon energy, is now urging for reconsiderations. Social conflicts over territorial appropriation procedures, water exploitation and environmental changes remain of urgent interest and debate. Concepts of reversibility and flexibility would have to urgently come into play in designing «projects of artificial geography» (Secchi, 2014:32), that could be reversible, adaptable and capable to construct large spatial policies which integrate design with socio-economic, political and environmental spheres.

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Hydro-Landscapes. Floods Are Landscape Builders

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Keywords:

Hydro-Landscapes, Waterscapes, flood control, conflicts, park

ABSTRACT

Floodings, with the consequent economic and material damages, are one of the most serious effects that climate changes and overbuilding have produced. In order to protect urban areas from inundations large flood storage reservoirs must be built. They are hydraulic infrastructures able to accumulate, in a controlled way, large volumes of water that overflow from streams, rivers or lakes' banks and spill over inside large areas of land.

Therefore when it comes to dealing with floods issue, many conflicts occur. There is a conflict between human and nature in which human feels threatened by nature because looks to floods as natural catastrophic events, also if they really depend largely from a not sustainable land management. But there is also a conflict between the inhabitants of agricultural territories upstream and the inhabitants of urban territories downstream because the former are damaged by flowage easement to protect the latter without obtaining truly equivalent benefits.

This paper presents a possible solution of such important conflicts by proposing Waterscapes that are able to transform flood water into a resource instead of being disaster producer.

INTRODUCTION

Hydro-Landscapes [Idropaesaggi] (Manfredi, 2008a) is the original name that was conceived to identify a sort of Waterscape based on the management of floodwater and water withdrawals to create a special type of park improving environmental quality, biodiversity and local economy.

This name refers the design criteria and the features of the scenarios output as the result of an interdisciplinary research, supported by Fondazione Cariplo and entitled: "*Environmental sustainability of the flood control works of the stream Lura: a pilot project of integrated and participatory management*"

The research was carried out by different subjects: Consortium of the Lura Park, research leader, with L.I.P.U. and Francesca Oggionni; Urban Hydraulics Research Center - CSDU, scientific coordination, with Etatec s.r.l.; DIIAR (Department of Hydraulic, Environmental Engineering, Road infrastructures and Detection), Politecnico di Milano, about hydraulic infrastructures and flood protection; DISAT (Department of Environmental and Territory Sciences), Università degli Studi di Milano Bicocca, about water quality and ecology; ABITAlab, BEST (Building Environment Science and Tecnology) with Monica Manfredi, Politecnico di Milano, about sustainable development, people's involvement, environment and landscape design; LURA AMBIENTE S.p.A. and Province of Como, Sectors of *Ecology and Environment*. (Consortium of the Lura Park et al., 2008)

To provide flood protection to urban areas in northern Milan, the Po River Basin Authority has planned to construct, along the stream Lura, 16 both fluvial and urban flood storage reservoirs, together with some first flush reservoirs, that will be able to accumulate a volumes of 1.200.000 cubic meters of water.

The stream Lura runs through the Lura Park that belongs to territories of 10 Municipalities, 8 of them are in Province of Como and 2 are in Province of Varese. (Lopez Nunes, 2008)

As a result, the park, the landscape and the environment have become research topics together with flood control and disaster management.

The aim was to define a pilot

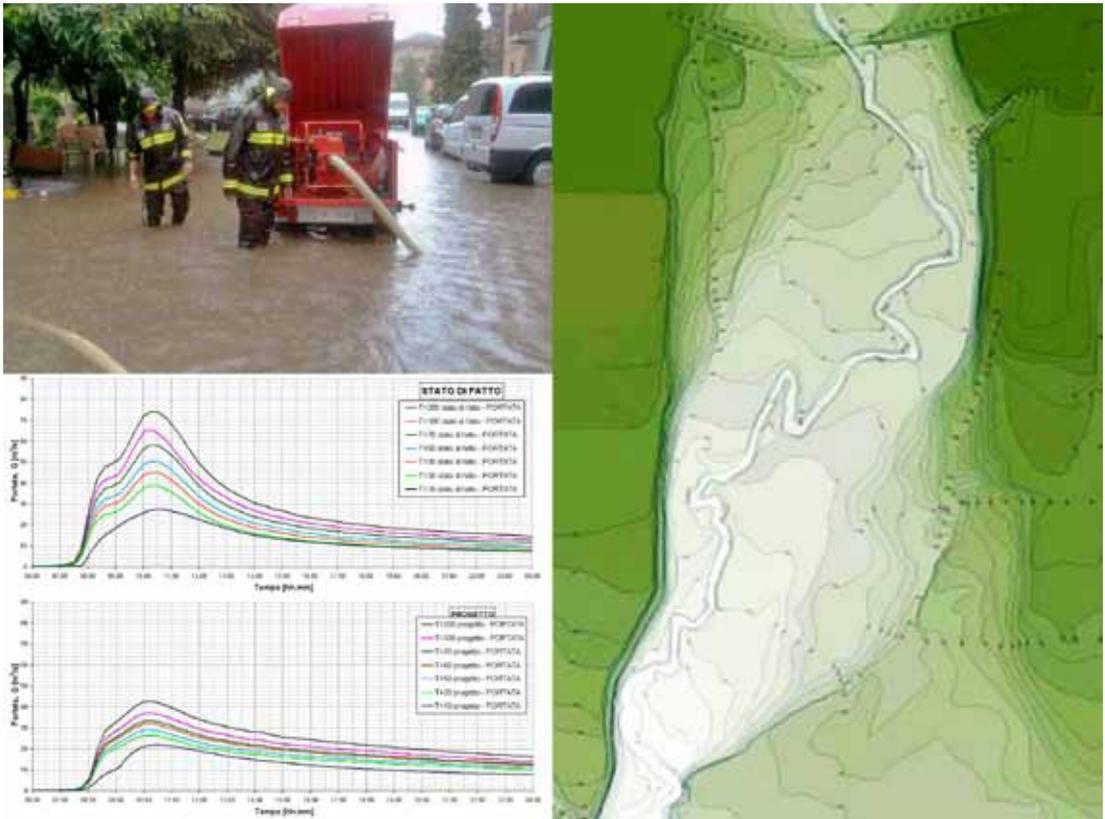


Figure 1. Flooding in urban areas, Saronno (MI), based on photo by Simona Giudici (2015); Contour lines of land surface in the municipalities of Bregnano, Lomazzo, Rovellasca, drawing by Francesco Lopez Nunez (2008, p.136); Comparison between hydrogrammes of the volumetric flow rates of the stream Lura referring to different return period with or without flood control infra-structures built, graph by CSDU (Consortium of the Lura Park et al., 2008, pp.82,84)

project starting focusing on the territory of Bregnano and Lomazzo.

So new guidelines to provide all necessary flood protection works along the stream Lura had to be established.

Transformations related to the construction of flood storage reservoirs modify current ways of life and production in large areas of the territory subject to flowage easement.

For this reason since the beginning of the design process the consensus on flood control works needs to be built.

The composition of the Research Grouping is exactly evidence of a multidisciplinary approach including involvement of stakeholders in the process of choices and proposals during all the period that the research is being carried out.

Suggestions and desires of inhabitants, local organizations and

public authorities have been gathered while purposes of the research were explained in numerous meetings and conferences.

This way of managing the decision-making process, regarding changes and developments induced by flood control works, is essential condition for their realization over the time and the best tool for providing necessary support and endorsement to make them possible.

HYDRO-LANDSCAPES

Flood storage reservoirs' construction involves an alteration of the original morphology of the territory that hosts them.

They are active factor in modifying physical, economic and production characters of the territory, they affect market value in place, possible



Figure 2. Agricultural fields inside the Lura Park and wetlands inside the Parco delle Cave, Milan, photos by Monica Manfredi; Earth retaining wall with bird nests in the Netherlands, photo by Massimiliano Biasioli (LIPU); A *Sympetrum Fonscolombii* and a Kingfisher at La Cassinazza, an agricultural area accomplished together with many naturalization maintenance, photos by La Cassinazza.

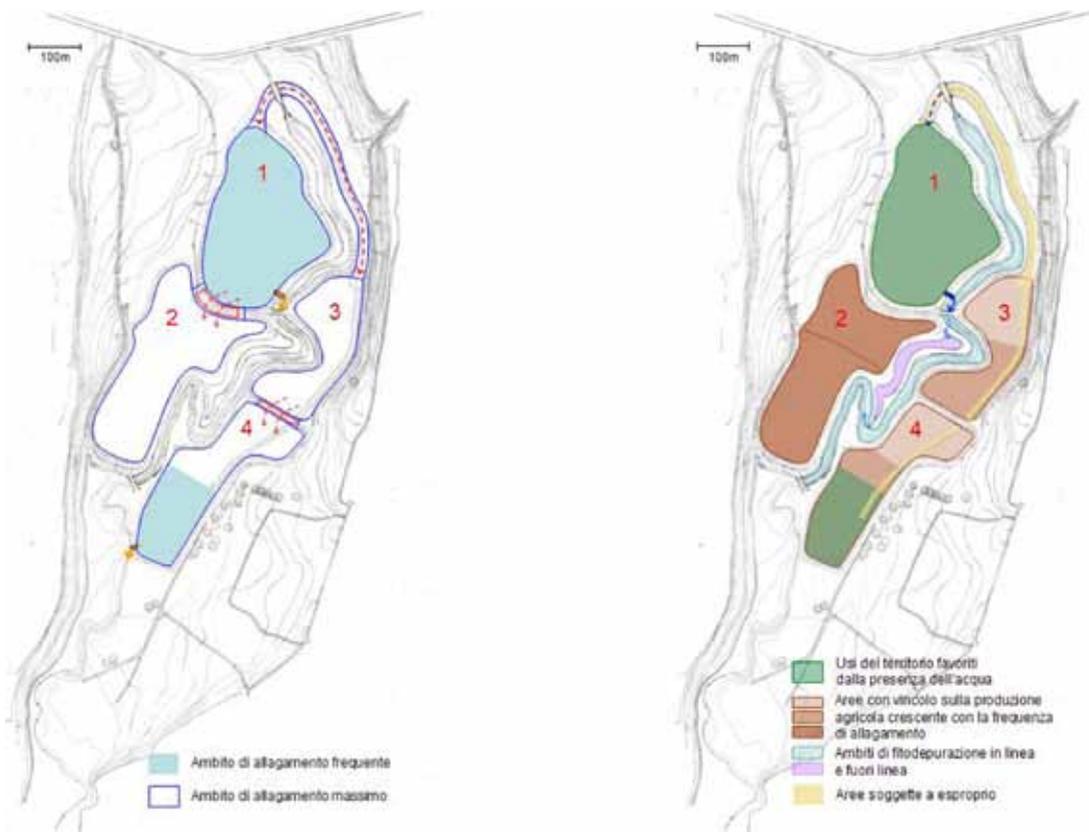


Figure 3. Scenario S1.a: Off-line flood storage reservoirs - Minimizing earthmoving (cut and fill)

land uses and activities that can be established.

But this so closely link between territory destinies and flood control infrastructures can become an opportunity of positive transformations. (Manfredi, 2009)

If we design *Hydro-Landscapes*, which are types of *Waterscape* that could not exist without flood water coming from the management and prevention of catastrophic events, we can say that we find an analogue in the *Pyro-Landscapes* by Gilles Clément which he describes as one of the four basic types of landscape in his *Planetary Garden*. (Roger, 2001)

In fact the birth of a particularly spectacular and specific vegetation "fire plants" is possible only as a consequence of fire destructive action. Seeds of some plant species, *Passive* and *active pyrophytes - black-boys*, pyrophytes of the southern zones for example - can germinate only in the presence of heat from the fire or by exposure to its fumes.

"Even the fire trees engage in a more copious flowering after its passage: the great white stalks of the black-boys that rise like spears towards the sky..."

"Work of fire gardening" "Could we not turn fire into our ally? And guide it instead of opposing it?..." (Clément, n.d., cited in Roger, 2001, p. 89)

Therefore the conflict expressed in human-nature opposition, emerging about destructive actions of nature that damages or threats inhabited areas and productive activities, finds its solution by human intervention that control catastrophic events and transform them in landscape builders.

By designing a *Hydro-Landscape*, flood water, available as result of catastrophic events or minimum river overflows, becomes useful for creating wet environments otherwise not possible inside the park that receives it.

In a *Hydro-Landscape* flood control infrastructures are not only

designed for flood protection efficiency but also to create new landscapes based on water management.

In this way rainwater come back to be a resource again, not a disaster producer. (Innocenti et al., 2009) (Figure 2)

THE TIME FACTOR

Within a *Hydro-Landscape*, flood protection infrastructures and the park that hosts them, produce together a positive interaction because of the combined presence of three elements: availability of water, soil modeling and the time factor.

By their coordinated and integrated design the *Hydro-Landscapes* are built as instantaneous visions of moving water and permanent configurations of environments deeply linked to hydraulic management.

The flood control infrastructures act in two ways on the construction of a park.

They modify the topography of lands giving them a new stable shape consisting of the height of the basins' embankments and the dimensions and configurations of the storage areas, channels and other flood control devices.

But also manage flooding sequences of basins and the time of permanence of flood water inside them producing dynamic features and temporary visions of the park.

Floods have a more or less rare frequency depending on their size.

Small floods impact on the territory with short return period, even one or two years, great floods occur with long return period, 100 or 200 years, producing catastrophic events.

The return period referred to floods is the number of years that statistically elapse between two rain events of the same intensity.

The statistical frequency with which a flooding phenomenon occurs is inversely proportional to its severity,

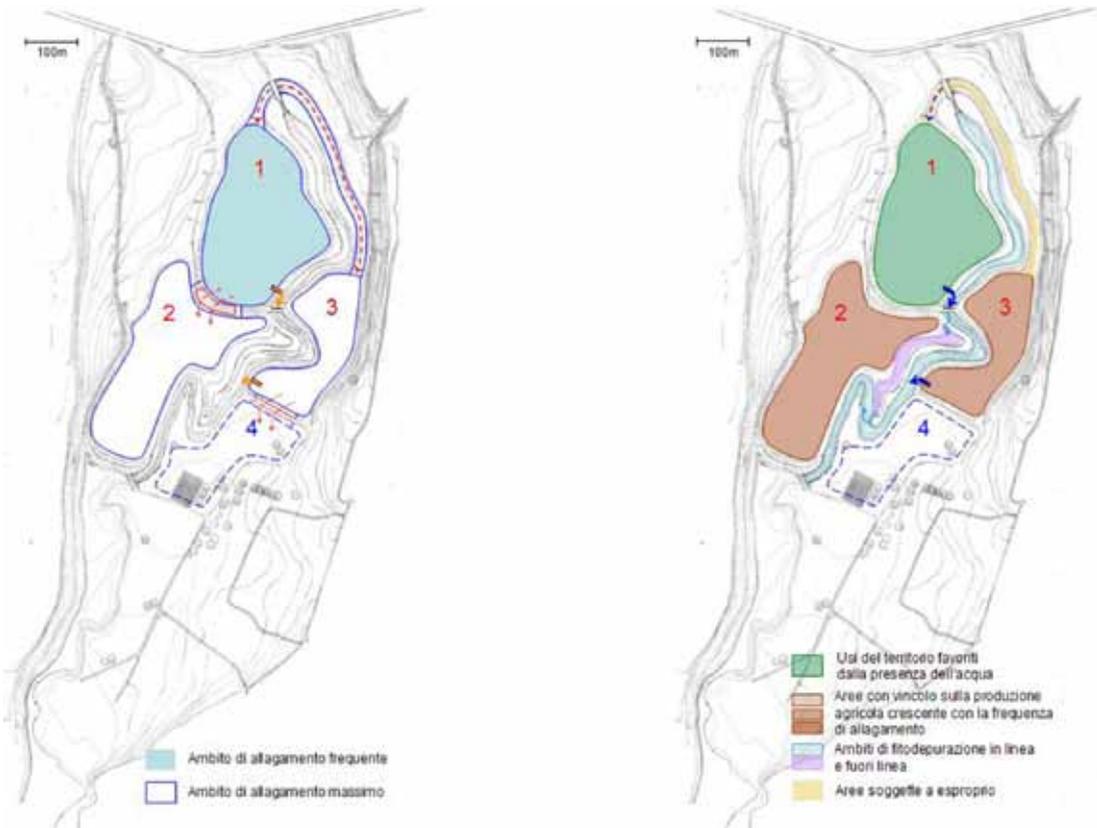


Figure 4. Scenario S1.b: Off-line flood storage reservoirs - Minimizing land transformations

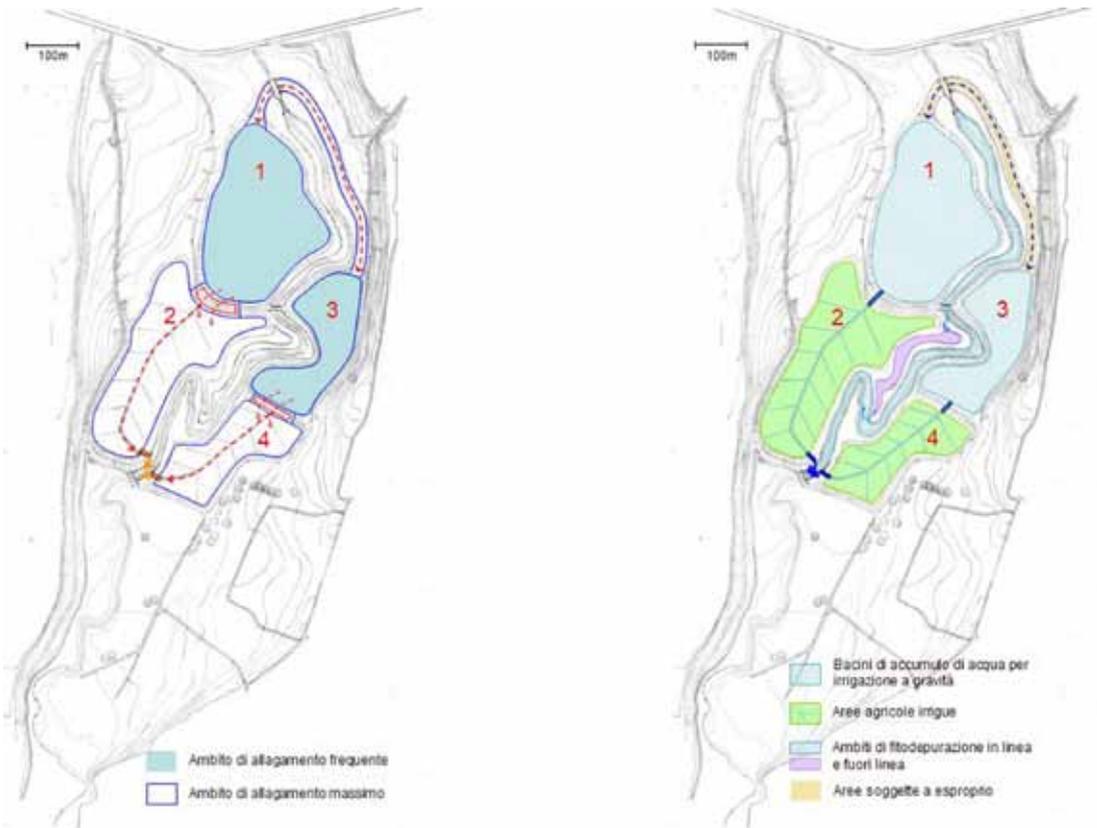


Figure 5. Scenario S1.c: Off-line flood storage reservoirs

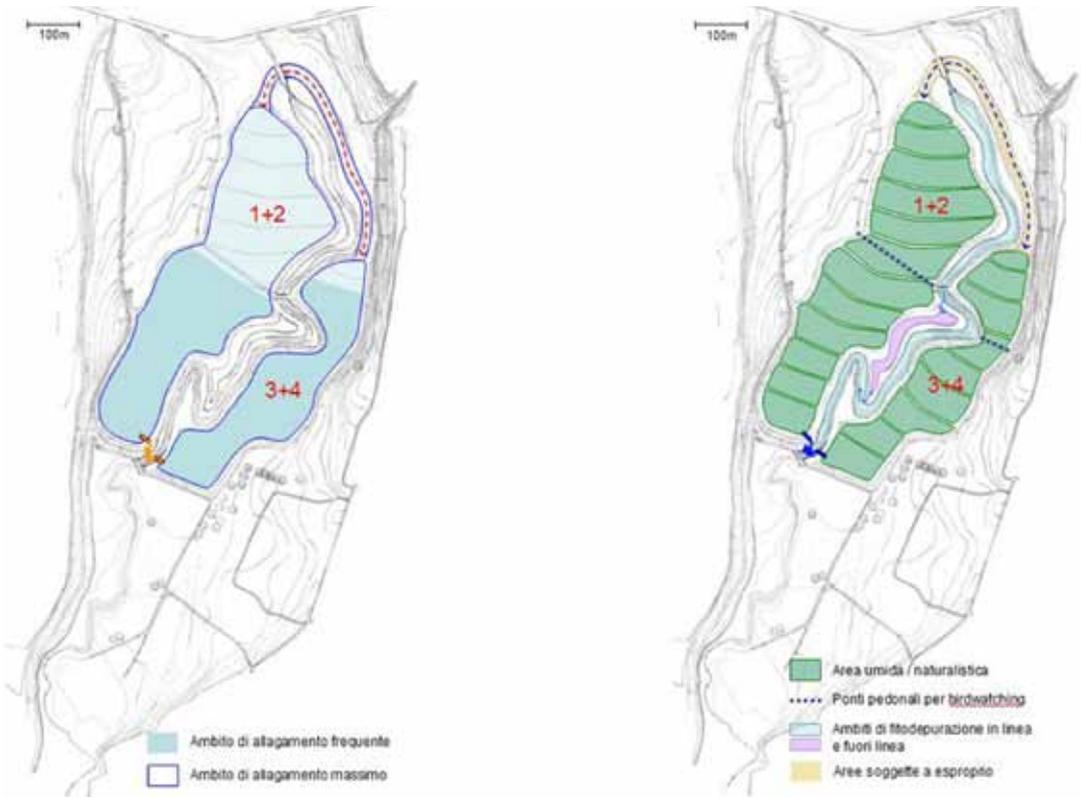


Figure 6. Scenario S1.d: Off-line flood storage reservoirs - Wetlands and nature reserves

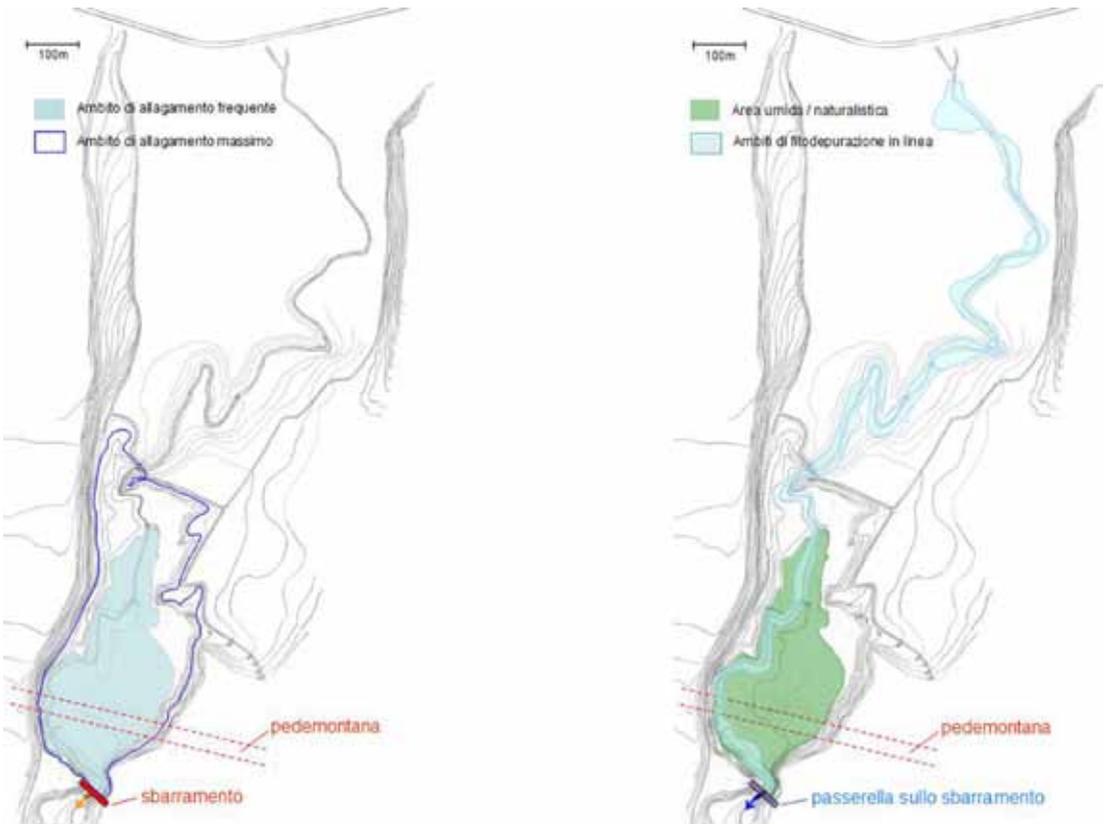


Figure 7. Scenario S2: In-line flood storage reservoir

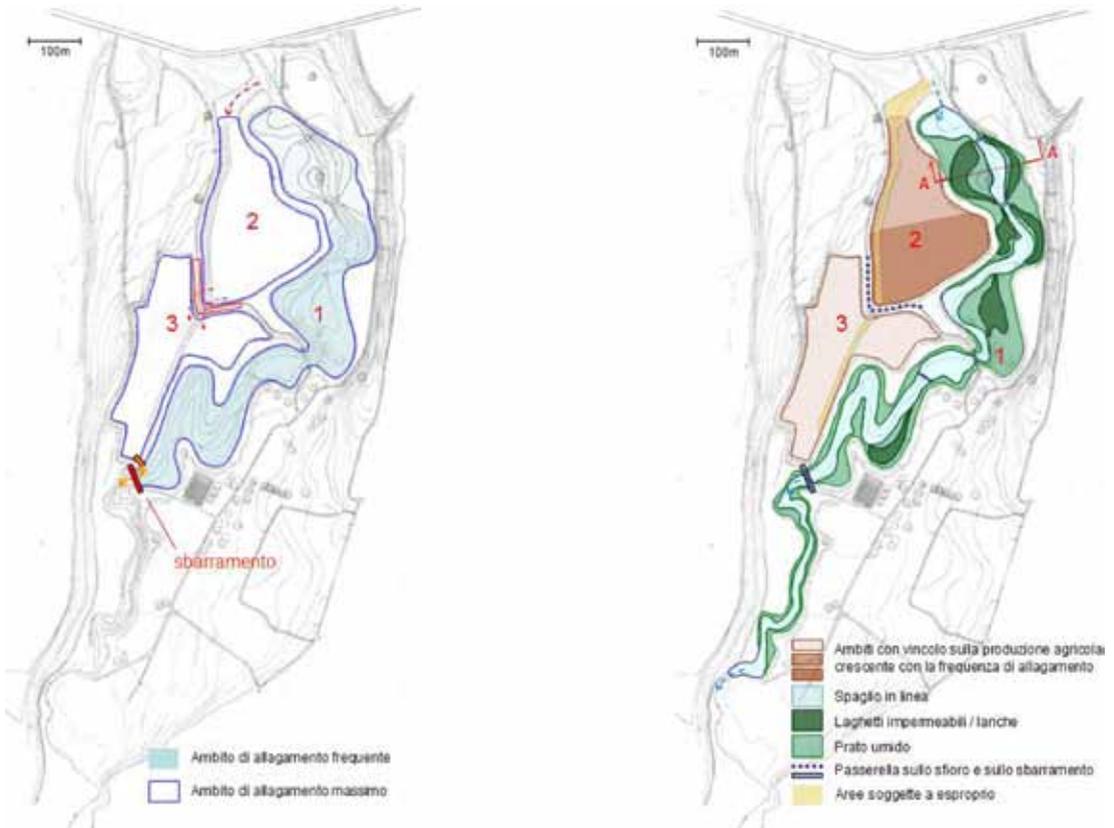


Figure 8. Scenario S3: Both on-line and off-line flood storage reservoirs - Wetlands and current agricultural production

i.e. it is inversely proportional to the intensity of the corresponding rainfall phenomenon.

The great floods, according to which flood storage reservoirs are sized, happen rarely over time, while small floods are frequent.

This circumstance implies that the lands subjected to flowage easement are continuously prone to floodings that stress them influencing uses and economic values.

So it becomes necessary to govern these negative events trying to turn them into opportunities instead of being damaged by them.

Within a *Hydro-Landscape* the floods return periods become related with the emergence of a type of park that receives from floodwater new and precise opportunities for its construction.

The importance of time belongs to the nature of the living matter by which

the park is made.

The park modifies its image and physical form according to the changing seasons, a measurable time, according to the growth of plants, a knowable time, but also, in the case of a *Hydro-Landscape*, according to meteorological events that are statistically predictable but not localizable at a particular time.

However, there is a problem of concordance between the statistical time when water is available by flooding and the time when water must be available to be useful for the biological life of animals and plants.

In fact the flood water quantity is inversely proportional to the frequency of its availability and not continuously present.

For this reason an adequate amount of water taken from the stream has been necessary to be associated with water coming from floods.

The hydraulic devices, deployed for flood protection, are implemented and modified in order to withdraw water from the stream to maintain the necessary and continuously availability of water.

So the hydraulic infrastructure can act on the configurations of the park by defining the times and the ways of taking, storing and distributing water, becoming the "choreographer" of waterscapes in motion.

SCENARIOS

The main strategy to design a *Hydro-Landscape* is planning of land uses that are not only compatible with the presence of flood water but that are also promoted by it, involving those parts of territory that are subjected to small but frequent floodings differently for each specific hydraulic scheme.

In this way the maximum integration and best mutual influence between flood control and park life is realized.

Inside a *Hydro-Landscape* large and small quantities of rainwater, which would otherwise invade inhabited areas and productive lands, are integrated with the structure, morphology and life of a new park.

The principal land uses that characterize a *Hydro-Landscape* are wetlands, wet environments and nature reserves or even basins for storage flood water to be reused in irrigated agriculture.

The management of flood water volumes is combined with their treatment and reuse to improve environmental quality within each scenario.

The research focused on six scenarios whose names refer to the different land uses that characterize areas subject to frequent floodings.

Each scenario provides the same flood protection in urban areas while the different land uses determine which type of park will emerge.

A description of scenarios shows how the concept of *Hydro-Landscape* can be used to create different types of park.

The criteria for designing flood storage reservoirs inside a park (or for designing a park that hosts flood storage reservoirs) are determined but none configuration of the park is predetermined. (Consortium of the Lura Park et al., 2008, pp. 187-289; Manfredi, 2008b).

This means that the characteristics of a *Hydro-Landscape* are identifiable in different parks, making it a generalized concept.

Drawing the Scenario S1.a (Figure 3) a cost containment criteria has been adopted by minimizing earthworks.

The image shows the correlation between the frequently flooding areas and the land uses that are associated with them.

Within the basin 1 biomass, grass or low quality crops can be produced. The other basins maintain the current agriculture with increasing production constraints in relation to flood frequency.

The objective of the Scenario S1.b (Figure 4) was to minimize land transformations by reducing the number of flood storage reservoirs. Land uses are similar to the previous scenario.

The Scenario S1.c (Figure 5) corresponds to an Agricultural Park where two large vegetable gardens are irrigated by flood water stored in two large artificial lakes.

By proposing the Scenario S1.d (Figure 6), priority was given to improving water quality and increasing biodiversity. In fact it was planned a wet park through the creation of wetlands and nature reserves that occupy all areas of flood storage reservoirs.

The Scenario S2 (Figure 7) is positioned to take advantage of the topography of land. In fact it is planned to build only a large on-line flood storage reservoirs within a natural depression of land.

The construction of a large wetland and a nature reserve is planned and current agricultural production is maintained around.

Different wet environments characterize the Scenario S3 (Figure 8) where frequent flooding areas coincide with the on-line flood storage reservoirs.

Here a great variety of environments is in function of different levels of water that are regulated by modeling of land surface.

Instead within the areas of off-line flood storage reservoirs current uses are maintained with constraints on agricultural production.

CONCLUSION

Hydro-Landscapes can therefore be defined as dynamic landscape configurations based on the integrated construction of a flood control infrastructure with a park.

The possibility of building *Hydro-Landscapes* was verified designing some scenarios that associate land uses with flood sequences in different flood storage schemes: on-line, off-line or a combination of them.

Each scenario represents the possible coexistence of flood protection with the improvement of environmental quality and with a greater profitability of production activities within a particular type of park.

The different scenarios show that is possible to build in the same place different parks that respect all features of the *Hydro-Landscapes*. (Consortium of the Lura Park et al., 2008, p. 280) indeed the goal of the research has been to identify some guidelines for designing flood storage reservoirs together with a park and not to propose a specific scenario as the best.

The research aims to influence the current practice of planning and design flood storage reservoirs in relation to territory and its inhabitants.

In order to limit costs the project of flood control works generally proposes

minimizing earthmoving together with mitigation and compensation works to reduce impacts that result from the flood storage reservoirs realization and maintenance.

On the contrary, the scenarios propose the flowage easement as a producer of positive opportunity and not as a producer of damages that have to be compensated.

The research studies some flood storage schemes associated with specific land uses in areas most prone to floodings.

Each one creates a different scenario presenting itself as a positive opportunity and able to resolve the conflicts.

“... nature had much to teach us, it was not an enemy to fight, but on the contrary we could have the tools to make us an ally”.

The words pronounced by Gilles Clément during an interview by Simona Calvagna (2004, p.101) suggest that nature and its manifestations, even catastrophic, can be guided by man in his favor.

Nature offers its riches to man and it is up to him to know what to do to get an advantage from this relationship.

Human must act locally but in the name of a planetary consciousness that recognizes the finitude of the resources of the Planetary Garden and must produce actions aimed at preserving, enhancing and renewing the resources offered by Nature, even when it manifests itself in adverse conditions. (Clément, 1999)

Furthermore, the reuse of water that becomes available through flood events belongs to an ecological behavior that should generally be applied to saving and reusing water as a resource.

This requires both specific attention from the designers and the construction of a widespread awareness. (Dreiseitl and Grau, 2005)

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Inherit and Develop Traditional Eco-Wisdom of Polder Landscape in Yangtze Watershed Based on Landscape Regeneration

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Landscape Regeneration Ecological
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Control

ABSTRACT

The polder is a wise response of ancient Chinese to the lowland environment in Yangtze watershed. Nowadays the conversion of land-use from polder to new town results in isolation from this traditional eco-wisdom, which manifests as aggravation of the risk of flood, decrease of biodiversity and obsolescence of the original model of human settlement. To make reconnection, we summarize the mechanism of the traditional polder landscape based on reviewing literature of ancient books and pertinent researches, and find out it is efficient coupling of three subsystems, namely economy, environment and society, that provides the driving force of regeneration. To reconstruct coupling and balance of system is pivotal to constructing a sustainable new town. Taking Hangbu New Town of Anhui Province in China as a case, the paper further explores specific planning and design strategies and methods. The conclusion can be drawn that new town planning should refer to the traditional polder wisdom's way of organizing stormwater, land-use and human beings.

INTRODUCTION

In the history of exploring the way to dwell in nature, people in Yangtze Watershed have summarized numerous eco-wisdom, among which is the polder system most prominent. Polder

is a kind of field that is surrounded by banks and zoned by ditches in lowland area (Huafeng, 2005). Essentially speaking, polder landscape is total human ecosystem that links nature and society (Naveh, 2000). It is based on human's in-depth understanding of lowland environment, which follows ecology principles and ecosystem processes, so as to meet human's living needs.

With the continuing urbanization in China, there will soon be a lot of new towns in the Yangtze Watershed. The intensive construction of new town will transform the patterns of land-use in agriculture society, which will lead to a series of changes in the environment and society, breaking the balance of the original total human ecosystem. Firstly, a lot of farmland will be replaced with constructed land, resulting in decrease of surface runoff percolation and then aggravation of the risk of flood (Wang Jieqiong, 2016); Secondly, regional biodiversity could not be thoroughly avoided (Li Junsheng, 2005); Lastly, demographic growth makes traditional low-density settlement model in agriculture society no longer applicable (LI Hong-bo, 2015).

Could the traditional polder eco-wisdom still have reference value for the contemporary new town construction? To respond this question, the paper summarizes the dynamic mechanism of regeneration of the traditional polder landscape in Yangtze watershed based on literature review. Thus, the mechanism is developed to adapt to today's nonagricultural society. Taking Hangbu New Town of Anhui Province in China as a case, the paper further explores specific planning and design strategies and methods, providing an example for inheritance and development of the traditional polder eco-wisdom in present day.

DYNAMIC MECHANISM OF TRADITIONAL POLDER LANDSCAPE REGENERATION

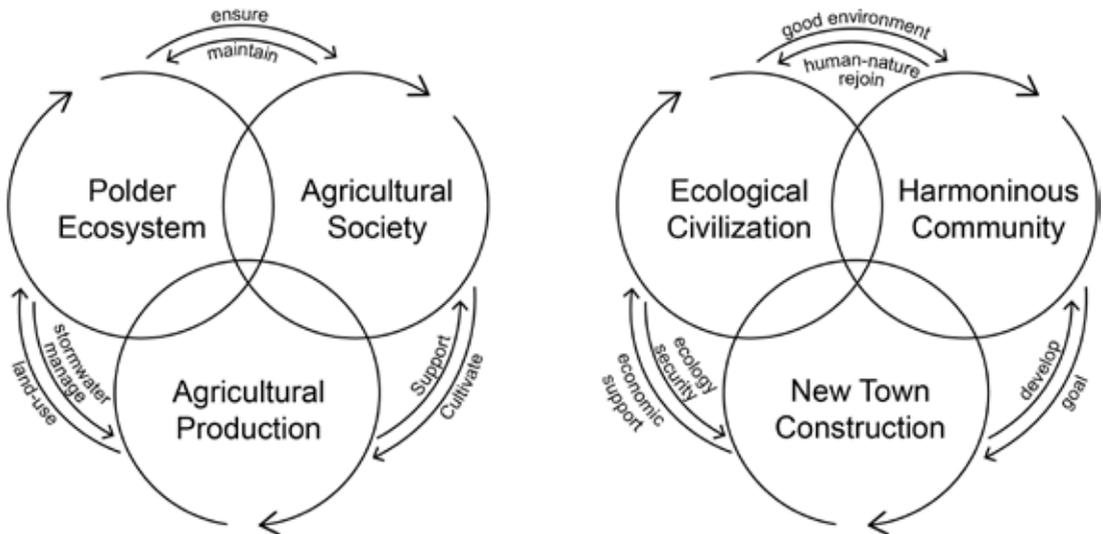


Figure 1: Polder Landscape Regeneration Mechanism

The traditional polder landscape integrates human and nature, including three aspects of flexible stormwater, efficient land-use and polder-based community. Three components play their own role in the system so properly that the landscape is like living organism and could regenerate continuously.

Flexible Stormwater Management

Traditional polders consist of three parts, namely polder banks, ditches, and water conservancy facilities. They are complimentary in solving the problem of uneven distribution in temporal and spacial dimensions of water resources. The banks play a key role in separating water and land. It is constructed under the principle that water resources are allocated in order of hierarchy. Outermost banks are the first defense, which are raised higher and extraordinarily consolidated. Internal banks are built according to topography and elevation (Fang, 1985). They make it possible for stormwater to only enter one or a few sectors during rainstorm season, preventing farmland from being entirely flooded in a short time (Gengji, 1980). Ditches are also divided into two kinds. The outer one serves ships' transporting and stormwater

regulating (Jialun, 1980), while the internal one irrigating and draining. Ditches are required to occupy least land area but provide most efficiency. For example, Increases the contact area between water and soil could raise the rate of drainage (Kai, 2007). Water conservancy facilities are the key to regulate polders' functions. For instance, bank locks are the control switches of the polders, with which people can regulate the irrigation and drainage of the entire system according to changes in hydrological conditions inside and outside the polder banks.

Efficient Land-Use

Planting on banks is an important way of land use in Polder system. First of all, trees are rooted in banks and have such strong soil-retaining function as to prevent banks from erosion of rainwater. Sometimes people even plant trees at first to consolidate the soil, and after years then construct banks on that (Jiange, 2006a). Tree species vary from mulberry to other various fruit trees, which can generate profit to farmers (Zhuang Huafeng, 2013). Furthermore, plants adorn polder banks and many ancient chinese poets have been inspired by that and left many marvelous masterpieces to depict the picturesque landscape.

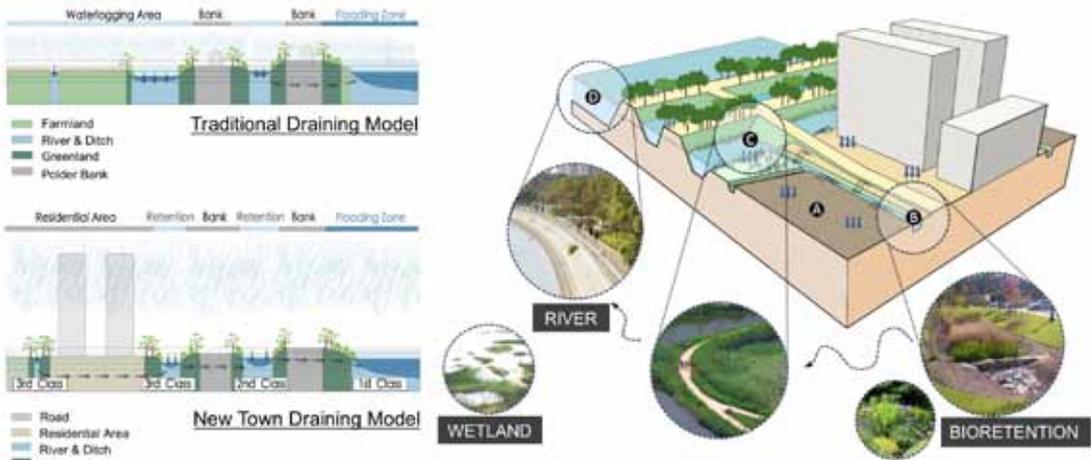


Figure 2: Water Classification in Hangbu New Town



Figure 3: Master Plan of the northern wetland park

Polder-Based Community

In terms of settlement patterns, people in the polder areas usually dwell on the banks to escape from flood disaster. As a result of that, the residential cluster often presents linear. Moreover, with respect to customs, residents around Chaohu Lake in Anhui-province nowadays still set graves on polder banks, which not only helps prevent flooding, but reflectst that polder system is closely bound up

with birth and death of people in polder areas. Lastly, as far as management methods are concerned, residents in polder areas allocate tasks of maintaining polder banks according to the distance between houses and banks or the number of private farmland (Zhuang Huafeng, 2013). Someone is elected as polder manager and is responsible for organisation and supervision of polder maintenance (Tao, 1995).

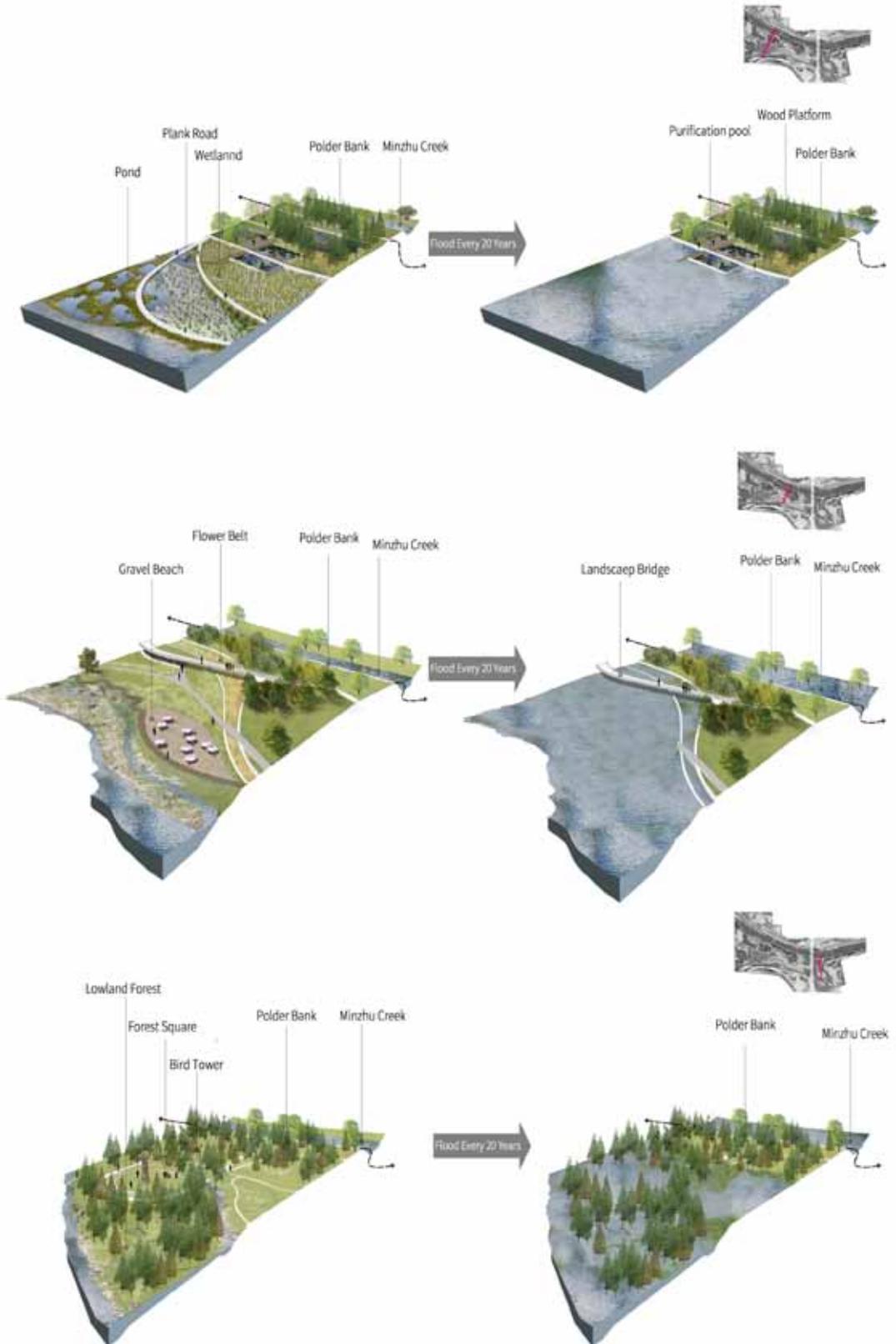


Figure 4: Flood-adaptive Landscape Design

Coupling of Economy-Environment-Society Subsystems as Pivot of Polder Landscape Regeneration

Regeneration is a biological term used to describe a process in which a part of living organism is recreated after being damaged, shed, or cut off. It has become a concept of planning and design since the 1990s, emphasizing the ability that landscape achieves a dynamic balance and in different situations manifests as features of living organism, including adaptation, resilience, restoration and growth. We have once reviewed the history of landscape regeneration theories and constructed a conceptual framework combining with oriental philosophy. The framework includes ecological theoretical wisdom and ecological practical wisdom. The former requires that process of landscape regeneration should cohere with features of the total human ecosystem, and the latter requires observing and reflecting the relationship between human beings and nature (Daixin, 2017).

Through summarizing the features of the polder landscape system, we find out the reasons why it can adapt to flood disaster and continually exist. It is due to the coupling of its three subsystems (see Fig.1a), namely economy (agricultural production), environment (ecosystem), and society (farming society). For instance, polder banks prevent nutrients in the soil from being pushed out of fields by rainwater (Jiange, 2006b) and meanwhile polder, as wetland, provides habitats for various species (HOU Xiaolei, 2015). Polder banks defend flood for residents, while residents spontaneously unite to protect banks (Zhuang Huafeng, 2013). For nature, the efficient flow of matter and energy in the ecosystem ensures realization of functions (Wu, 2000). For human society, human beings, as stakeholders, become the system's maintainer. You could say

that components of polder landscape are coupled with each other so tightly that the system is able to on-going run. Therefore, we should pay more attention on spatial structure and elements which bear the coupling relationship of polder system when constructing new towns, such as polder banks, biological communities and so on. Based on that planning of new towns should focus on how to construct a new balance of economy (new town construction), environment (eco-civilization), and social (harmonious community) (Fig.1b).

A CASE IN HANGBU OF ANHUI-PROVINCE, CHINA

Hangbu New Town is a representative of new town construction practices in Yangtze Watershed. It is adjacent to Chaohu Lake and located at the confluence of Hangbu River, Fengle River, and Xiaonan River. Residents in Hangbu have also established a polder system earlier, however, due to the development imbalance between urban and rural areas, the ditches have been congested with silt and grey water are disposed and discharged without any management. That ultimately results in flow's stagnating for lack of hydrodynamic force. At the same time, the outer polder banks are not well maintained in years and cannot meet the standards of resisting floods. Thus, these years stormwater frequently breaks through the polder banks. Our research team proposes to integrate the new town planning with the existing polder system, which learns from the traditional polder system and also consists of three aspects of stormwater, land-use, and residents.

Urban Flood-management System

The primary principle of flood control in new towns is to follow the traditional strategy of hierarchical banks and establish an urban flood-manage-



Figure 5: Greenway on the Polder Bank

ment system. The system aims to delay flood peak of runoff flows and achieve decentralized control of stormwater. Specific approaches are as follows:

Polder banks should be reserved and adjusted. In the planning of Hangbu New Town, the banks will be selectively reserved or rebuilt. All of the outer surrounding banks have been reserved, and the height standard has been

raised from every 30 years to every 50 years. As for inner banks, there are only some conjunctions between planned roads and them, because polder banks in Hangbu mainly stand from east to west, thus they could be conserved as much as possible. Only in the north of Hangbu should new polder banks be constructed to unite all banks as whole one.

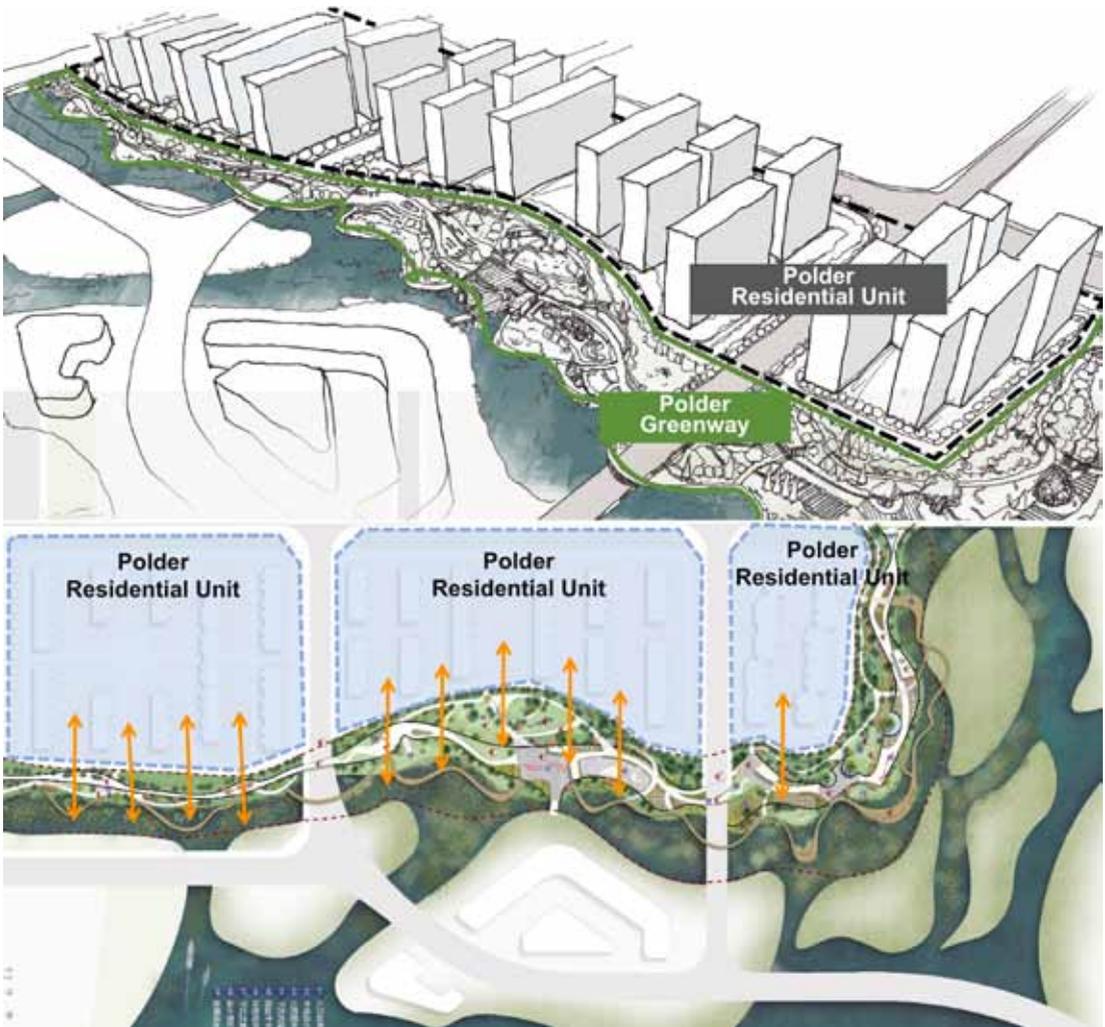


Figure 6: Open Residential Community

Based on the banks, hierarchical drainage System will be constructed. The original ditches should bear more responsibility of retaining and draining rainwater than before, for the construction activities will weaken the ability of the land to absorb runoff. So first of all, silt should be eliminated to restore ditches. Then ditches will be widened to strengthen retaining capacity. After that, the goal is to establish urban hierachical drainage network. As shown in Figure 2, the first class refers to urban rivers and suburban natural wetlands, for example, Fengle River and Hangbu River, and suburban wetland parks based on the existing large-scale swamp. The

rainwater will finally be drained into this class. The second class consists of creeks which originally exist or newly excavated around each retaining sector, which collect the runoff from the third class and then transport it to the first class. Bioretention, especially rain gardens, ecological open ditches, etc, make up the third class. They, like capillaries, gather the runoff inside the urban construction area. In normal times, runoff is retained and evaporates in-situ, but when flood comes out, the drainage system can fastly transport the superfluous water so that the pressure of discharging flood could be shared for rivers and the town's security could be guaranteed.

The development of engineering technology has enabled Hangbu New Town to rely more on engineering measures to accelerate effluents of stormwater, so that the town has multi drainage approaches, including engineering drainage, self-discharge, and infiltration in-situ. In the planning, Hangbu has been divided into three drainage zones according to drainage capacity of each ditch and creek. Each zone will have a pump station, located at confluence of the second-class creek and the Hangbu River or the Fengle River. The capacity of each station accords with ability of self-discharge and infiltration in-situ. Rainwater and greywater in residential areas are discharged into second-class creek via bioretention, where the runoff could fully infiltrate into land. At the same time, if there is still superfluous waterlogging, it will be pumped outside the town or be conserved in wetlands in the suburban areas.

Enhance of Ecosystem Services

The polder land used to function as agricultural production, but the construction of Hangbu has changed the way of land-use, which means the production function does not come first any longer and instead integrated functions of ecology-production-living. Under the background of deteriorating global environment and more frequent extreme weather, management of land does not only mean promoting its sustainability, but also imposing positive effect on the environment by means of positive development (Birkeland, 2012). Therefore, new town construction should preserve current supporting and regulating ecosystem services and moreover explore ways of services' performance promotion. The approaches could be as follows:

Reserve bank biotopes for supporting ecosystem service. The ecological importance assessment indicates that in polder areas especially

like Hangbu, where farmland is the dominated ecosystem, polder banks are the area with highest biodiversity and the most complex vegetation structure. To reserve plant communities on polder banks could provide supporting ecosystem service to new towns. In Hangbu, the reserved banks offer 55 hectares green lands. On that grow a large number of natural forests, mainly *Pterocarya stenoptera* and *Broussonetia*, where various birds and small animal dwell. The planning also proposes a concept of animal passages, which are set in transport facilities to reduce interference of roads on the original animal's activities.

Reserve wetland for regulating ecosystem service. With regard to the goals of runoff control and rainwater purification, green land system of new towns should be resilient and low-cost. In Hangbu there are a lot of ponds and wetlands, which are perfect natural retention. It has been proposed to reserve the wetland near Fengle River in the planning. It will be designed as a rural wetland park, which establish an ecological barrier around the New Town. What's more, there is a green land in the north of the town with an area of more than 40 hectares. A creek, important for drainage, flows through it and then into Fengle River, which makes it a significant node of the ecological security pattern. Therefore, it is designed as a park which is able to retain stormwater instead of an ordinary park (see Figure 3&4). The design fully considers the adaptability to flood, planning a complete process of retaining and discharging flood and landscape in different water levels.

Construct polder greenway for cultural ecosystem service. In agricultural age, the space on polder banks merely functioned as transportation and residence. However, nowadays the space is returned to the public and has the potential to become important public space for new towns. In Hangbu we have planned a

greenway based on the polder banks network, which link nearly all the space on the banks. According to different themes, like ecological education, natural recreation and so on, the polder greenway is divided into different sections, where various landscape and public space have been designed. As shown in Figure 5, as a unique landmark, the polder space will feature the new town. There can residents perceive and know the town and carry out diverse recreational activities.

Residents -

Open Residential Community

Nowadays population in polder areas is much larger than in the age of agricultural society. It has become unrealistic for residents to live on the banks to escape from flood as in the past. This kind of settlement cluster, where residents live and work interiorly, and recreate and communicate with each other exteriorly, is an attempt to innovate the traditional polder settlement model and it is good for activating communication between neighbourhood. Traditional residential unit is endocentric, for internal greenland is located in the center of it. Thus, different units lack good contact. In the new model, service facilities, which are necessary for daily life, are placed within units, while recreational activities facilities along borders. Figure 6 shows an urban park built on the original polder bank. It links the daily leisure life of the residents all around.

and resilience. Yet its precondition is a continuous regeneration motivation and a matched mechanism. For the traditional polder ecosystem, how to dwell under flooding motivates the landscape regeneration and the coupling of the three subsystems provides the driving force. As new towns as are concerned, the motivation has not changed but it is necessary to reconstruct the coupling and balance of the three subsystems, referring to traditional eco-wisdom's way of organizing stormwater, land-use and human beings.

REFLECTIONS

John Lyle once used floating seeds as a metaphor for land development. He tends to express that only with a deep understanding of ecosystems can our planning and design for the land form a stable living organism (Lyle, 1999). Facing the tensive relationship between land and human, we believe the solution is landscape regeneration, which can strengthen ecosystems' adaptability

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The Landscape of an Agreement: The Role of Regional Landscape and Territorial Agriculture in a Future Peace Agreement Between Palestine and Israel

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Keywords:

regional landscape, territorial agriculture, religious landscape, geopolitical landscape, spatial religion

ABSTRACT

The research delineates a spatial notion of regional landscape, which is integral to complex urban-rural areas such as the West Bank. The analysis addresses territorial agriculture, nature reserves, religious landscapes, expanse and horizon - as a central geopolitical platform in the Palestinian-Israeli conflict.

We initially examine regional landscape in the context of a future prosperous Palestine, as a trigger for balanced growth, and as part of a rural and regional urbanism. Israeli proposed annexations are challenged on this basis. Following this, we examine Israel's land swap policy, proposing a limitation on the area of land that can be given, and in turn annexed. Next, we consider religious agriculture and landscape as part of the Israeli settlement, and propose to focus on Israel's affinity with heritage landscapes, instead of annexing designated "settlements without landscape". Finally, we show the drastic effect the settlement of the mountain had on Israeli culture and society. We suggest that Israel should rebuild "a culture of the plain". Regional landscapes directly affect vast populations. Understanding and defining their role is critical to the discipline of landscape architecture, broadening its scope and responsibility.

INTRODUCTION

Any future peace agreement between Israel and Palestine will require a

territorial solution for agreed borders. Our applied research, used by key NGOs and thinktanks, proposes three foundations for discussing a solution: 1. Which territories in the West Bank can Israel annex to its 1949 Armistice line territory, while enhancing Palestine's potential for long-term prosperity? 2. Which territories within Israel's 1949 Armistice line can Palestine annex in return, as part of a "land swap"? 3. Which heritage territories in the West Bank should Israel maintain affinity with? The areas Israel intends to annex are also proposed as a territory where Israel can continue to build today. Thus the discourse is not only academic or diplomatic, but has a present, urgent, critical influence on any future agreement.

The West Bank comprises an **integrative, regional urbanism**: intertwining cities, traditional village clusters, agriculture, open spaces and infrastructure. The research delineates a spatial notion of **regional landscape**, which is especially integral to such complex urban-rural areas. Territorial agriculture and water, nature reserves, religious and historic landscapes, spatial religions, expanse and horizon - all have a central role in the Palestinian-Israeli conflict, and in any future peace agreement. The following article will present the role of "regional landscape" and "territorial agriculture" within this context.

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As a research and design studio integrating architecture, landscape and planning, we base our projects on a critical, methodological mapping of the lands and regions in which we work. It is accompanied by academic work at the LandBasics programme in the Technion, Haifa. Thus the context in which we were approached to conduct this study is that of advancing towards scenarios, proposals and an agreed solution.

The research presented here not only directly affects the issues



IMAGE 1a – Regional landscape as integral to growth – Palestinian proposed poly-centric network, nature sensitivity, and agriculture.

IMAGE 1b – Regional landscape as settlement – Israeli agriculture, nature reserves, and heritage landscapes.

discussed with practical planning proposals, but also illuminates adjacent subjects, such as the character of nature, expanse and horizon. In a time of extreme political transformations, landscape architecture should broaden its scope and responsibility. Regional landscapes directly affect vast populations, and should be planned as such - from a clear geopolitical stance, and towards a clear and effective design. We believe the lessons from this study are relevant worldwide. It is especially true for rural regions, and their critical importance in national planning today.

THE LANDSCAPE OF A PROSPEROUS PALESTINE

A stable, lasting and just peace is only possible between two countries with equal opportunities. It requires a prosperous Palestinian state, with a scope for long-term, balanced growth.

One should not merely focus on the partial functioning of a given space today (as is often done to justify present settlement), but rather examine possible future development, in a variety of scenarios that at present cannot be predicted, in the long-term – 25, 50, 100 years from now, such as a village cluster growing into an integrated city, and the role of landscape in such a scenario.

Such a sovereign, sustainable, space is an expression of the Palestinians' right to national self-determination. It gives hope, confidence, and a clear territorial, sovereign identity. Landscape and open space have a central part in this.

1. Regional landscape directing balanced growth

The development layout required for the future Palestinian state is a balanced, distributed, polycentric development that is based on existing localities. It provides local

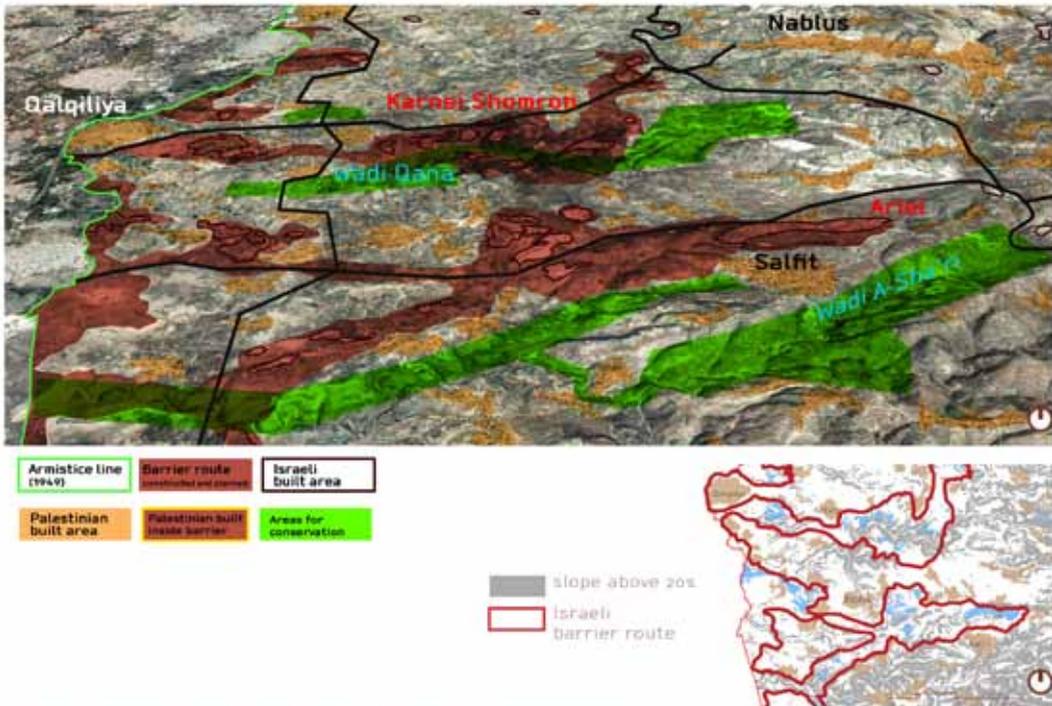


IMAGE 2 – Landscape and development – Salfit, Wadi a-Sar'i and Ariel.

IMAGE 2 – Landscape and development – Salfit, Wadi a-Sha'ri and Ariel.

growth opportunities to a variety of communities, allowing residents to reap the benefits of a peace agreement. Due to the regional landscape characteristics of the Judean Mountains and the Jordan Valley on the east, the main future development region are the western slopes of the West Bank. This is where the majority of the territories Israel wishes to annex are located, and should therefore be reconsidered.

2. Regional landscape directing areas for development

The regional landscape also affects the delineations of land reserves for development on a regional-urban-rural scale. As an example, Wadi a-Sha'ri, with steep topography and high landscape value, limits the development of Salfit northward, but this is where the Israeli settlement Ariel is located. It is perhaps the most controversial settlement which Israel proposes to annex. We suggest that it should be evacuated.

3. Regional landscape and “rural urbanism”

The territories Israel proposes to annex also include open spaces which are integral to fulfilling the potential prosperity of Palestine. Wadi Qana, for example, is one of the most important agriculture heritage sites in the West Bank. Today, it is completely engulfed by Israeli settlements. The settlements and Wadi are considered by Israel as a territory for annexation. Our analysis suggests that these settlements should be evacuated, to bring Wadi Qana back into a broad, meaningful, continuous Palestinian sovereign territory.

4. Regional landscape as addressing a regional urbanism

Settlements not only block open space of heritage value, and regional continuity value – such as Wadi Qana, but also open spaces which are integral to urban-rural regions. For example, Beit al-Baraka - a relatively recent



IMAGE 3 – The landscape of a rural urbanism – Wadi Qana and surrounding villages, towns and settlements

IMAGE 3 – The landscape of a rural urbanism – Wadi Qana and surrounding villages, towns and settlements.

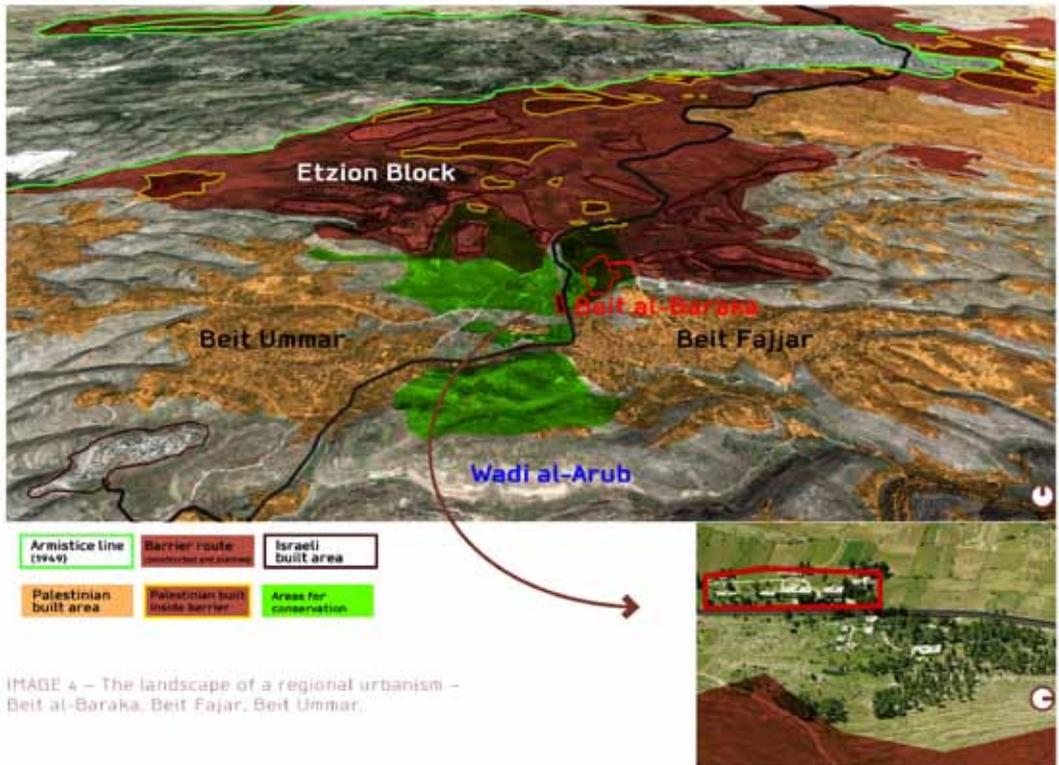


IMAGE 4 – The landscape of a regional urbanism – Beit al-Baraka, Beit Fajar, Beit Ummar.

IMAGE 4 – The landscape of a regional urbanism – Beit al-Baraka, Beit Fajar, Beit Ummar.

settlement - cuts through the main open space and traditional agriculture site of an **integrative, regional urbanism and landscape**. It consists of the cities Beit Fajar, Beit Ummar, and surrounding villages, agriculture, and other open spaces – forming a functioning whole. These landscapes serve as the metropolitan parks of the regional city. With the expansion southward of Gush Etzyon via Beit Al-Baraka, the Beit Fajar and Beit Ummar regional landscape and urbanism is split. We therefore claim that this settlement cannot stay.

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The characteristics of the landscape ultimately determine the characteristics of the society: continuity and proximity, size and width, components of heritage, agriculture, ecology – all affect social and economic relations, culture, communal growth, and so on. As the examples above show, the regional landscape is an integral part of the sovereign, broad, continuous territories required for a long-term growth of a prosperous Palestine. Any annexations by Israel should take this into consideration.

THE LANDSCAPE OF LAND SWAPS BETWEEN PALESTINE AND ISRAEL

Any area Israel wishes to annex in the West Bank will have to be “swapped” for regional open spaces of the same size, quality and characteristics – mostly Israeli agricultural land of historical landscape value. The character and economy of the landscape - mainly its relationship with villages and the farmers which together form a **regional rural system** - directly affects the possibilities for swaps, and therefore the scenarios of a future agreement.

For example, if Israel is to annex all the land within the security barrier route, the land it will have to swap will engulf Israeli villages around Gaza, taking nearly all their agricultural land.

This agriculture is important not only economically, but is embedded historically in the original Zionist ethos of Israel. As Ran Pauker, one of the founders of the Nir-Oz Kibbutz near Gaza, told us in an interview: “Of course for peace I would give the land that I cultivated for more than 50 years, but it’s a shame that its actually to swap for suburbs in the West Bank”.

In contrast - we study the regional landscape required around Israeli villages and Kibbutzim around Gaza and the West Bank – keeping a continuous open expanse around them, connecting them, maintaining the “village in the fields” landscape – both economically and phenomenally (based on the work of Shaul Arieli and Dan Rotem). We then obtain a far smaller area possible for swap. Such an area significantly limits the amount of land Israel can annex in the West Bank.

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The land swaps analysis goes hand in hand with the analysis of regional landscape required for a prosperous Palestine. The two converge to form a territorial scenario for a possible agreement. We thus see how an analysis and planning of regional landscape directly affects geopolitical possibilities, and the character of communities, such as the number of settler population Israel will need to evacuate.

THE LANDSCAPE OF ISRAELI SETTLEMENT

1. Settlements without landscape

When discussing land swaps we saw what Israel within its 1949 borders loses from annexation. What, on the other hand, do settlers staying in the annexed areas, and Israel as a whole, actually gain? Not only do the blocks obstruct access of Palestinians to a disjointed landscape, they do the same to Israelis as well. The new border proposed by Israel, in the



IMAGE 5 – The geopolitical landscape - land swaps in the Gaza perimeter and annexation in the West Bank.

Annapolis negotiations or the security barrier for example, leaves annexed Jewish settlements isolated from their surroundings. What kind of a unique quality of life does an Ariel resident stand to gain from living there? Living in a “sleeping-suburb”, that resident is enclosed within a wall, and is unable to simply take a walk out in the surrounding landscape, as any resident of a similar locality does regularly. Ariel could therefore exist anywhere within the original borders of Israel.

2. Territorial, religious agriculture as settlement

Since most Israeli agriculture and declarations of national parks are outside the potential areas for annexation, their development is not necessarily aiming to promote areas for annexation in an agreement, but simply to obstruct the possibility for any agreement at all.

First, they are used by Israel to form political land continuities, blocking Palestinian development. Second and more important – Israeli use of territorial, religious agriculture and landscape

presents a sort of “affinity with the land”. As has been in the evacuation of Gaza settlements in 2005 - it is more complicated to “uproot” a farmer whose employment is the local land, or a settlement with heritage landscape, than evacuating a suburban settler, probably employed within the 1949 borders.

As is described in detail in the report “Kerem Navot” by Dror Etkes – Since 1997, after the Oslo accords (which divided the West Bank to Palestinian and Israeli controlled areas), there was a meaningful change in the character of Israeli agricultural expansion. Rather than secular, ideologically moderate, industrial-sized farms in the Jordan valley, most growth has been in extreme right-wing, religious fundamentalist settlements in the mountain ridge of the West Bank - where until that time, there was almost no agricultural activity but rather suburban settlements. This is part of an overall strategy of land grabs by extremist settler population, and it conforms with “back to earth” recent religious trends.

3. Territorial, religious landscape as settlement

Israeli development of landscapes of religious, archeological, scenic, and environmental values, is used to consolidate geopolitical continuities, blocking Palestinian future continuous sovereignty.

For example, in the same Wadi Qana where Palestinian agriculture is engulfed by Israeli settlements, Israel has declared a nature reserve. It is also justified **religiously and historically**, on biblical reference: “The border went out from Tappuah westward to the Brook Kanah, and it ended at the sea. This was the inheritance of the tribe of the children of Ephraim according to their families.” (Joshua 16:8 (NKJV)). Israeli inspectors then ordered the removal of newly planted 1400 olive trees by Palestinians, even though the landscape has historically been combined with vines and orchards (in a region where most fertile land has been cultivated or grazed for more than 3,000 years). Meanwhile, an Israeli illegal outpost in the reserve, called Alonei Shiloh and Nof Kanah (Landscape of Kanah) has not been ordered to evacuate.

4. Spatial religion

While there are famous Jewish religious buildings in the West Bank (such as the Cave of the Patriarchs and Rachel’s Tomb), most Jewish spatial heritage in the West Bank is embodied in the landscape – archeological, natural, agricultural, scenic, or simply the land as a whole. Most of the spatial heritage is located along the mountain ridge, away from the territories for annexation. Therefore, Israel’s insistence on these extensive territories for annexation, is in fact disconnecting it from its own historical, cultural and religious heritage. We suggest that instead of annexing settlements with almost no heritage value, Israel should propose arrangements that preserve access to sites and landscapes that the

Jewish people have an actual affinity with - similar to arrangements other religions have with Israel within its 1949 borders.

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To conclude, we propose an additional stage for geopolitical planning based also on regional landscape – First, consolidating the territories for annexation to areas that allow a regional landscape for a prosperous Palestinian state, with long term balanced growth. Second – land swaps that allow the conservation of Israeli regional landscapes within the 1949 armistice line. Third – designing an arrangement which enables Israel to maintain an affinity with historic and religious heritage landscapes in the West Bank. Such a solution – **enhanced by our understanding of regional, territorial, religious landscape and agriculture** - can promote a stable, sustainable agreement, and most importantly – a just and equitable peace.

THE PLAIN AND THE MOUNTAIN – BACK TO THE PLAIN

The conflict over the West Bank is a conflict for the mountain, between the Jordan valley and the coastal plain. It is a conflict for myth and land – landscape. Regional landscape has a cultural, mythical role in past and future **divisions of the land**.

The Zionist movement utilized agricultural settlement to form territorial continuity with a relatively small number of people, believing correctly that “The blade of the plough will determine the border”. Notably, land was acquired on the western coastal plain, rather than in the more historical area of the eastern mountain range (now the West Bank). It meant a distancing from the existing, relatively isolated “old” orthodox Jewish communities in the sacred cities of the mountains, in favor of getting closer

to international trade routes via the Mediterranean port cities.

With the occupation of the West Bank in 1967, the relationship to the regional landscape has drastically changed. To follow Fernand Braudel - **from a culture of the plain to a culture of the mountain**. From a modernist-humanistic-secular-ideological-socialist culture raising the view from the soil to the horizon (of the sea to the west) – to a post-modernist, religious, mythical, self-reflective, new-age, late-capitalist culture lowering the view back from the horizon to the soil (in the now controlled mountain).

Similar expansion from the plain to the mountain by regional landscape and territorial agriculture was administered also within the 1949 borders – such as a network of suburban “community towns” expanding from the valleys to the Hills of Galilee, and “individual farms” expanding from the northern Negev to the south, towards the Negev Mountain.

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Analysis, maps, and images by s--r –
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Stiemer Valley Park: An Agent for Cultural and Ecological Transformation

PECHA KUCHA PAPER & POSTER

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Keywords:

human and nature, ecological transformation, cultural transformation, landscape strategy

ABSTRACT

Different assumption about nature and the relation between man and nature exist. This plurality of assumptions often leads to conflicting ideas among stakeholders involved in spatial projects. The discipline of landscape architecture should acknowledge these assumptions and work with different views and design approaches towards the relation between man and nature. The Masterplan of the Stiemer Valley Park, in Genk Belgium, employs different views towards nature, resulting in a spatial framework and spatial strategies that instigate aesthetic experiences that reduce barriers between humans and nature. Linear gardens, ecological conservancy areas and valley edges are spatial articulations which juxtapose nature's order and humans order. Thematic strategies dealing with processes of hydrology, ecology, trajectories and public culture are proposed as catalytic agents for transformation of the valley. As a result the Masterplan of the Stiemer Valley Park encourages contemplation on humans relation towards nature and could become an agent for cultural and ecological transformation.

INTRODUCTION

Humans have different assumptions about nature. These assumptions are fundamentally different often resulting in conflicting ideas on our relation towards nature. As Anne Whitson Spirn states: 'Nature is both given and constructed. There is always a tension between the autonomy of nonhuman features

and phenomena and the meaning we ascribe to them. (...) Nature is a mirror of and for culture. Ideas of nature reveal as much or more about human society as they do about human processes and features' (Whitson Spirn 1997: 251-252). Today's planetary state forces us to renegotiate our relation towards our environment, or the 'natural world'. But how can we do this, given the conflicting ideas about nature? And what role should the discipline of landscape architecture have in this process?

The idea of Nature is a result of the Western cultural paradigm, which creates binary oppositions and promotes domination of humans over the nonhuman world. In the field of landscape architecture this has led to different views towards the relation between humans and nature. Described as the 'Arcadian view' (protection of nature whose harmony is threatened by human action) and the 'Imperialist view' (consolidation of human domination over nature to multiply and subdue the earth) by Anne Whitson Spirn (1985) or the 'Conservationist/Resourcist' view ('landscape is composed of various resources that have a particular value to people') and the 'Restorative view' (emphasis is on the acquisition of technical knowledge and skill with respect to the physical reconstruction of landscapes') by James Corner (1997). Both authors argued for a more critical, reasoned, creative and meaningful practice in which nature is seen as a cultural construct and the result of interaction between cultural processes of society and the physical and biological processes of the natural world.

The Masterplan for the Stiemer Valley Park, in the city of Genk (Belgium), does so by acknowledging the plurality of human values ascribed to nature and translating them into possible experiences that 'intermingle cyclical natural processes with rhythms of collective social life' (Meyer, 2001).



Figure 1: Evolution of the Stiemer valley.

The Masterplan tries to `create an awareness that ecological environment is here, flowing in and through human life and construction` (Meyer, 2001). In doing so the Masterplan can become an agent for cultural and ecological transformation in the city of Genk.

DESIGN APPROACH

To become this agent the Masterplan proposes a design attitude which is based on a *process of making with* both in longitudinal and transversal direction of the valley. The *process of making with* takes into account the so-

cio-economical, cultural, hydrological and ecological processes that could potentially transform the Valley Park in time. In doing so, the Masterplan does not present a blueprint for a future development but rather it presents `discrete, tactical operations` (Descombes, 1999) and strategies as `catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect and differentiate` (Corner, 1997).

The research by design process was characterized as a participatory process in which the city of Genk, Flemish public institutions and citizens

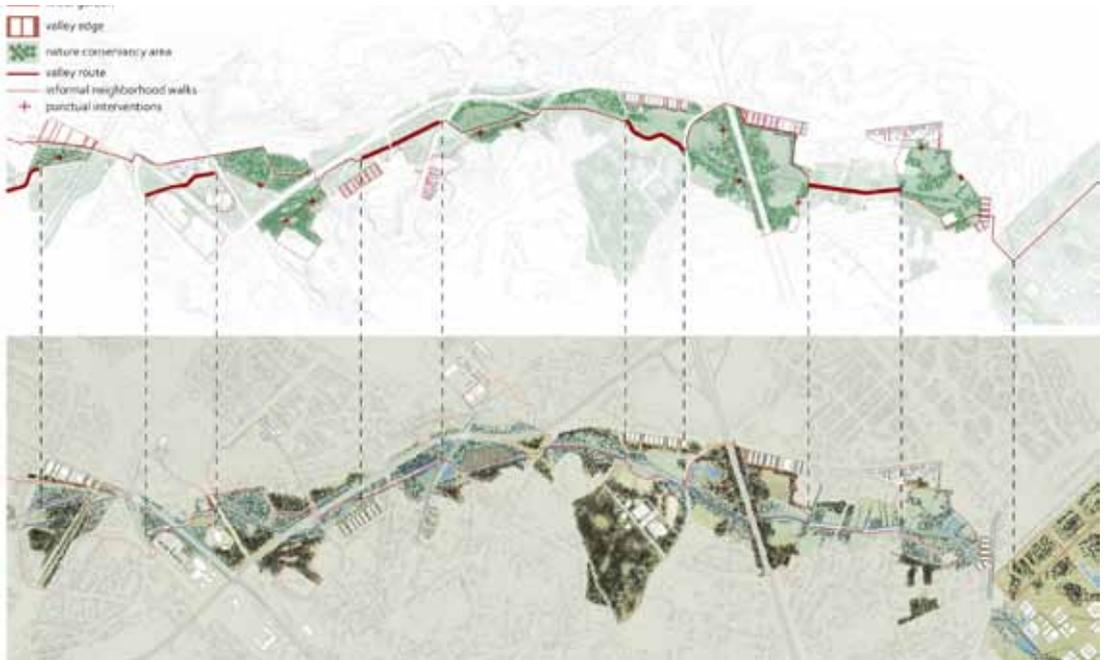


Figure 2: The masterplan of Stiemer Valley Park presents a sequence of linear gardens, ecological conservancy areas and valley edges that represent different relations between humans and nature.

of Genk were involved. Organized according to four themes (hydrology, ecology, trajectories and public culture) the participatory process resulted in tracings and mappings that both give a description of the current territory and set the conditions for new physical worlds to emerge (Corner, 1999). Based on these mappings complementary spatial entities and thematic strategies are designed and visualized that can transform the Valley Park in time.

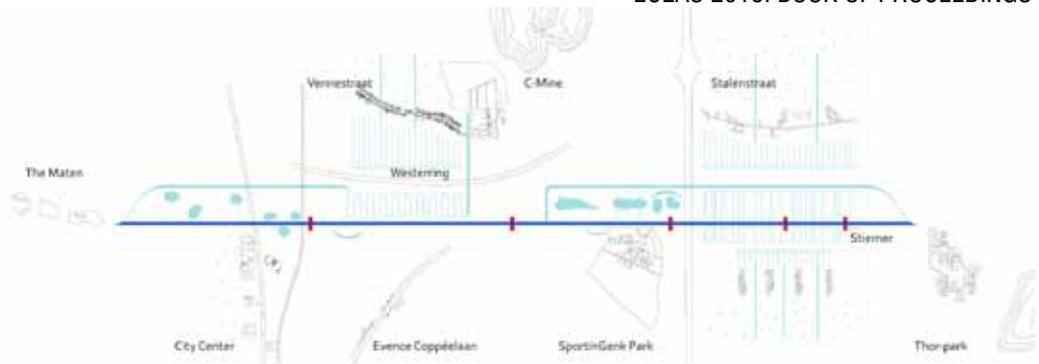
RESULTS AND DISCUSSION

Historically the valley of the Stiemer was an open landscape of wet meadows along the creek, which were of great importance for the rural settlements along the valley edges. With the rise of the mine-industry the rural settlements evolved into mine-towns structured around the coalmines. The city of Genk evolved into the multi-nucleus town and the valley of the Stiemer got neglected and the meadows transformed into woods (Figure 1). The Stiemer became canalized and accompanied by sewage-collectors, which overflow into

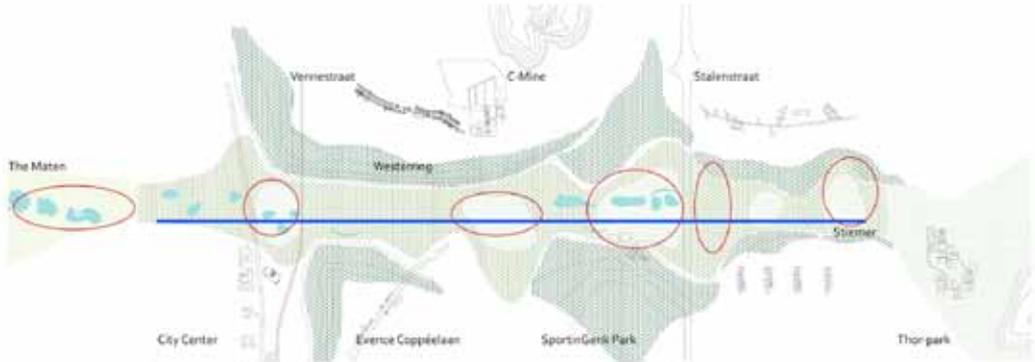
the creek during heavy rainfall. As a result the valley dried out and the water quality of the Stiemer dropped during overflow events. Today the city of Genk has the ambition to restore the valley of the Stiemer into a landscape park that connects different neighborhoods and in which nature can be experienced in daily life.

Spatial and programmatic articulations

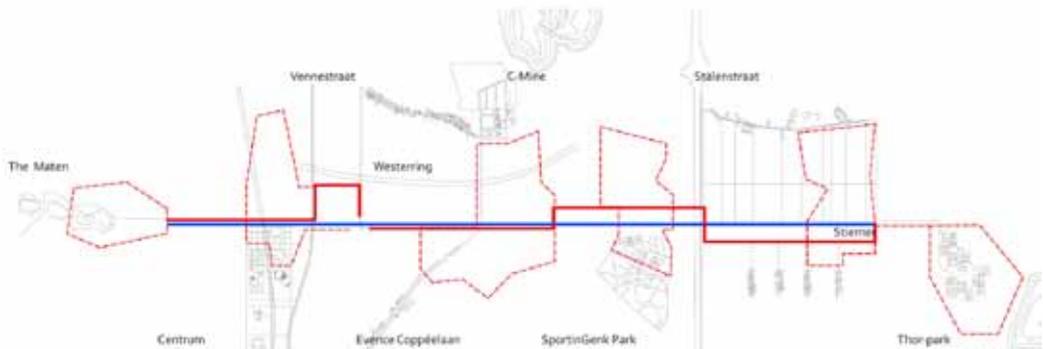
The Masterplan proposes a sequence of spatial articulations that represent different relations between humans and nature (Figure 2). Based on a demand for public space from surrounding neighborhoods, linear public gardens are identified and linked to the existing creek. By transforming the infrastructure of the channel into linear gardens, places are articulated, that are open to a diverse use attracting citizens into the valley. Second, ecological conservancy areas have ecological potential due to existing abiotic and biotic characteristics. These characteristics are intensified and accessibility to the areas is limited to



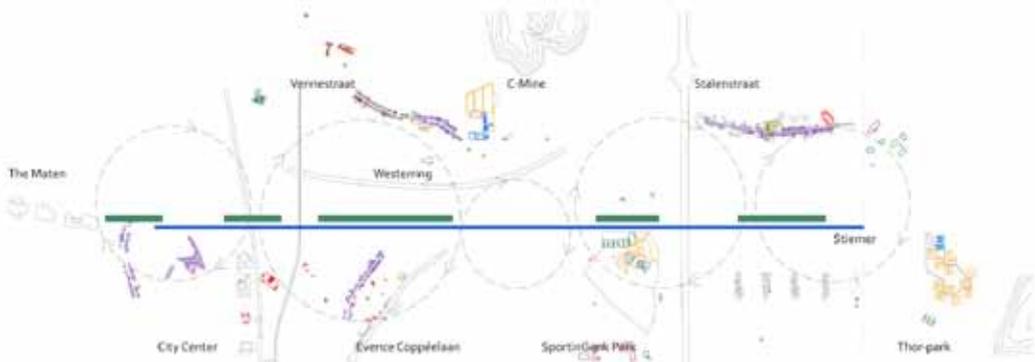
Empower hydrology: introduction of SUDS in the urban fabric which drain stormwater into a parallel creek thereby restoring hydrological dynamics.



Stimulate Ecology: ecological diversification within natural conservancy areas connected by the parallel creek.



Connect trajectories: a continuous valley route connects strategic urban sites and a series of informal neighborhood walks connect urban fabric and valley.

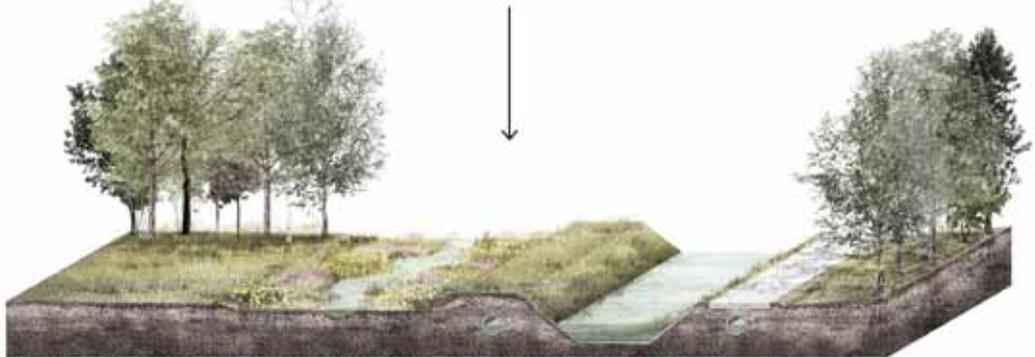


Activate public culture: punctual interventions, linear gardens and urban valley edges intensifying the experience and program within the valley park.

Figure 3. Schematic representation of the different thematic strategies: empower water, stimulate ecology, connect trajectories and activate public culture.



Current situation: canalized creek aligned by sewage collectors and a wooded valley.



Phase 1: introduction of a parallel creek, restoring hydrological processes and intensifying ecological diversity.



Phase 2: introduction of SUDS in the urban fabric reducing overflows into the channel, punctual intervention along the channel.



Phase 3: transformation of the channel into a linear garden, and articulated public space, juxtaposed to the parallel creek.

Figure 4. Transformation of the canalized creek into a linear garden and the introduction of a new parallel creek juxtaposing different views towards nature and showing both natural and human order. (Tractebel, 2018)

informal walkways that allow citizens to experience the ecological richness of the valley landscape. Finally valley edges are places where urban transformations can reinforce the relation between the valley and the surrounding urban fabric. These valley edges can provide access to the Valley Park or can become public spaces overlooking the landscape. A valley route connects the different entities providing a diverse experience of both cultural and natural expressions in the landscape.

Thematic strategies

Thematic strategies provide agents for transformation of the Valley Park (Figure 3). Empowering water contains the creation of a parallel creek next to the channelized Stiemer, restoring the hydrological relation between valley and creek. Stormwater is drained into the parallel creek by the introduction of SUDS (Sustainable Urban Drainage Systems) in the urban fabric, thereby reducing the sewage overflow into the channel. Linked to the parallel creek ecology is stimulated by providing conditions for different ecological typologies to evolve, providing a diverse landscape. The valley route and a series of neighborhood walks connect trajectories within the valley and the urban fabric. Public space is activated by the introduction of punctual interventions along the walkways, linear gardens linked to the channelized creek into and the transformation of valley edges.

CONCLUSIONS

The Masterplan of the Stiemer Valley Park presents a design strategy that gradually transforms the valley landscape using both ecological and social processes. In doing so, it juxtaposes and contrasts nature's order and human order which prompts the contemplation of what it means to be human and what is nature (Whitson

Spirn, 1988). The transformation of the channel into a linear garden and introduction of the parallel creek most strongly displays this juxtaposition (Figure 4). This design strategy is based on the notion that nature is a cultural construct; as such it employs different views towards nature. A more Arcadian (Spirn, 1985), Resourceist (Corner, 1997) view for the nature reserves, a more Restorative (Corner, 1997) view for the creation of the parallel stream and finally a more Imperialist view (Spirn 1985) on the transformation of the channel. In doing so the project can `operate as a focusing lens for knowing the natural world, that instigate aesthetic experiences that reduces barriers between humans and the natural world, and that functions as physical catalyst for changing social rituals affecting the natural world` (Meyer, 2001). This is what the profession of landscape architecture should propagate in order to renegotiate man's relation towards nature. A role that can only be fulfilled well when different views and design approaches regarding man and nature are emphasized within educational programs.

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5.1. HUMAN AND NATURE

GROUP I

Radioactive Earth: Designing Nuclear
Waste Ecologies

Catherine De Almeida
PECHA KUCHA PAPER

Supernature in the Age of The
Anthropocene. The Wasserkrater as
Entry for an Intimate Relation to Nature

Saskia I. de Wit

Hidden Tributaries: Retooling the Pipe in
Agricultural and Urban Watersheds

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Landscape? The Case of Hydropower
Plant on the Mura River, Slovenia

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PECHA KUCHA PAPER

Mountaintop Removal Mining and the
Narrative of Conflict

Stefania Staniscia

Radioactive Earth: Designing Nuclear Waste Ecologies

PECHA KUCHA PAPER

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Keywords:

nuclear waste, post-nuclear landscapes, environmental justice, contamination, waste management

ABSTRACT

Nuclear weapons manufacturing, testing, and energy production has produced an invisible waste legacy that will last over 10,000 years. Defaulting to conventional waste management practices, nuclear waste creates conflicts between the landscapes deemed as storage facilities and their surrounding communities. The West Lake Landfill Superfund site in St. Louis, Missouri is presented as a case study that materializes these contemporary and growing conflicts between ineffective radioactive waste storage, public and private entities, and technological and environmental systems that interface in this post-nuclear, envirotechnical landscape. Arguing for waste legibility and the necessity for a nuanced design approach to diverse waste conditions, this paper presents two alternative case studies. The Rocky Flats in Colorado is discussed as a radioactive landscape of invisibility, reverting to a post-nuclear wilderness, hiding to forget the site's legacy under rolling green hills and a wildlife refuge. Testbed, the first-place winning proposal for ArchOutLoud's 2017 competition, is a speculative project that emphasizes legibility through evolution and disturbance. The proposal recognizes that waste landscapes are neither fully natural nor technological, but a hybrid, envirotechnical system that must be embraced, activated, and made legible—design principles that may be applied to the West Lake Superfund site and other post-nuclear landscapes.

INTRODUCTION



Figure 1: West Lake Landfill in July, 2014 with methane capture and geotextile cover. Credit: Kqueirolomce, Creative Commons.

Nuclear waste is one of the least visible, longest-lasting, most toxic byproducts created by humans. The inescapable legacy of weapons manufacturing, testing, and energy production has left radioactive residues incapable of decay for tens of thousands of years. As if it were generic trash, these industries have defaulted to conventional forms of waste management—burying radioactive waste in layers of metal, air, and earth—never seen again. With no real solutions available, we have failed to permanently store radioactive waste, generating some of the most contaminated landscapes in the United States (U.S.). As a design challenge, entombing nuclear waste presents spatial conflicts, from the landscapes it occupies to the communities it affects. How can designers confront this human-created anomaly—a highly toxic material incapable of short-term decay—as an opportunity?

This paper explores the shortcomings, conflicts, and design potentials for confronting nuclear waste by highlighting contemporary forms of radioactive waste management bred out of necessity. The West Lake Landfill Superfund site in St. Louis, Missouri is a present-day case study that demonstrates conflict around historical nuclear waste disposal practices and its effect on neighbouring communities. Alternatively presented are one constructed project that seeks



Figure 2: The Cold War Horse, an atomic icon that marks the historical legacy of the Rocky Flats Nuclear Weapons Plant. Copyright: Rick McKissock.

to hide nuclear waste legacies (Rocky Flats), and one speculative project that confronts it through legibility (Testbed). Through interpretive and descriptive critiques, this paper argues for not only a nuanced approach to waste, but also for the necessity to make waste legible through design.

THE WEST LAKE SUPERFUND LANDFILL

Uranium processing for the first atomic bombs occurred in St. Louis, Missouri. The West Lake Landfill is one relic of this activity, widely regarded as one of the most high profile and complex Superfund sites in the country. A former limestone quarry turned waste repository, landfilling operations in the 1970s used 46,700 tons of radioactive material as a daily cover: uranium ore residues from the Manhattan Project mixed with soil (Gray, 2018). Underground smouldering spreading to the radioactive waste compounds the situation further—a ticking time bomb of flaming garbage. The air smells of burning chemicals and residents monitor wind patterns and toxicity using carbon monoxide detectors outside their homes (Cammisa, 2018). Perceived as a highly controlled, engineered landscape isolated from the natural world [Figure 1], is, in fact, heavily affected by biophysical systems—wind, water, and fire—acting above and below earth’s surface renders these conditions visible.

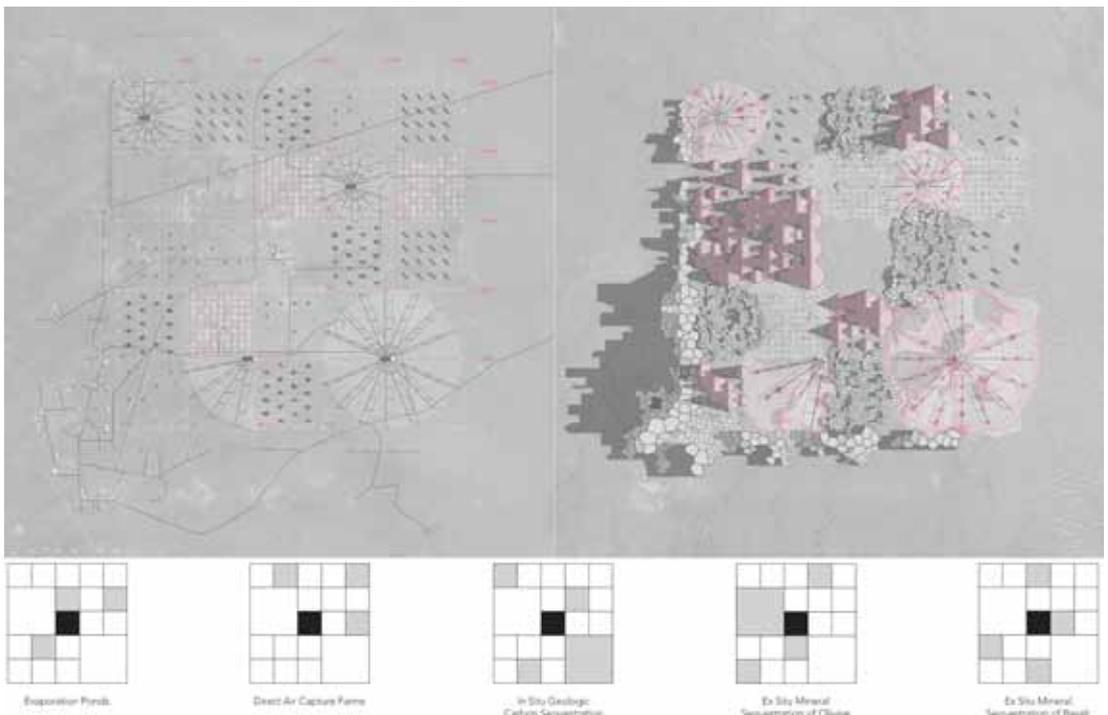


Figure 3: Designed to change over time, Testbed provides projective speculations on the proposal’s evolution. The two plans illustrate how the proposal would evolve from 2092 (75 years into the future, left) to 2017 (5,000 years into the future, right). The checkerboard diagrams below illustrate shifting uses of the open-ended assemblages. Copyright: Agency-Agency.

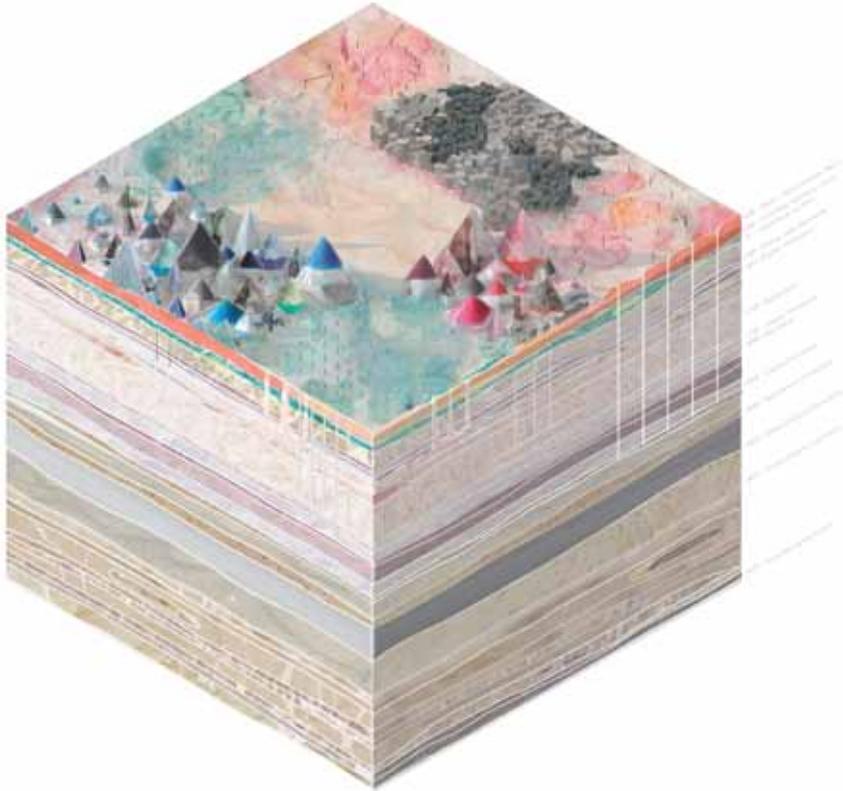


Figure 4: Strategic disturbance is the key activity that creates visibility in Testbed, as illustrated in the axonometric and perspective, both set 5,000 years later. Copyright: Agency-Agency.

Although the U.S. Superfund Program has been established for almost 30 years, environmental injustice persists and actions lack immediacy. The West Lake Landfill is our present-day Love Canal gone nuclear.

This case study presents several conflicts around nuclear waste. Intertwined in this landscape are public and private entities, from the U.S. government, to Republic Services

(a private company who owns the landfill), to the hundreds of impacted residents. Although these entities ensure that both the fire and spread of radioactivity are under control, third-party tests have yielded different results. The smouldering's scent heightens the present danger posed by this radioactive landscape. By necessity, residents have become vocal citizens of this landscape, affected through illness

and death, further marking its visibility.

Technologically engineered landscapes like waste landscapes exist within and are impacted by biophysical systems, a condition Sara Pritchard has termed “enviro-technical landscapes” (Pritchard, 2011). Her phrase emphasizes, “the ways nonhuman nature affords material constraints to technological development and use, ultimately partly constituting ‘technology’ itself” (Pritchard, 2011:11-12). Through this lens, waste landscapes are envirotechnical systems, in which the natural and the technological cannot be separated. How can designers play a role in further rendering the visibility of envirotechnical waste landscapes, particularly those that pose a threat to both ecological systems and surrounding communities through radioactive contamination? Rocky Flats is one example of a failed attempt to mask radioactive legacies with a wildlife refuge.

MASKING RADIOACTIVITY WITH WILDLIFE REFUGES— ROCKY FLATS

Located 26 kilometers northwest of Denver, Colorado, the over 5,000-acre Rocky Flats nuclear weapons site contributed to the production of approximately 70,000 nuclear weapons during the Cold War, from 1952-1989 (Grenoble, 2017). Following a series of spontaneous fires, suspected spills, and unregulated dumping, the U.S. government raided itself on June 6, 1989 (Ackland, 2009:259). Investigators from the Federal Bureau of Investigation (FBI) and EPA entered the complex to collect evidence that the Department of Energy (DOE) was guilty of environmental crimes. Operations seized that November, and was designated a Superfund site in the early 1990s. After the \$7.2 billion cleanup in 2006, “the designated refuge land was turned over to the U.S. Fish and Wildlife Service the following year”

with a portion retained by the DOE to “manage ongoing remedies” (Ackland, 2009:249). Over a decade later, the National Wildlife Refuge is set to open to the public for recreation in summer 2018 (FWS, 2018).

However, many community members and former FBI agents are skeptical the site is safe for public use. Although the Refuge is a lush, “post-nuclear wilderness” (Beardsley, 1998) touting more than 630 species of plants and 239 migratory and resident wildlife species, some of which are threatened (FWS, 2018), the areas designated as the Refuge were not thoroughly test nor remediated. Due to this fear, some Coloradans are suing to stop its public opening. The verdant rolling hills disguise potential radioactivity while simultaneously erasing the historical legacy of the site—made green to forget. As Ackland describes, the environmentally remediated landscape is one that discourages “the public from remembering and considering the broad historical legacies of Rocky Flats” (2009:249). The only physical indication of the site’s legacy is artist Jeff Gipe’s sculpture “Cold War Horse” wearing a gas mask and bright red hazmat suit with the inscription, “This memorial stands as a reminder for a history that we must not forget” [Figure 2]. How can designers intervene in a radioactive landscape to make both the hazards and the legacy of such a site visible and safely accessible?

ENGAGING WITH ENVIRO TECHNICAL RADIOACTIVE LEGACIES—TESTBED

In fall 2017, the organization ArchOutLoud held an open ideas competition. Titled “Nuclear: Landmarker for a Waste Isolation Site,” it called on participants to “design a marker or marker system to deter inadvertent human intrusion into the Waste Isolation Pilot Plant (WIPP),”

CONCLUSION

which stores nuclear waste over 650 meters below ground near Carlsbad, New Mexico (ArchOutLoud, 2018:1).

Most of the award-winning proposals were highly object-oriented and architectural in form, creating symbolic monuments warning of what lies beneath. However, the winning proposal *Testbed* [Figure 3] took a landscape-based and process-oriented approach emphasizing change through open-ended assemblages, “doubling-down on disturbance to ensure the site will remain undisturbed” (Agency-Agency, 2017).

The project by Agency-Agency transforms the WIPP site into a climate engineering experiment site, manipulating the site’s geology through mineral storage and CO2 capture. The geologic forms grow and transform over time, using the site to communicate “its otherness by intervening in fundamental [material and landscape] processes” (Agency-Agency, 2017). By proposing a highly active landscape that engages with its nuclear legacy, *Testbed* recognizes that this landscape is neither natural nor artificial, but a hybrid, envirotechnical system in which humans and technology are entangled with its natural environment—visibility through constant change [Figure 4].

The West Lake Landfill materializes the intersecting interface between humans, waste production, conventional waste management practices, and biophysical systems acting on the landscape, illuminating the critical importance of confronting, not running away from, our toxic waste legacies in productive ways through design. Tackling nuclear waste landscapes is a cultural project that should not simply result in a post-nuclear wilderness such as Rocky Flats, left to be forgotten. Humans must actively engage with these landscapes as envirotechnical systems, in which technology, labour, ecology, and geology interact, as *Testbed* demonstrates. Design has the capacity to create places of remembrance to confront the existence of radioactive waste by activating these complex landscapes. Such design principles may be applied to West Lake to not only bring legibility to the landscape’s radioactivity, but also develops safe and creative opportunities to interact with and understand such landscapes of conflict.

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Figure 1: The Wasserkrater Garden is hidden underground, only to become visible when the water jet shoots into the air.

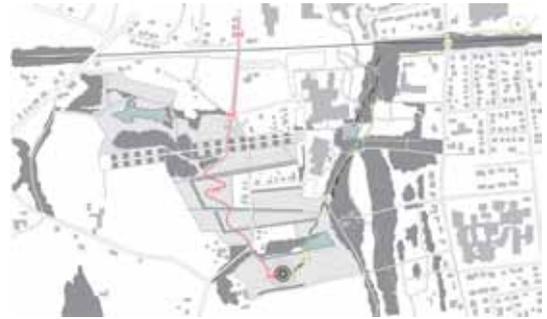


Figure 2: Position of the garden in the Aqua Magica park and the two routes that connect it to the urban cores, the park and the valley.

Supernature in the Age of The Anthropocene The Wasserkrater as Entry for an Intimate Relation to Nature

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Keywords:

Anthropocene, supernature, Wasserkrater Garden, metropolitan landscape

ABSTRACT

In a globalised world under pressure of climate change, nature remains at the centre of societal concerns and the appreciation of nature by urban communities presents a critical challenge for the landscape architecture agenda. But nature is a dynamic concept, transforming in accordance with societal changes. We now live in what can be called the Anthropocene, and this far-reaching influence of man on natural processes should result in a revised vision of the concept of nature. A reading of the Wasserkrater Garden (Agence Ter 1997, Bad Oeynhausen,DE) will illustrate such a new understanding of nature: as a force of abundance, showing existence to its full extent in which humans are only a small part, and at the same time something close to home, incorporated in our daily environment. Merging an architectural

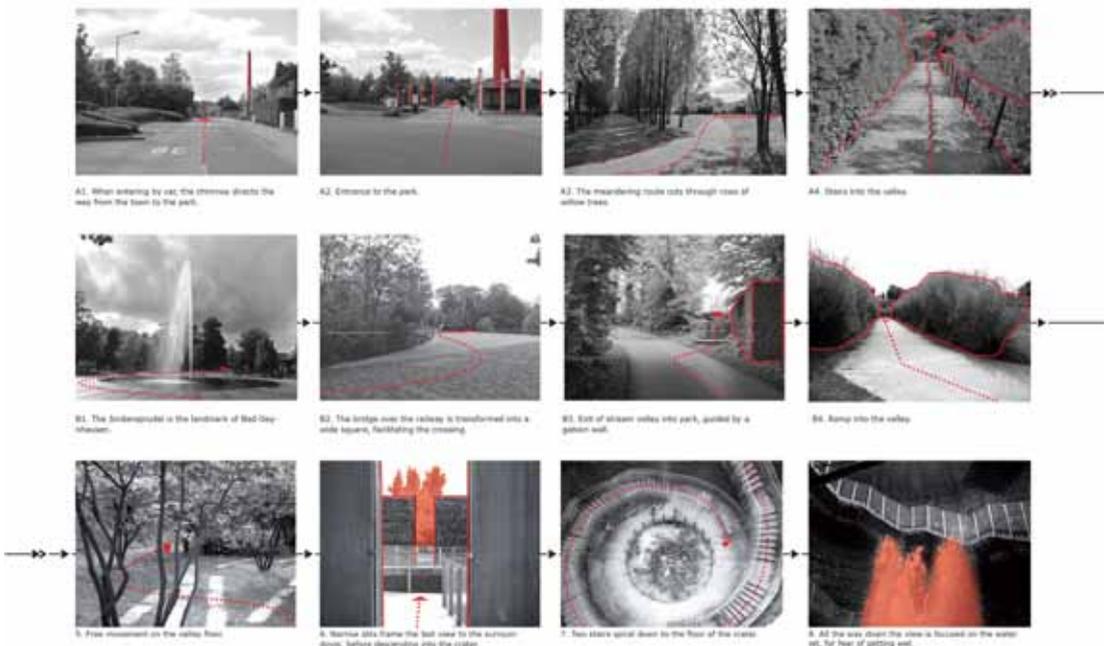


Figure 3: Visual scores of the two routes.

and an ecological view, this understanding of ‘supernature’ brings together the natural and the artificial. The premise that we somehow stand outside (or apart from) nature no longer holds true.

INTRODUCTION

In a globalised world under pressure of climate change, nature remains at the centre of societal concerns and the appreciation of nature presents a critical challenge for the landscape architecture agenda. While many green infrastructures focus on functional considerations, their elaboration as places where concepts of nature are represented, and where aspects of nature can be experienced and understood, has received little attention in research and praxis. Urban societies entertain varied ideas on nature and their relationship to it: nature as resource, as model, as process, as co-creator, as ideal. But we will never move beyond the dualistic concept of humans versus nature as ‘the other’—which in the past has led, and still leads to extreme exploitation of natural resources—if we do not begin to appreciate the inextricable relationship between man and nature. For this to happen we need to move

beyond considering what we think of as ‘nature’ through the lens of visual beauty or distant images, sublime ideals or technical ecology.

A reading of the Wasserkrater Garden might provide some insights into the comprehension and experience of a contemporary understanding of nature. (Fig. 1) The discussion follows a research method that was developed in my newly published book *Hidden Landscapes*, in order to address the formal expression of site-specificity in landscape architectural design. In this book, the Wasserkrater Garden is studied as one of six ‘metropolitan gardens’, in order to gain an insight in the relation between metropolitan conditions (such as globalisation, suburbanisation and infrastructure) and a contemporary understanding of place and nature (De Wit 2018). The research methodology builds on the Delft method of layer analysis that specifically addressed the spatial, visual aspects of the composition (Steenbergen 2014). But the complexity of today’s design challenges, often with a particular geological, industrial, agricultural and social history, demand analysis and design approaches that

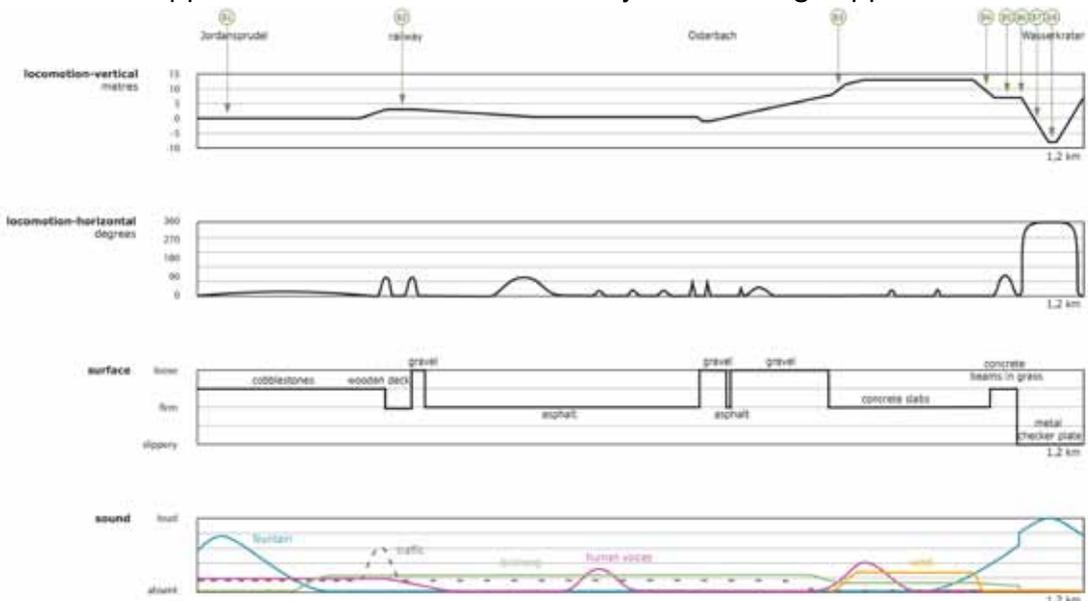


Figure 4: Haptic score of the route through the valley, representing the different sensory stimuli: vertical and horizontal movement, texture of the surface and sound.

take into account the experience on the ground, the 'sense of place', the different layers and meanings of a site, the experience of movement and time. Therefore I extended the method with the phenomenological, multisensory dimensions of landscape. I documented experiences on site in measurements, photographs, notes of sounds and smells and other sensory perceptions, notes of my own movements and of the other visitors. Researching the perceived situation rather than the intended design, I then redrew the site in interpretative drawings—reconstructed from the impressions gained and measurements taken during this visit, design drawings, topographic information, and technical drawings provided by the landscape architect



Figure 5: A lush green carpet and dappled sunlight through the tree canopy evoke in the sunken garden the image of a natural forest glade.

and the client—in order to objectify the experiential components as attributes of the place.

THE WASSERKRATER GARDEN

In 1997 a garden show took place in the suburban agglomeration of the German towns of Bad Oeynhausen en Löhne, designed by Agence Ter. The show grounds remained as an urban park, with the Wasserkrater Garden as the pivot point. The garden is positioned exactly above one of a series of subterranean fault lines, which

used to determine the relationship of the urban development of the spa town of Bad Oeynhausen, but which are now hidden underneath the suburban developments. The natural source of the subterranean water is made expressive again in the fountain that is the centre of the garden, enabling the visitor to explore a landscape that had remained hidden from the public eye. By carving vertically in the soil the metropolitan landscape is connected to the natural landscape underneath.

The vertical elaboration of the garden, and the aural expression of the fountain set apart a sequestered space for play, temporary and limited.

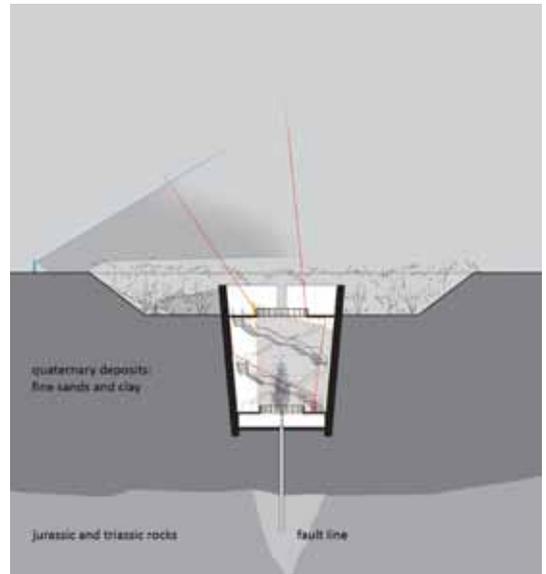


Figure 6: The different slopes and the tree canopy direct the view top the horizon, then downward and finally upward, visually connecting the layers of the design and the natural landscape.

The outer ring of the garden is a circular valley, which is open all year, allowing the visitor to perceive the seasonal effects of the planting. The central crater however, only opens in the summer season (May-October). Its peak is during the summer holiday, when little boys in swimming trunks play here all day. To enter the garden the visitor passes a ticket booth, where a small entrance fee is charged (and rain coats can be purchased). The fee guarantees surveillance but



Figure 7: The roughness of the walls, the all-enveloping mist, the contrasts of light and dark, and the change in equilibrium and muscle tension when descending enhance the sensation of being underground.

is not so high as to prevent people from entering. The position of the garden within the Aqua Magica Park is elaborated as an interaction between social and individual, and between play and contemplation. In the park the interaction between active play and discovery on the one hand, and passive viewing and relaxation on the other, is a social phenomenon. The same interaction in the garden is transformed into an individual and private (multi-sensory) experience. The horizontal plane is the level of the everyday, public life. Retreating into the depths of the earth in the Wasserkrater is also retreating from public life into an individual experience.

The garden is key to the kinetic structure of the park. (Fig. 2 and 3) A meandering park route strings together a sequence of delineated park spaces and urban fragments and ends abruptly at the edge of the park. The route exposes the contemporary, generic landscape of urban, rural and suburban fragments, directly connected to the A30 motorway, the spine of the metropolitan landscape. The garden, to be entered via a small exit and steep stairs, escapes from this fragmentary landscape and creates its own private world. In the second route the narrative of the underground water unfolds in a sequence of images, the rising and falling of the topography, the meandering of the path as well

as in a sequence of sounds with the grand finale of the roaring Wasserkrater fountain. Descending under the earth's crust in the garden is anticipated as the path moves up and down along the natural relief of the valley. In the garden the path spirals downward, first in a path of stepping-stones, then more forceful in the spiral staircases. Loose and hard materials underfoot alternate, giving the route a rhythmic undertone. (Fig. 4)

The precise position of the garden on the subterranean fault line is emphasised by a concentric composition of the fountain, crater and sunken garden, a sequence that is experienced as consecutive layers of enclosure, while penetrating into the earth. The main enclosure is the earth itself, so the garden remains invisible apart from the moments when the water jet shoots into the air. The double boundary of the sunken garden and the cone-shaped crater wall enables a sequence of entrances, as a rite of passage before entering the inner space.

With its gentle slopes, planted with a carpet of creeping willow (*Salix repens*), its transparent canopy of serviceberries (*Amelanchier lamarckii*) and its open centre the six metre deep circular valley is a calm and pleasant place. Shade-loving plants form a lush green carpet to be crossed via a pattern of irregularly placed concrete beams, as if they were tree logs in a river. The dappled sunlight through the canopy evokes the image of a natural forest glade. (Fig. 5) It is not a natural site however, but clearly designed as a garden, hidden from view by its position, sunken in the ground. The crater in the centre of the garden is like an artificial grotto: an ambiguous place that is both art and nature, and both a frightening experience and an agreeable shelter. The funnel-like space forces the visitor closer to the centre while descending, increasing the risk of getting wet. The horizontal and far view of the (suburban) landscape is drawn

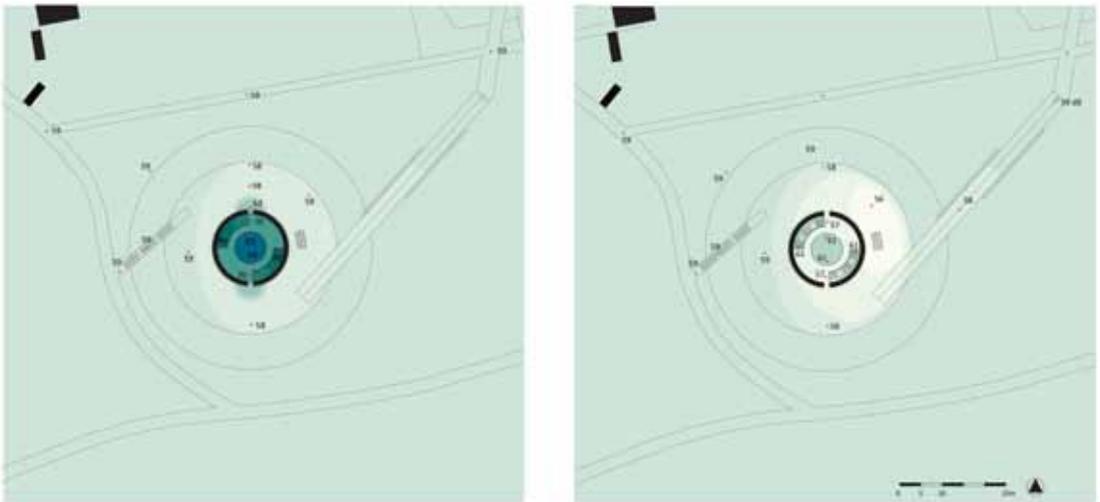


Figure 8: The different stages of the soundscape—during and in-between eruptions—can be clearly distinguished. Sound level measurements taken on an almost windless Sunday morning (13 May 2012, between 10.30 and 12.00), show that from the rattle of the dripping (61 decibels) the heavy bubbling raises the sound level to a constant 65 decibels, rising to 73 decibels when the music swells and in between 79 and 83 decibels when the fountain erupts.

downward in the crater, into the earth, and then upward following the erupting fountain, evoking a vertical axis between enclosing earth and open sky. (Fig. 6) The defined space creates a connection to the natural space (both above and below ground level) in the field of undefined and fragmented space of the suburban landscape.

The spectacle of the fountain that gradually builds up to a dramatic climax and then subdues into nothing, only to start over again in an apparently endless cycle, evokes the force exerted by the pressure of water in the subterranean fault line, the force that led to the genesis of the spa town Bad Oeynhausen in the first place. From the black water surface a frothy water column erupts at irregular intervals, building up to a climax that is accompanied by computer-generated rumbling sounds and atonal music, and flashes of light. When the water jet falls away suddenly, everything is wrapped in a dense mist. (Fig. 7)

Outside the garden the volume of the fountain does not rise above the volume of everyday sounds: the almost continuous roar of aircraft, bird singing and background sounds of children playing and people talking.

In the surrounding garden the sound is still muffled by the tree canopy, and in the intervals between the eruptions of the fountain the garden appears to be quieter than the surrounding plain, even though the sound level is only slightly lower. The fountain is only clearly audible inside the garden and down at the crater floor the different stages of the soundscape can be clearly distinguished. The thundering sound of the fountain is echoed by the hard materials of the crater (rock-filled gabions and metal), and is so loud it prevents people from talking and allows them to retreat into themselves. Within the intervals the rattle of the dripping on the metal stairs continues and gradually lessens until the fountain starts again: a heavy bubbling raises the sound level, rising even more when the music swells, followed by a sound explosion when the fountain erupts again, retained by the enclosure of the space. The impact of the fountain on the soundscape is to a great extent determined by the geometry and spatial differentiation of the garden. It makes the spatial form not only visually but also aurally perceptible and draws the attention from the visual towards the multisensory qualities of the garden. (Fig. 8)

The stages of entrance into the garden mark the transition from the horizontal suburban field to the vertical sub-urban space, literally under the city. This sequence from outside to inside, from surface to subsurface, is simultaneously a progressive sequence of stimuli, intensified by the proximity of the perceived space and the enclosure that blocks sensory information from outside the garden. The roughness of the walls, the dampness on the skin, the strong smell brought about by the constant dampness of the space, the darkness, the coolness resulting from the lack of sunlight and the change in equilibrium and muscle tension when descending enhance the sensation of being underground. Visually the crater is explicitly artificial but these specific stimuli induce the sensory experience of being in a natural cave, evoking an augmented experience of nature and of place, condensed into playful ritual, and orchestrated by the rhythm of the fountain. The reception of the haptic information of the garden by skin, muscles and joints reduces the distance between man and nature to within the body, internalising the experience.

In landscape architecture the emphasis usually is on what geographer Johannes Granö defined as *Fernsicht* [distant view], the part of our environment we mainly experience by vision: the landscape, determined by the horizon (1997). However, visual experience detaches us from tactile experience, it dematerialises the world. The world becomes purely a spectacle. To move beyond this, and to move beyond considering landscape and nature through the lens of visual beauty or distant images, sublime ideals or technical ecology begins with enabling what Elizabeth Meyer called 'affective encounters' (2008). For these affective encounters to happen, we need to be near, to experience our surroundings, to be immersed in them. *Nahsicht* [proximity] is the environment we can experience with all our senses, making

one attentive to the material reality of earth, plants and water, such as mass, grain, fragility or suppleness. Bernard Lassus suggested that the difference between the tactile scale and the visual scale corresponds in many respects to the distinction between garden and landscape (1998). The garden is a multisensory object, a space seen as well as felt, touched and heard. The enclosure and proximity of the garden space puts an emphasis on its materiality and its perception: a haptic perception, or, an inducement for affective encounters.

GHOSTS, PLACES AND SUPERNATURE

The garden has always been an artificial (artistic) reflection of nature. However, in the Wasserkrater Garden the version of nature that is exposed, in itself has become as much artificial as natural. The quality of nature that can be encountered here is not the sublime wilderness of the Himalayas or the Australian outback, frightening and immeasurable, nor the visual and representational image of beauty that we see in the classical garden.

In the classical design tradition gardens represented the first nature of natural processes and the second nature of cultivation and organisation, as well as first and second nature as real places, outside the urban realm. In the contemporary metropolitan landscape however, structures of cultural landscapes and urban settlements have converged into a continuous field of forces and vectors that result in types of landscape that are hard to distinguish. Maybe this is why the emphasis in the Wasserkrater Garden has shifted from representing identifiable natural and cultural territories to exposing the spatial and temporal natural dynamics, and from representation to engagement. The garden exposes wilderness not in opposition of, but as an integral part of the metropolitan

realm, evoking an immersive encounter with nature: an embodied experience. With the pleasurable sunken garden as a filter between the suburban, uneventful landscape on the surface and the tactile and rough crater that is dramatised as much in its artificiality as in its naturalness, the garden evokes contemplation as well as fun, with elements of the unexpected and surprise. It is about the body's immersion in the world, guided by emotions, interaction, performance, 'things', technology, experience, and the feeling that a place can evoke.

In the 19th century such an integral connection between nature and experience was already brought forward in the romantic concept of the 'supernatural': a ghost that is rooted in a place but is not physically present. The 19th-century author of supernatural fiction Vernon Lee wrote:

The ghost [...] is the damp, the darkness, the silence, the solitude; a ghost is the sound of our steps through a ruined cloister, where the ivy-berries and convolvulus growing in the fissures sway up and down among the sculptured foliage of the windows, it is the scent of mouldering plaster and mouldering bones from beneath the broken pavement [...] Each and all of these things, and a hundred others besides, according to our nature, is a ghost, a vague feeling we can scarcely describe, a something pleasing and terrible which invades our whole consciousness. (1898: 310).

The ghost that Lee describes is a 'substrate of potential bodily responses' (Clough and Halley, 2007: 2) present in a location, connecting the physical reality of nature to the ephemeral plane of the supernatural and collapsing the boundary between what is out there and in here.

A century later Rem Koolhaas re-introduced the supernatural, but this time as an integral component of the metropolitan landscape, making a direct connection between artificial nature and metropolitan conditions (1978). In his double coding super-nature implied both larger-than-life nature and fake, plastic nature. Koolhaas used the prefix 'super' ironically, suggesting a promise of the possibility to transcend late-modern dreariness without lapsing into nostalgia or conservatism. The image he presents nonetheless strongly reminds us of the modernistic, architectural vision of a generic, shapeless landscape (flowing and park-like) of unmanipulated nature, an image light years away from the ecological view that lived among landscape architects in the same period. In 2010, Malene Hauxner introduced a more mature version of supernature into the metropolitan landscape architecture debate as an intensified version of nature that is deeply embedded in history, culture and technology and brings together the architectural and the ecological view of the 20th century.

In the Wasserkrater Garden the natural force of the underground water becomes perceivable, while at the same time it is clearly visible that it is brought up by human hands. There is no distinction between what is natural and what is manmade and nature is exposed as something close to the skin, incorporated into the metropolitan fabric and our daily environment. The premise that we somehow stand outside (or apart from) nature no longer holds true. Nature is not only found 'out there', but also 'in here', and in the shell-like space of the garden the boundary between man and nature is dissolved, underlining the necessity of an attentive interaction with, and care for the living environment, which is not an abstract and inexhaustible force but interwoven with everything we do. To be fully engaged with nature means to come

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into a visceral and immediate contact with it. The articulation of sound, light, humidity, colour, texture and height differences can create a multi-sensory experience, which emphasises the exposure of nature and involves a 'feeling of being surrounded by or infused with an enveloping, engaging tactility' (Foster 1998: 133). Addressing the proximate senses such as smell and touch reduces the physical distance between us and nature to zero, and nature as the object of appreciation dissolves as a separate and distant 'thing' and becomes inextricably intermingled with the perceiver (Parsons 2008). Thus, stimulating a multi-sensory perception of nature becomes a critical aspect of landscape architecture.

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Hidden Tributaries: Retooling the Pipe in Agricultural and Urban Watersheds

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ABSTRACT

Both urban and agricultural systems in the American Midwest are dominated by networks of underground pipes that funnel pollutants to the adjacent waterways. Space for pollution prevention and mitigation is limited in both urban and agricultural contexts. In urban areas space is limited as a result of density, while in agricultural landscapes space is limited to maximize the square footage of crops. Coastal ecosystems in the United States are impacted by urban and agricultural runoff, yet management strategies tend to focus on one land-use at a time. Can green infrastructure mediate the conflict between artificially drained landscapes and downstream ecosystems? Though largely missing from production agriculture, green infrastructure has been proven to be a robust strategy for improving pollution from urban water systems. Teams of landscape architects, civil engineers, hydrologists, and urban planners have been on the forefront in designing green infrastructure to mitigate storm water runoff. New water regulations created the political will necessary to rapidly design, test and deploy green infrastructure strategies in cities across the country. This paper asks how landscape architects might adapt urban infrastructure systems like bioswales and rain gardens to Midwestern agriculture and examines the legal or regulatory frameworks that could facilitate the development and deployment of such strategies.

INTRODUCTION

Both urban and agricultural systems in the American Midwest are dominated

by networks of underground pipes that funnel pollutants to the adjacent waterways. In urban areas, a network of pipes under city streets bring in potable water, take away used water, and remove runoff from our city streets. The scale of this underground network has become increasingly under stress as cities have continued to densify and grow. As a result, the capacity of the existing infrastructure cannot handle the current volumes resulting in increased combined sewer overflow events. In production agriculture, buried four inch plastic pipes or “tile drains” bring subsurface soil moisture levels down for optimal crop growth, while accelerating nutrient runoff. Nutrients from tile drains contribute to dead zones in the Gulf of Mexico and the Great Lakes. Space for pollution prevention and mitigation is limited in both urban and agricultural contexts. In urban areas space is limited as a result of density, while in agricultural landscapes space is limited to maximize the square footage of crops. Coastal ecosystems in the United States are impacted by urban and agricultural runoff, yet management strategies tend to focus on one land-use at a time. What is needed is a synthetic approach to continental drainage systems whereby upland rural and urban systems support rather than suppress downstream coastal ecologies. Can green infrastructure mediate the conflict between artificially drained landscapes and downstream ecosystems?

Though largely missing from production agriculture, green infrastructure has been proven to be a robust strategy for improving pollution from urban water systems. Teams of landscape architects, civil engineers, hydrologists, and urban planners have been on the forefront in designing green infrastructure to mitigate stormwater runoff. New water regulations created the political will necessary to rapidly design, test and deploy green infrastructure strategies

in cities across the country. This paper asks how landscape architects might adapt urban infrastructure systems like bioswales and rain gardens to Midwestern agriculture and examines the legal or regulatory frameworks that could facilitate the development and deployment of such strategies.

AN ABBREVIATED HISTORY OF PIPED INFRASTRUCTURE

Pipes have long been a key component of urban and agricultural landscapes. In urban contexts the pipe addresses both economic and public health needs, while in agricultural settings the driver of piped infrastructure is primarily economic. By separating waste streams from potable water, the pipe vastly improves public health, while storm drains protect urban investments from flooding. In urban areas these piped infrastructures emerged as a reaction to issues of water quality. Garbage, chamber pot, privy, and animal refuse clogged city streets with no drainage network. (Atwater, 1996; Evans, 2015) These issues in addition to cesspools would compromise soil, groundwater, and/or springs, often impacting the source of water via well for the city (Burian et al, 2000). Yellow fever and cholera outbreaks frequented cities like Philadelphia, New York, and Chicago who began robust plans for construction of new water supply networks (Atwater, 1996; Smith, 2013). Sewer networks were built prior to the popularity of the flush toilet and instead were constructed to mitigate the refuse that collected on city streets (Evans, 2018; Atwater 1996). As a result, our initial sewer and water systems were designed for a different standard of living and as our needs changed they were augmented to facilitate higher water use and increased density.

As a tool of agriculture, the pipe was deployed partly in response to the Swamp Lands Acts, a national

land reclamation effort to drain swamps across the country and create agricultural economies. By lowering the water table, the pipe converted wetlands and marshes into productive agricultural land, while also minimizing surface erosion. John Johnston, a Scottish farmer that relocated to upstate New York, introduced tiles drains to the United States in the 19th century. Using patterns for horseshoe-shaped clay tiles, he commissioned a potter to fabricate tiles in 1835. As Johnston's farm yields increased tenfold and word of the benefits of subsurface spread, more shops began to manufacture and distribute tiles across the region. Some fifty years later, 500 steam-powered tile factories produced some 2,000 miles of drain tile a year in Ohio alone (Beauchamp, 1987). Today, the practice of installing agricultural subsurface tile drainage is pervasive in much of the midwestern Corn Belt, where it has been used for decades to transform poorly drained soils into highly productive cropland.

As cities have grown and agriculture intensified, the varied chemical composition and volume of runoff has strained static pipe infrastructure. By accelerating nutrient rich runoff into natural waterways, subsurface drains have myriad ecological consequences. In cities with combined sewer systems (CSS), raw sewage and inadequately controlled stormwater discharges from municipal sewer systems introduce a variety of harmful pollutants, including disease causing organisms, metals and nutrients that threaten our communities' water quality and can contribute to disease outbreaks, beach and shellfish bed closings, flooding, stream scouring, fishing advisories and basement backups of sewage.

In CSSs, during dry weather or light rain events stormwater and sewage are directed to the sewage treatment plant and processed. However, the volume exceeds the capacity of the

sewage treatment plant the excess is released into an adjacent river, ocean, or lake. This overflow event, Combined Sewer Overflow or CSO, can occur from less than an inch of rain. Newtown Creek, located in New York City, has 22 CSO outfalls that can be triggered by 1/10th of an inch of rain and recent modeling suggests that over 1.2 billion gallons are discharged annually. Consider this at a regional scale, the Environmental Protection Agency's (EPA) *Report to Congress on Combined Sewer Overflows to the Great Lakes Basin* estimates that over 22 billion gallons of untreated wastewater was discharged into the Great Lakes in 2014. The gallons include raw sewage, as well, as first flush toxins and litter that have accumulated on the roadway. These events cause beach closures, drinking water advisories, and shellfish contamination.

In agricultural watersheds, tile drains increase the flow nitrogen, dissolved phosphorous and a variety of pesticides and herbicides. In the Mississippi River Basin, agricultural subsurface drainage is responsible for over 70% of the nitrogen entering the Mississippi River Delta, where it creates a 8,000 square mile dead zone each summer. Because agricultural runoff can also contaminate municipal water sources, urban communities that source water from agricultural watersheds must often construct expensive filtration systems to remove nitrates from their potable water. In 1991, faced with increasing levels of nitrate in its source water, Des Moines Water Works constructed the world's largest ion exchange facility to remove nitrate from its finished water. Due to its age and the limited capacity of the existing nitrate removal facility, Des Moines Water Works anticipates that it will need to design and construct a new nitrate removal facility with a 50 million-gallon-per-day capacity at a capital cost of between \$76 million and \$183.5 million before 2020. With the

nitrate removal facility reaching the end of its lifespan, the Des Moines utility has decided to take legal action against upstream polluters, and is sued three agricultural counties in Iowa, claiming drainage districts there act as conduits for nitrates to move from farm fields into the Raccoon River, one of two sources of drinking water for 500,000 residents in the Des Moines metro area. They argued that pollution tile drain outlets should be classified as point source pollution, subject to the federal discharge permit requirements set out in the U.S. Clean Water Act. Though the Iowa Supreme Court ultimately sided with the drainage districts, the case is an indication of growing concern of water quality and the potential for new regulations to impact drained cropland.

UNCOVERING THE SUBSURFACE DRAINAGE MATRIX

The material and morphological conditions of subsurface drainage infrastructure and the chemical composition of its runoff varies by region in accordance with advances in technology and local hydrologic conditions. In urban landscapes, the subgrade network often falls into two categories, the aforementioned combined sewer system (CSS) and separate sewer system (SSS). CSSs are found in 772 cities in the United States. These cities are typically older and primarily concentrated in the eastern states. A CSS has a single pipe that conveys both sanitary sewage and stormwater, while a SSS conveys sanitary sewage and stormwater through separate piped networks. CSSs were adopted in US cities due to success in Europe, cost compared to SSS, and lack of certainty of the potential reuse of sewage in agriculture (Burrian et al, 2001).

In Alice Atwater's book *Water* she states, "The myriad of sewer lines join with many others to the sewer

main, a great underground river with daily flow that may be hundreds of millions of gallons, carrying feces from millions of people to be discharged at a single point into our waterways” (1996, p.145). These pipes were first built from wood, brick, or stone pipes. Later, as SSSs became the new standard, smaller vitrified clay pipes were used (Burian et al, 2000). Today, pipes are primarily PVC, but older pipes still in place may be metal or concrete. In addition, many older cities have both CSS and SSSs that reflect the growth of the city over time, resulting in a complex underground network. Stormwater enters these pipes through storm drains cut into the concrete curb and/or a sewer grate. This water can come from the street, sidewalk, and rooftops. Stormwater moves through the pipes and connects to additional stormwater and sanitary sewer pipes. The combined liquid either continues through the piped network to the sewage treatment plant or if that pipe is at capacity flows over a weir into the CSO pipe. CSO pipes can range in size from 2ft to 24ft and carry that wastewater to the nearest river, ocean, or lake.

This network of pipes forms a sewershed. Cities are comprised of smaller sewersheds, in many instances the footprint of a sewershed and a watershed do not align. A sewershed is defined by the “drainage areas of man-made sewers and storm drains” that flow toward a sewage treatment plant (Shamsi, 2005). A sewershed may be divided by a river, the Newtown Creek Sewer Treatment Plant’s treatment area includes parts of Brooklyn, Queens, and Manhattan. The waterfront of a sewershed is dotted with many CSO outfalls, these can range in size and in New York City fall into three tiers that reflect their size. The combination of these outfalls along the waters edge can result in an outfalls only separated by one block. The underground river meets the waterbody

at these waterfronts and connects the man-made and natural hydrologies.

The ‘great underground river’ exists in under both urban and agricultural areas in the United States. Some 48 million acres of farmland are tile drained. Agricultural subsurface drainage infrastructure is more standardized across landscape types, though primarily used in flat areas with slow-draining soils like the Midwest. Typically, 4” inch PVC pipe is laid 3-6’ below the surface, with parallel tiles spaced every 30-100’. Lateral tiles feed into a primary outflow pipe, which discharges into an adjacent ditch or waterbody. Unlike urban drainage networks which are heavily documented and regulated, the location and configuration of agricultural tile drains and their catchment areas can be difficult to ascertain as installation information is often lost over several decades of farming. Though some researchers are developing strategies for remotely sensing and identifying tile drains using Geographic Information Systems, this technology is not readily available to farmers.

THE CLEAN WATER ACT, MISSING THE NON-POINT

The Clean Water Act (CWA) and the creation of the EPA mark a clear shift in a national approach to water management. However, the environmental regulations imposed upon point sources, like municipal sewage treatment plants, cannot safeguard against diffuse, often invisible sources of pollution. The EPA attempted to address this oversight in 1994, when it issued the CSO Control Policy which “represents a comprehensive national strategy to ensure that municipalities, permitting authorities, WQS authorities, and the public engage in a comprehensive and coordinative effort to achieve cost effective CSO controls that ultimately meet appropriate health and environmental objectives”

(EPA, 2016). This called for the development and implementation of long-term CSO management strategies. In 2000, Congress amended the CWA, the amendment commonly referred to as the “Wet Weather Water Quality Act of 2000” requires municipal conformance to the 1994 CSO Control Policy. The Office of Enforcement and Compliance Assurance (OECA) National Enforcement Initiative focuses on enforcement of the 1994 Policy, as well as, the 2000 Amendment through consent decrees and administrative orders. The EPA has issued 47 consent decrees to communities nationally with an estimated cost of over \$32 billion to become compliant. Often this money is partially funded by increased sewer rates to households. Overall the EPA has “addressed 92 percent (196) of the 213 large CSO communities nationwide” (Butler et al, 2015).

These communities have developed various strategies to meet federal compliance. Some cities have added to their infrastructure through increasing the capacity of sewage treatment plants and/or building large diversion pipes to store stormwater in rain events. Others have further added green infrastructure solutions to these traditional grey infrastructure strategies. This legislation has required city and state agencies to coordinate with each other in new ways such as the development of green infrastructure master plans, the formation of green infrastructure departments and task forces, and new positions such as Chief Resilience Officer were created. The CSO Control Policy and the amendment to the CWA catalyzed cities to rethink their approaches to these issues.

The regulation on CSO communities and the green infrastructural innovations that followed is largely absent in agricultural watersheds. Currently tile drained lands are unregulated and are classified as “return flows from irrigated agriculture” under the Clean Water Act, point

sources that are exempt from the act's statute. Voluntary compliance programs like the United States Department of Agriculture (USDA) Environmental Quality Incentives Program (EQIP), the EPA's Great Lakes Restoration and the Mississippi River/Gulf of Mexico Task Force have focused on encouraging the adoption of best management practices to minimize nutrient runoff. Though there has been significant investment in BMPs, the size of the Gulf of Mexico dead zone and the Toxic Algal Bloom in Lake Erie has continued to increase (Turner et al., 2012). Though conservation strategies like no-till farming for reducing erosion and improving soil organic matter have been very successful, farmers have been slow to adopt nutrient management BMPs. This is in part because water quality benefits from constructed wetlands and perennial buffers occur downstream, while the high costs of implementation and management must occur on the farm itself. This makes farmers hesitant to adopt such strategies even when incentive programs like EQIP exist (Ribauda et al, 2017).

CONCLUSION

The CWA and EPA have led to improvement of water quality by first targeting industry and then adapting their approach to include cities. The result has created new streetscapes, new and improved habitat, reduced energy costs with implementation of greenroofs, reduce the heat island effect, and measurably improved water quality. New green infrastructure pilot projects continue to broaden the potential of green infrastructure to continue to adapt to the myriad of complex and compact spaces in the city. With rapid advancement taking place in urban environments, landscape architects should consider how to leverage these successes and adapt them for agriculture. Working with agricultural economists, rural

sociologists and policy makers, we should consider how such strategies could gain traction in the absence of federal compliance policy.

The standardization of agricultural drainage networks and production methods afford the opportunity for monumental change, for if the ecology of one productive site can be affected thousands of other sites may be affected in their turn. Landscape Architects could develop spatial strategies that not only improve water quality, but also mitigate flooding, create habitat for fish and wildlife, create space for passive recreation like bird watching as well as educational opportunities and inherent aesthetic value. Infrastructure featuring native prairie and wetland plants could provide year-round habitat and food for beneficial insects and pollinators. Greater numbers and species of birds are consistently found in agricultural fields with small patches of prairie and wetland. Research has also shown that insect diversity in cropland with linear prairie plantings equals that of nearby prairie restorations. Though agriculture has historically fragmented regional, discrete site scale interventions could network to generate connected wetland, grassland, and forested habitat.

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Environment Versus Nature and Landscape? The Case of Hydropower Plant on the Mura River, Slovenia

PECHA KUCHA PAPER

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ABSTRACT

The conflict between renewable energy resources on one side and nature and landscape conservation on the other is presented and discussed in this paper. Although there seem to be general consensus among environmental, nature conservation and landscape protection goals on policy level, the discrepancy often emerges on implementation level. The case study of the proposed hydropower plant Hrastje – Mota on Mura river (Slovenia) has shown, that on the implementation level reconciliation among these sectors is additionally aggravated by public opinion.

INTRODUCTION

The protection of European environment and landscape is guided by numerous policies, focusing on different aspects of the environment (e.g. nature and biodiversity, air and water quality, waste disposal, environmental assessment, etc. (Ec.europa.eu, 2018)), as well as on landscape (European landscape convention, 2000). Governed by one political body (EU Commission), one would expect that at least environmental policies all aim towards common goals: protecting qualities of natural and human environment. Although environmental aims and objectives seem to be tuned on policy level, where they are accompanied by strong public

and NGO's support, conflicts often appear on implementation level, where different objectives collide and conflicts are inevitable.

In this paper, the conflict between environmental goals (renewable energy sources) on one side and nature and landscape conservation goals on the other side will be presented and discussed. Whereas the public opinion supports the use of renewable energy, the reactions are much more diversified and controversial on the implementation level. There, calls for nature and landscape conservation seem to prevail, accompanied by uncertainty and mistrust in benefits of the planned development.



Figure 1: The change of Mura riverbed after the construction of the HPP

RENEWABLE ENERGY SOURCES (RES)

According to Renewable energy directive and national action plans, EU member states have committed to increase the share of RES in energy production and consumption. Slovenia set as its national targets to reach 25% share of RES in net final energy consumption by 2020, and 27% by 2030.

The majority of energy from RES in Slovenia is produced in hydro power plants. Four bigger rivers (Sava, Drava, Soča and Mura) hold the majority of hydro potential. Whereas the majority

of the potential on the first three rivers is largely used, the hydro potential on Mura river, which is estimated around 690 gWh/year (Kryžanowsky and Rosina, 2012), remains unexploited (hydropower plant (HPP) Ceršek is



Figure 2: The protests for preserving Mura

the only HPP on Mura within Slovene territory).

In 2012 the planning of the HPP Hrastje – Mota on Mura river was initiated. Three alternatives of the power plant were proposed with the capacity between 102 and 109 gWh/year (Figure 1). Parallel to the development plan, an environmental impact assessment (EIA) of the proposed power plant started¹. The crucial output of the EIA is an *Environmental report*², where the environmental conditions of the area are evaluated, and the impacts of the planned development are assessed.

NATURE AND LANDSCAPE CONSERVATION

The first two targets of the EU Biodiversity strategy focus on (1) protecting species and habitats and (2) maintaining and restoring ecosystems. Natura 2000 with its system of protected and connected habitats is probably the most powerful mechanism for implementing these targets. The area along Mura river is protected according to bird and habitat directive: 8 habitat types are identified, as well as 66 endangered species (Naravovarstveni-atlas.si., 2018). The area is protected

with two national conservation regimes: as ecologically important area and as natural value. According to Slovene legislation, any intervention in protected areas needs to be assessed and presented separately, as a special part of Environmental report.

European landscape convention in its preamble emphasizes several other aspects: an importance of landscapes to the formation of local cultures, as a basic part of natural and cultural heritage, which contributes to human well-being, the quality of life, and consolidates European identity. As such, landscapes should be protected, managed or planned in order to preserve their qualities and their character. The landscape along Mura river has no official designation, although Mura is often described as “the mystic naturally preserved river” in general public’ opinion.

THE CONFLICT

Considering the presented facts, the conflict was inevitable. Soon after the planning of HPP was initiated in 2012, it was followed with numerous protests against it (Figure 2). The opponents’ main arguments emphasize mostly the importance of Mura river in terms of nature and habitat conservation, as well as the meaning of the river landscape for national and local identity.

Despite the protests, the developer continued with preparation of plan and environmental report. Twenty-five studies were prepared within the EIA to serve as expertise for Environmental report (Demsi, 2018). The main purpose of these studies was to provide a comprehensive overview of the environmental conditions and to assess the possible negative impacts of proposed development plan on the environment. Up to some point these studies served also as a mean for (positive) publicity, but were more or less unsuccessful.

One of examples which showed the discrepancy between general

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public' and experts' opinion was the study where the landscape qualities of Mura were assessed together with other Slovene rivers. A questionnaire among experts from the field of spatial planning has shown, that despite the mystic, symbolic and natural reputation of the river, photographs of Mura were not evaluated as exceptional. Six criteria were selected to assess the "rank" of Mura among several Slovene rivers: natural quality, coherence, heterogeneity, symbolic/cultural value, aesthetic value and outstanding qualities. In average, the majority of photographs of Mura were classified into second half (Golobič et al., 2014).

The final assessment of the environmental report has shown, that the influence of HPP on the environment would be essential (class D³), therefore, the effects of the plan to achieve the environmental objectives of the plan have not been met. The most negative impact of the HPP would be on hydro-morphology, on ecological conditions of surface waters, on plants, animals and habitat types. The environmental report stated that: *"Considering the regulations on protection of Natura 2000 areas, the planned development could be implemented only if the principle of overriding public interest would be recognized (e.g. the public benefits of producing energy from RES) as more important than public interest of nature conservation."* And this is no longer experts' but political decision (Pojbič, 2018).

Despite the negative environmental report and negative public opinion, the developer decided to continue with the project by putting forward the principle of overriding public interest. The principle enables that the plan (could) become acceptable if certain mitigation measures and replacement habitats are planned. By that Slovenia's legal obligations regarding RES and nature conservation are confronted. Until now, the project is still not adopted and the conflict (obviously) still not resolved.

1 According to Slovene legislation, for each project where impacts on the environment are expected, an environmental report should be prepared parallel to the development plan.

2 An Environmental Report is a document in which the major impacts of the plan on the environment, nature conservation, protection of human health and cultural heritage, as well as possible alternatives that take into account environmental objectives and characteristics of the area to which the plan relates are identified, described and evaluated (Decree on Environmental report ..., 2005).

3 For evaluating an impact of the plan on the environment, six classes are used: A – no impact/positive impact, B – minor impact, C – minor impact because of mitigation measures, D – essential impact, E – destructive impact, and X – the impact is impossible to assess.

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Mountaintop Removal Mining and the Narrative of Conflict

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Keywords:

Landscapes of extraction; Coal mining; Appalachian Mountains; Reclamation; Human Right to landscape.

ABSTRACT

Increasingly landscape forms and dynamics can be described through the narrative of conflict. Conflicts generated by different interests and values shape the form of landscapes giving rise to manifold and divergent perspectives on past, present, and the future of lands.

One of the most divisive conflicts is related to environmental matters, particularly the conflict over natural resource extraction processes. Environmental and cultural values, community perceptions, and aesthetic ideals come into conflict with global economic interests that overcome local scale and community needs and aspirations. This is what is happening in the Appalachian Mountains (USA) where, since the late 1960's, mountaintop removal coal mining (MTR) is practiced. MTR is a highly disruptive activity that endangers tangible and intangible dimensions of landscape. It in fact harms the environment, economy, and socio-cultural fabric.

After outlining MTR practice within the conflict discourse, this reflection paper gives an account of how MTR disturbs landscapes and the environment and heavily affects communities' livelihood. Authors make the case for reframing the problem in human-right-to-landscape terms and finally identify, in the reclamation process, the opportunity for reconciling conflicting narratives over the same landscape. Authors argue for reclamation efforts that consider both tangible and intangible impacts of MTR under penalty of triggering new conflicts.

"We live in a world of many Appalachias. These are places of extravagant natural wealth and enduring poverty, places where the raw consequences of unsustainable economic practices predicated on human and environmental exploitation are unusually stark."
(Fisher and Smith 2012: 1)

CONTESTED LANDSCAPES

In 2013, the Museum of Modern Art in New York launched the online curatorial experiment *Design and Violence*. The curators aspired to investigate "the role of design in engendering (...) new forms [of violence]—or not." (Antonelli and Hunt 2015: 10) Curators define violence as the "manifestation of the power to alter the circumstances around us, against the will of others and to their detriment." (Antonelli and Hunt 2015: 10-11) The inference of this definition for designers is clear. Every time the transformation of the material world and experiences happen, design is implicated. "Designers often generate forms for social, psychological, and material violence" (Antonelli and Hunt 2015: 10) becoming unintentional accomplices of destruction as well as agents of creation and innovation. *Design and Violence* is an online platform in which critical design projects are presented along with projects whose concrete results are a direct manifestation of designed violence. Mountaintop removal coal mining (MTR), according to the curators, falls within the *Annihilate* design category and it is attributed to various designers (Caskey, 2014). This design category is the one that "seek[s] out total obliteration of an obstacle or adversary by any means available, whether human made or naturally occurring." (Antonelli and Hunt 2015: 15) In fact, MTR is the practice of blasting away mountains for extracting coal from seams that lay deep beneath even hundreds of meters

of rocks transmuting landscapes, flattening the land, burying thousands of kilometers of headwater streams, polluting air and water, depopulating mountain communities, and erasing coal towns.

Nowadays some of the most divisive conflicts are related to environmental matters. Brisman et al. (2015) classify environmental conflicts into four typologies: conflict over natural resources possession, declining resources, natural resource extraction processes, and conflict that destroys environments. The authors argue that natural resource extraction processes represent not only a conflict over the necessity for the resource extraction tout court but also over the implements of extraction. When comparing the benefits in terms of energy/raw materials supply with the environmental and social harms the extraction process generates, there is no general agreement on the fact that it is worthy. MTR is one of the cited examples of contested extraction methods that spawn resistance and protests bringing to the emergence of “battlegrounds (...): between different land uses and economic sectors (...); between corporate mining interests and novel alliances (...); between resident workers in traditional mining communities and new non-residents workforces;” (Carrington et al. 2015: 242) among others. The landscape of extraction is the very body of conflict, the battleground over which the process of extraction and its byproducts leave physical traces of destruction, disregarding the cultural, environmental, and social implications. Landscapes of extraction are, in fact, geology, technology and market generated forms; pits, mines, quarries, and every form of raw material extraction have their shapes primarily determined by:

- depth, thickness, and material confinement of mineral ore seams;
- development of new mining

- technology and labor organization;
- raw material price trends.

Conflict manifests not only in the disrupted physical forms of the landscape – or because of that – but also in the disputes over landscape values and land uses. The perspective on land as pure commodity, as something to be tamed and consumed, is greatly divergent from the perspective of the ones who claim landscape values through narratives of heritage, common goods, public resources, recreation, biodiversity, wilderness, etc. It is in these divergent views that the essence of the conflict lies. As acknowledged in international literature, landscape is a socio-cultural construct and not just a visually appealing physical tract of land. This point is also recognized by charters and treaties such as the *European Landscape Convention* (2000) and the *Natchitoches Declaration on Heritage Landscapes* (US ICOMOS, 2004) that acknowledge the landscape as a combination of natural and cultural factors and the role of it in building and consolidating identities and in embedding collective meanings and memories (Stephenson, 2006). Therefore, when divergent views overlap in the same area, it is not only the land to be threatened, but it is also people’s tangible and intangible legacy. “[L]andscapes have become a battlefield as they are subjected to rapid and widespread change. In the nineteenth century, we engaged in active conflict over *land*. Today, we are in regular conflict over *landscapes*.” (Stephenson 2006: 36) This is what is being experienced in the Appalachian Mountains (USA) where, since the late 1960’s, MTR is practiced.

MISSING MOUNTAINS

MTR came to the Appalachians in the late 1960’s and early 1970’s with the demonstration of the mining method at

two different sites in McDowell County, West Virginia. Instead of mining around the mountain hillsides, mountaintop coal mining operations moved through the mountains typically removing multiple seams of coal to depths that became hundreds of meters, as larger and larger mining equipment moved into Appalachian coal mines. Bulldozers were replaced by large shovels and draglines that were more typical of the large area and open pit coal mines of the Midwest. Miners embraced the mining method as many more coal seams became economical to mine with surface mining combing the low cost of recovering coal from readily accessible coal seams that were often near the ridgetops with coal seams further down the hillsides that in the past would have been unrecoverable or recoverable utilizing more costly underground mining methods. The soil and rock materials that were removed were typically placed into hollow or valley fills covering the ephemeral and intermittent headwaters of literally thousands of Appalachian mountain streams. In the early years, mountaintop coal mines were often no more than few hundred hectares with a few minor fills in the upper valleys covering minimal stream lengths. But by the early 2000's MTR were often exceeding thousands of hectares in area with associated fills covering many kilometers of adjacent streams.

Since 1977, surface mining is regulated by the Federal Office of Surface Mining through the Surface Mining Control and Reclamation Act (SMCRA) and associated regulatory program development. As originally conceived when SMCRA was passed, MTR was expected to be utilized as the preferred mining methods only when there were compelling post-mining land use potentials such as development of sites for housing, industry, recreation, institutional facilities. This was due to SMCRA and associated regulations requiring site regrading to what is

referred to as “approximate original contour” (AOC). With AOC, once mining is complete, the restored mine site must approximate the landforms that were present in the pre-mined landscape. MTR would always require a variance to this requirement and such variances were to be granted primarily to support a range of more intensive post-mining land uses. However, MTR permits were and are being routinely granted to mining companies regardless of their post-mining land use plans or the feasibility of those plans. Many times, simple wildlife habitat post-mining land use plans were and are being approved.

Since implementation of SMCRA, several somewhat unforeseen impacts have been noted and became the source of a great deal of controversy including: the loss of landform and topographic complexity and decreased overall landscape quality (Staniscia and Yuill, 2017); forest and wildlife habitat losses due to fragmentation; loss of biological diversity; and impacts on adjacent community human health and wellbeing including significantly reduced community environmental services. Numerous community and citizen group legal challenges have been mounted over the years addressing aspects of MTR most often including:

- Requirements for maintaining stream buffers during mining were not being met;
- Fills were often being incorrectly placed in intermittent and perennial stream valleys;
- Proposed post mining land uses were not being addressed, planned and implemented as originally intended in the law and associated regulations;
- Cumulative community impacts were not being considered in granting mining permits; and
- Cumulative impacts on mountain forested areas (primarily for community water supplies and

other ecosystem services) were not being considered.

If these are issues that it was possible to deal with in court, there are many other impacts that are more intangible and difficult to measure. They mainly relate to a compromised bond between the land and communities that inhabit it and that can be addressed in terms of damaging or loss of sense of place, identity, and belonging. What follows is a brief overview of these further impacts. People have lost their land. In the late 1800s and early 1900s many landowners signed the so called “broad form deed”; the deed allowed to transfer subsurface rights to a person other than the surface owner. Thus, landowners sold the subsurface of their land to coal agents maintaining ownership of the surface (Eldridge, 2015). When surface mining started, people didn't have any legal protection against coal extraction through surface mining and MTR which both brought to the annihilation of the land, leaving surface landowners with nothing. Unfortunately, this situation lasted until recently (Whilden, n.d.; Scherpf, 2016).

Loss of land and mountaintops – more than 500 have been counted (Geredien, 2009) – is probably the most visible effect but with it many more elements disappear. Cultural items such as historic community mountain cemeteries have vanished due to blasting, bulldozing and valley filling after MTR. Those cemeteries, in fact, have shared the same location with MTR. They have been intentionally placed in remote areas distant from future development, such as on mountaintops. Difficult accessibility due to mining sites presence and depopulation caused by lack of jobs and compromised livelihood by mining activities in the coalfields, are further factors of risk for cemeteries' disappearance (Maples and East, 2013). Compromised livelihood and town buyouts from coal companies are also

one of the reasons for vanishing historic coalfield towns and former coal camps (Maples and East, 2013; McGinley, 2004). Even more intangible elements disappear because of MTR. Among them it is possible to include: customary use rights (walking through the woods, picking berries, ginseng roots, ramps, and mushrooms, etc.); the livelihood of who depends on landscape for income and for sustenance; the right to live where one's family has lived for generations; the quality of life; the scenic views; the places of memory. Radical landscape changes produced by MTR are also the cause of disruption to place attachment and of solastalgia: “the pain experienced when there is recognition that the place where one resides and that one loves is under immediate assault (...). It is manifest in an attack on one's sense of place, in the erosion of the sense of belonging (...) to a particular place and a feeling of distress (...) about its transformation.” (Albrecht 2005: 48)

RECLAMATION AS RECONCILING PRACTICE

Landscapes manufactured by MTR are a ruthless epiphenomenon of the Anthropocene (Staniscia and Yuill, 2017), the current era marked by the role of mankind in shaping the present and future environment. However, claims for banning MTR are beyond the scope of this paper, although highly desirable and urged. Thus, these final remarks draw attention to the possible future of these disrupted landscapes envisioning a time of reconciliation since the authors agree with Stephenson that, predominantly, “the roots of the conflict lie in the failure to recognise and reconcile the multiple values associated with specific places.” (2006: 35) Then it seems that post-mining reclamation (PMR) can be identified as a good opportunity for doing so and for landscape architects to play an important role in reshaping the relation

between humans and the world they inhabit.

Nevertheless, PMR can still be very controversial. PMR activities usually focus on environmental cleanup, hazard mitigation and, occasionally, on redevelopment (Langhorst and Bolton, 2017). In the western Appalachian Mountains, only around 6% of post-mining surface after reclamation has been converted to new land uses such as industrial, commercial or residential development (Geredien, 2009). What is typically considered as PMR is unmanaged and unproductive grassland and scrubland that is incomparably of less social and ecological value than the original biologically diverse forest (Doshi, 2009). Scholars are currently exploring the possibility to develop renewable energy (RE) on mine sites in Appalachia (Todd et al., 2010; Ziemkiewicz, 2012 among others). Though, RE projects generally are socially controversial – “people rarely like [large-scale RE facilities] ‘in their back yards’ or even within their viewshed” (Smardon and Pasqualetti 2017: 108) – and often encounter public opposition. However, Cowell’s (2017) research, among others, has demonstrated that siting controversies can be avoided or limited when the sites chosen for new energy facilities are old energy landscapes. Although disturbed areas such as former mining sites are good candidates for RE siting, the tendency to concentrate unwelcomed uses in already spoiled regions can generate environmental and social justice issues triggering new conflicts over landscape values and land uses, and potentially turning coalfields’ landscape once again into a battleground. Thus, which kind of reclamation would be able to finally reconcile the different and conflicting narratives over the same landscape and would serve as a just reparation?

Reframing the problem of MTR from only environmental and public health terms in human-right-to-land-

scape terms (Egoz et al., 2016) would probably help to more broadly define the scope and meaning of PMR practice. According to Egoz et al. the landscape as a concept integrates “tangible spatio-physical elements and resources and intangible socio-economic and cultural values.” In its double interpretation as cultural realm and natural setting landscape is suited to “serv[e] as an inclusive framework for negotiating the rights of local communities and the marginalized, just as it serves as a medium for securing physical and spiritual wellbeing.” (2016: 17) As discussed above, traditional reclamation efforts can only partially address the physical outcomes of the extraction process. In addition, they usually totally disregard the restoration of the “spiritual wellbeing” that doesn’t arise from solely “healing” the material negative impacts.

Langhorst and Bolton identify four different currently adopted PMR strategies: PMR as restoration – physical and environmental damages created by mining activities need to be repaired; PMR as redevelopment – the abandoned mine sites are intended for economic development; PMR in transition – reclamation effort is understood as processual and able to respond to the multiplicity of meaning and value embedded in post-mining landscapes; PMR as recovery. This latter is a critical approach that “avoids the erasure of contested and conflicted histories (...) but instead reveals them and provides a platform on which the different interpretations and narratives of the past can be debated as they relate to different ways forward.” (2017: 167) The most relevant aspect of this approach, for the sake of our own reflection on reclamation of former MTR sites, is the consideration of reclaimed landscapes as dialogic and dialectic spaces where the past, current conditions, and alternative futures are the object of a debate that doesn’t prioritize one view over the others and

considers all lenses through which landscape is seen.

Thus, within the PMR as recovery frame, the reclaimed landscape would serve as a form of remembrance, a warning against the distorted relation between humans and the natural environment (Staniscia and Yuill, 2017). At the same time, it would also serve as a venue for building “knowledge commons” – locale where “knowledge [that] derives from practical, pragmatic, and physically real engagements with the outcomes of MTR mining” (Puckett et al. 2012: 240) would merge with technical expertise – and for, finally, giving voice to communities, to the “expendable people” – as activist and 2003 Goldman Environmental Prize Judy Bonds called Appalachians living in the coalfields (cited in Eldridge 2015: 291). The involvement and participation of residents in PMR efforts will enable the acknowledgement and account for the values and meanings – neglected and/or suppressed – still embedded in the landscape and for the ones lost along with mountaintops but that, nevertheless, represent the primeval bonds between people and place. All of them need to be uncovered, retrieved and re-enacted for providing solace and a just transition toward the future. If these final remarks may sound obvious or even rhetorical for a European audience, it isn’t so for “countries with weaker or less long-established planning systems, or with even more aggressive capitalism than in the post-2010 UK.” (Fairclough et al., 2018: 8)

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5.1. HUMAN AND NATURE

GROUP M

Portuguese National Ecological and
Agricultural Reserve: An Opportunity
to Manage Territorial and Landscape
Conflicts?

Carla Gonçalves

The Historical Path of the Green
Landscape of Kinshasa City: Revelation
of a Landscape of Conflict

Rita Occhiuto

What Landscape for Kindele (Kinshasa,
DRC)? Environments and Communities
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Reconcil/Reinvent by the Project

Rita Occhiuto

Waging War in a Peacetime Landscape
1896-1941: United States Army Corps of
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Tracy Walker Moir-McClean

Interactive Knowledge Production in
Self-Organized Urban Areas

Kathrin Wieck

Portuguese National Ecological and Agricultural Reserve: An Opportunity to Manage Territorial and Landscape Conflicts?

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Keywords:

landscape planning, natural resources, conflicts, national ecological reserve, national agricultural reserve, future

ABSTRACT

This paper aims to explore and discuss the future conflicts that land and natural resource planning are facing in Vila do Conde, a Portuguese municipality located in Oporto Metropolitan Area and how can we give room to those conflicts. For that a process of landscape characterization, with landscape types identification, have been developed and results were confronted with the National Ecological Reserve and the National Agricultural Reserve. Those two laws were created in the 80's, by Gonçalo Ribeiro Telles, and they were considered a pioneering concept in the field of environmental protection, being still in force.

Results are potentially useful to base appropriate policies for landscape conflict management establishing guidelines that allow us to safeguard many of the most relevant ecological, cultural and aesthetic values, especially using the green infrastructure concept.

INTRODUCTION

European landscapes have been facing constant change in the second half of the 20th century due to urbanization processes, population migrations and policies influencing land use (Antrop, 2000). That interaction between people, territory and policies led to an acceleration of landscape



Figure 1: 'Campo-bouça' system

transformation and in many situations led to an occupation of fertile soils, fresh water recharge zones and biodiversity spots and even areas susceptible to natural hazards. Landscape transformation and fragmentation results in the loss of landscape character but also in the decline of biodiversity (Cunha et al, 2017; Tillmann, 2005; Jaeger et al., 2011; Hagen et al., 2012) and in the change of landscape services.

Portugal was no exception to the process that led to an accelerating of landscape transformation, reason why in the early 1980s, Gonçalo Ribeiro Telles, a prominent landscape architect and minister of the Portuguese government, devised and released two very important laws that would influence significantly the land planning system: The National Ecological Reserve and the National Agricultural Reserve. The National Ecological Reserve aims to preserve natural values and ecosystems identifying a set of areas that, by their "ecological value or sensibility, or by exposure and susceptibility to natural hazards (mainly flooding, erosion and coastal instability), are subject to special protection" (Decree Law No. 321/1983 republished by the Decree Law No. 239/2012); the National Agriculture Reserve aims to protect the best soils for agriculture (Decree Law No. 196/1989 republished by the Decree Law No. 199/2015). Both laws are still in force and establish an opportunity to safeguard human populations security and the territorial biophysical wellbeing. However, these laws are also seen by some public or private interest groups

as barriers to economic development and general improvement of the human communities. They have therefore become a constant source of conflict being constantly under pressure to be reviewed or even suppressed.

Currently several international documents strengthen the need of landscape, soil and biodiversity protection (e.g. The European Landscape Convention of the Council of Europe, the European Biodiversity Strategy to 2020 of the European Commission, The European Union Strategy on Green Infrastructure the Convention to Combat Desertification of the United Nations, the Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil). Despite the European Landscape Convention was entered into force in Portugal, in 2005, there is no legal obligation to set up a landscape study at municipal spatial plans. Yet, its mandatory to establish The National Ecological Reserve and the National Agricultural Reserve, as well, as the green infrastructure at municipal scale.

According to Portuguese legislation (Ministered do Ambiente, Ordenamento do Território e Energia, 2015a, 2015b), the green infrastructure is composed by the set of areas whose main function is the conservation of environmental and landscape values, due to their biophysical, cultural or landscape characteristics, ecological continuity and planning. The National Ecological Reserve and the National Agricultural Reserve must inform the green infrastructure definition.

Considering that both reserves (and green infrastructure) includes the landscape systems which are critical to ecological stability assurance, this paper aims to aims to show, through the analysis of a case-study (Vila do Conde, Portugal) that a landscape study, with landscape types identification, is fundamental to combine land and natural resource planning

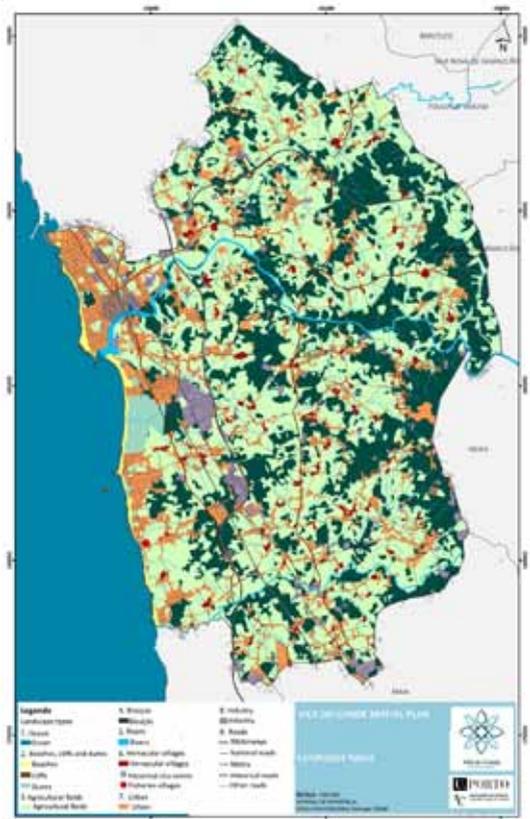


Figure 2: Landscape types – spatial representation

(national ecological and agriculture reserve identification) and livelihood considerations. Results are potentially useful to base appropriate policies for landscape conflict management guidelines that allow us to safeguard many of the most relevant ecological, cultural and aesthetic values presents in Vila do Conde.

STUDY AREA – VILA DO CONDE, PORTUGAL

Vila do Conde is a municipality located in Oporto Metropolitan Area, with an area of 149 km², whose spatial plan is nowadays being reviewed. The relief oscillates between the 0 meters (coastal zone) and the 233 meters, near the Eastern limit of the county. Its territorial organization is influenced by the existence of three main rivers (Ave, Este and Onda) and by the existence of a high network of road infrastructures,



Landscape type: ocean



Landscape type: beaches, cliffs and dunes



Landscape type: agricultural fields



Landscape type: 'bouças' (forestry)



Landscape type: rivers



Landscape type: vernacular villages



Landscape type: urban areas



Landscape type: industry



Landscape type: roads



'Campo-bouça' system

Figure 3: Landscape types and 'campo-bouça' system

which facilitates the rapid accessibility to Oporto city.

The landscape is strongly influenced by its proximity to the Atlantic Ocean and includes a remarkable agroforestry character expressed

by the 'campo-bouça' mosaic and a well-preserved coastal landscape with beaches, cliffs, dunes, wetlands, forests and agricultural areas, whose value has been recognized by the government through its classification

as Regional Protected I Landscape of the Coast of Vila do Conde and Ornithological Reserve of Mindelo. In addition to its rich landscape, Vila do Conde municipality has also had to deal with significant problems related to urban and industrial expansion, especially on coastal zone, and with the 'campo-bouça' system transformation during the last years. This system was formed by a mosaic like tapestry of grasslands surrounded by fruit orchards and forest (e.g., *Quercus robur*, *Quercus suber*). Nowadays mostly of the species were substituted by *Eucalyptus globulus* and more recently the municipality is dealing with its deforestation. The proposed concept to protect many of the most relevant ecological, cultural and aesthetic values was supported by a landscape study, whose proposal must attend to the relationship with the National Ecological Reserve and the National Agricultural Reserve, as mandatory instruments useful to set a network of areas which still include valuable resources.

MATERIAL AND METHODS

To gain an understanding of which are the actual and future conflicts that land and natural resource planning are facing in Vila do Conde, an integrated landscape characterization was undertaken, at 1/10.000 scale. The overall approach for Landscape Characterization was separated into three separate stages - Stage 1: Landscape Characterization; Stage 2: Landscape visual exposition and Stage 3: Landscape visual quality. The three stages involved the combination of the desk study research and field work analysis.

The data available included planimetry, elevation, slopes, aspect, soil type, geology, land use, hydrology, roads, cultural heritage, Natura 2000 habitats, flora, fauna, orthophoto maps (2015) and military maps.

The first stage aimed to identify,

map and describe the existing landscape types. They were identified and delimited by direct observation, from points with high expansion and visual amplitude, combined with the analysis and interpretation of the land use cartography and orthophoto maps.

To evaluate the visual exposure of the landscape types (stage 2), an expedited analysis of the territory was carried out, considering the visibility obtained from points of remarkable visibility and priority visibility paths, using the effect of the absence or existence of visual barriers. The points of remarkable visibility were accessible from the road network, located at the highest elevation levels, with a great visual expansion. The priority visibility paths were coinciding with road and pedestrian circulation networks and were created visibility points, with a 25-meter equidistance, using ArcGIS software. In a first moment, the exercise was carried exclusively based on the digital terrain model (potential visibilities). In a second moment, the land use occupation was considered, and it was assumed the average vertical projection of the vegetation or urban occupation (agriculture – 1 meter; forestry – 20 meters; industry – 9 meters and urban areas – 6 meters).

In stage 3 a landscape visual quality assessment focuses on the landscape types previously identified was developed. The landscape visual quality assessment is a critical and evaluative reflection on the visual information perceived by observers according to concepts, criteria and methodologies defined by specialists (Farinha-Marques 2014, quoting Ching 1986, Smardom et al. 1986, Câmara 1987, Higuchi 1988, Sanoff 1991, Daniel 2001). The process followed expert-evaluation method, based on three visually perceptible parameters: 1) landscape order; 2) landscape diversity; and 3) scenic value (adapted by Smardom et al., 1986 and Câmara, 1986-1987). All process was developed



Figure 4: Visual exposure without visual barriers

using a computer-based Geographic Information System (software arcgis 10.5, ESRI). In this research, it is understood that landscape order is the sensorial expression of organization and spatial regularity that is established between the main elements of a landscape type. Landscape diversity is the quantity of landscape components and / or variations explicit in a landscape type, which are perceptible and contribute to the creation of different stimuli in the observer. The scenic value of the landscape corresponds to the instantaneous and sensory impact caused by a landscape type on the observer. Inquiries were conducted to landscape architects and each parameter (order, diversity and scenic value) was evaluated using a qualitative parameter (high to low) and then converted to a numerical value (Table 1).

Finally, once the pertinent types



Figure 5: Visual exposure with visual barriers

of the landscape have been identified and defined and its landscape visual exposition and landscape visual quality assessment was carried out, it was analyzed its relationship with the national ecological reserve and the national agricultural reserve.

RESULTS AND DISCUSSION

Analysis of the existing situation a. Landscape types

The procedure described above resulted in the identification of nine types of landscape (Figure 2 and 3): (1) the ocean; (2) the beaches, the cliffs and the dunes; (3) the agricultural fields; (4) the 'bouças' (forestry); (5) the rivers; (6) the vernacular villages (e.g. Vila do Conde's historical city center, fisheries villages, rural centers); (7) the urban areas, (8) the industry and (9) the roads. This process allows us to conclude the current and the future conflicts that

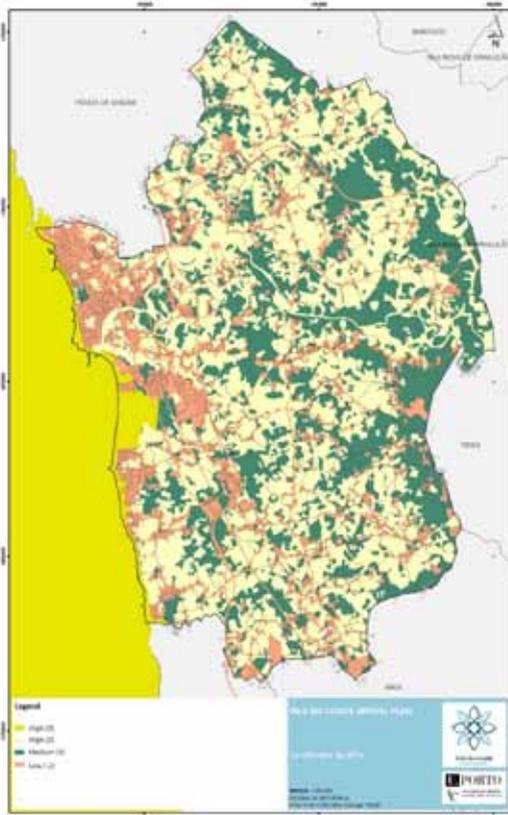


Figure 6: Landscape visual quality

land, natural resources and landscape is facing:

- The agricultural fields and the 'bouças' are the predominant landscape type;
- Temporary irrigated crops are the principal cultures used due to milk production;
- The 'Bouças' are disappearing because of agricultural intensification – there is a great uncertainty if the agriculture practices will subsist because the end of milk quotas;
- The oak trees were substituted by eucalyptus species, declining quality of forest ecosystems;
- The urban areas, industry and roads expansion has consumed land with productive soil and to fragment existing landscape structure.
- There's a demand for new industrial areas. The existing ones

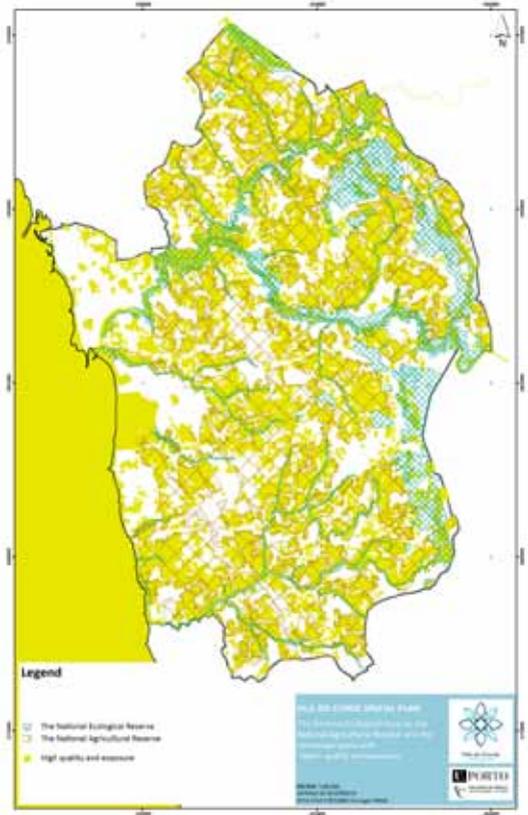


Figure 7: The National Ecological Reserve, The National Agricultural Reserve and the Landscape Types with higher quality and visual exposure

- are integrated due to the existence of eucalyptus forestry's ('bouças');
 - The shoreline is retreating due to coastal erosion;
 - The coastal area is increasingly dominated by urbanization;
 - The coastal area has different habitats. Yet, invasive and exotic species (*Acacia longifolia*, *Cortaderia selloana*, *Carpobrotus edulis*) have been increasing during the last years;
 - The beaches, the cliffs and the dunes are extremely important in the coastal zone protection.
 - The vernacular villages represent the character and rural identity of Vila do Conde.
- b. Landscape visual exposition**
The landscape visual exposition assessment was carried out considering the visibility obtained from points of

notable visibility and priority visibility paths, considering the effect of the absence (Figure 4) or existence (Figure 5) of visual barriers. Due to altitude and the lack of vegetation, Cidade, Serras de Rates and Santa Eufémia, are the areas with the greatest visual exposure. Although Vairão, Outeiro and Aveleda are also located at a high altitude, the visual exposure is absorbed by visual barriers – buildings or ‘bouças’. It was proved that trees play a predominant role, especially in areas with higher visual exposure, due to their volume, opacity, and perennial character.

c. Landscape visual quality

The landscape visual quality assessment allowed us to conclude that the landscape types with higher visual quality are: the ocean, the beaches the rocks and dunes; the agricultural fields; and the rivers (Figure 6). This is justified by their order, natural diversity and scenic value, associated with their natural metabolism. Comparing with the rivers, the ocean exhibits high sensory expression and scenic value due to its scale. The agricultural fields have a great aesthetic variability, superior, for example, to the rivers, justified using temporary irrigated crops. The ‘bouças’ and the vernacular villages have average visual quality. The ‘bouças’ are formed predominantly by tall and opaque trees, whose character gives a practically constant green color throughout the year. The vernacular villages represent the rural landscape of the past, expressing the relationship between man and nature and the identity of the place. The urban areas, the industry and the roads have low visual quality because there’s a high heterogeneity and a lack of order or harmony. We concluded that ‘bouças’ are a strategic landscape type, for their capacity of absorption and mitigation of visual intrusions.

d. The national ecological and agricultural reserve

Confronting Vila do Conde national ecological and agricultural reserve with the results of the landscape characterization (landscape types with higher visual quality and with higher visual exposure), we concluded that those are included in the national ecological reserve (the ocean, the beaches the rocks and dunes and the river, higher exposure) or in the agricultural reserve (the agricultural fields) (Figure 7).

The beaches and dunes play an important role in protecting the seafront and in regulating the its ecological and natural systems. The conservation and promotion of the sand dunes is one of the main goals of the national ecological reserve to protect the shoreline. The cliffs are also promoters of marine biodiversity, being associated with important habitats and fauna values. The Regional Protected Landscape of the Coast of Vila do Conde and Ornithological Reserve of Mindelo is a unique preserved landscape in North of Portugal, where the relationship between the dunes system, agricultural and forestry protect the coastal ecosystem and preserve it from urban expansion.

The Ave, Este and Onda rivers, along with the other streams of Vila do Conde are also fundamental as ecological corridors and for its important role in the regulation of water systems. The National Ecological Reserve protect them, as also the flood risk areas.

The ‘campo-bouça’ mosaics has an important aesthetic, patrimonial and environmental value. ‘Bouças’ play an important role in the mitigation of visual intrusions and in the regulation of visual quality, especially when located in the hills. Here, they are also extremely relevant because of they contribute to minimizes erosion risk and contribute to the recharge of water systems.

As referred, according to Portuguese Legislation at municipal scale isn’t mandatory to set up a landscape characterization but spatial plans must define both reserves and a

green infrastructure proposal. It's also mandatory that both reserves should inform the green infrastructure process.

Even though we consider that the integration of a landscape characterization in spatial planning and its articulation with the green infrastructure is crucial, while this is not legal establish in Portugal, we concluded that using different processes (landscape characterization or the national reserves definition), we achieved almost the same results. The legal basis of both reserves and green infrastructure is an important tool to minimize conflicts that land, natural resources and landscape are facing. If linked, both processes can strengthen multifunctional landscapes and ecosystems in urban and rural areas, contributing to multiple economic, environmental, cultural and societal benefits for its inhabitants. The proposed landscape characterization process can also help to develop the green infrastructure proposal by identifying the most relevant areas for green infrastructure from the biophysical, economic, cultural and social perspective.

CONCLUSIONS

During the last years, Vila do Conde municipality is under pressure due to its proximity to Oporto city and the existing of good accessibilities: a demand for urban areas, new industries and agriculture intensification lead to changes in landscape and loss and fragmentation of 'bouças' which threaten biodiversity. Thanks to the National Ecological and Agricultural Reserve, most of the landscape, land and natural resources values have been safeguarding.

This research develops and tests a methodological approach to identify landscape types and its quality, and results were confronted with the National Ecological Reserve and the National Agricultural Reserve. Nine landscape types were identified

(the ocean; the beaches, the cliffs and the dunes; the agricultural fields; the 'bouças' (forestry); the rivers; the vernacular villages; the urban areas; the industry and the roads), a landscape visual exposition assessment was carried out, highlighting the role of *Eucalyptus*'s 'bouças' in the integration of industry and urban areas. A landscape visual quality assessment was developed to identify the landscape types with higher visual quality.

Confronting the landscape characterization results with the National Ecological Reserve and the National Agricultural Reserve, we realized that mostly those are coincident despite different methodologies are using to identify each one. We concluded the relevance of those two laws to solve ongoing conflicts regarding landscape, land and natural resource planning, being the basis for a green infrastructure proposal. Further research will be conducted to set up the green infrastructure proposal for Vila do Conde Municipality, using the results showed on this paper.

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TABLES

Table 1. Parameters Order, Diversity and Scenic Value: numerical conversion

CLASSIFICATION	NUMBER CONVERSION
High	+ 1
Medium	0
Low	-1

Table 2. Landscape types: landscape visual quality

LANDSCAPE TYPES	ORDER		DIVERSITY		SCENIC VALUE		LANDSCAPE VISUAL QUALITY	
Ocean	High	1	High	1	High	1	High	3
Beaches, cliffs and dunes	High	1	High	1	High	1	High	3
Agricultural fields	High	1	Medium	0	High	1	High	2
'Bouças'	Medium	0	Medium	0	Medium	0	Medium	0
Rivers	High	1	High	1	Medium	0	High	2
Vernacular vil-lages	Medium	0	Medium	0	Medium	0	Medium	0
Urban areas	Low	-1	Medium	0	Low	-1	Low	-2
Industry	Medium	0	Low	-1	Low	-1	Low	-2
Roads	Low	-1	Medium	0	Low	-1	Low	-2

The Historical Path of the Green Landscape of Kinshasa City: Revelation of a Landscape of Conflict

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Landscape, Man-nature link, green system, co-partnership

ABSTRACT

Built on a geomorphological site of an amphitheater form, the strong population growth of Kinshasa city and its spontaneous urbanization causing several mutations of the urban landscape. Socio-spatial transformations induced were accompanied by degradation of the habitat damaging to the sustainable development of the city.

Faced with this emergency of the requalification of the habitat, this study aims to analyze the evolution of green landscape of Kinshasa. So, based on the hypothesis of four steps evolution of green landscape, the present study was carried out through survey and historical documents reading. The survey consisted of unstructured and informal interviews with 100 people over a one-year period. The historical document reading consisted in reviewing the historical and present textual, cartographic and photographic documents about the city vegetation cover. As results, our hypothesis is confirmed and resume the historical path of the green landscape of Kinshasa like following: original green landscape – imported green landscape – mimetic green landscape – unbalanced green landscape. These results reveal a veritable landscape conflict by highlighting the abstraction in the Man-Nature

link. Moreover, it is obvious that the natural environment is highly degraded and remains supported by the few remaining green spaces and agricultural spaces present thanks to the abundant network of hydrography of the city. By re-emerge initial green conditions of the city, this study feeds a reflection of the green landscape characters which were unknown by the new inhabitants. The green landscape change reconstructed through maps and stories offer the way to understand the habitat degradation process and their causes; to restore the environmental balance in order to reduce risks such as gullies based on culture of inhabitants by the co-partnership.

INTRODUCTION

A polynomial and polymorphic city with many names and faces in the heart of the African continent, Kinshasa, is the subject of multiple readings through the eyes of science and various arts. The interest in this city stems from its strong peri-urbanization subsequent to its relatively strong demographic and spatial growth (Pain, 1984; Lelo Nzuzi, 2008; Kayembe Wa Kayembe et al., 2009; SOSAK, 2014). It is also a city where the usual reference systems are scrambled and where everything works differently (De Boeck & Jacquemin, 2006).

The various studies dedicated to the Kinshasa territory reveal the image of an unbridled city with rather heterogeneous patchwork of an urban landscape. Built on a large amphitheater-shaped site, Kinshasa is comparable to what Dominique Malaquais calls “*ville-flux*”: composed of spaces born of complex overlaps, intense, contradictory, each generating others, carriers of multiple realities (Lagae, 2010). It is an atypical urban landscape resulting from an urbanism where the action often preceded the results of the analysis (Mutambaï, 1971). This urbanism based on a popular urbanization mixed with “*villagization*” or “*ruralization*” (Trefon, 2000) led to a city “of verb architecture” (De Boeck

& Jacquemin, 2006) where the idea of the habitat is enough to shelter the Kinois. As a result, in the eyes of the “powerless” or “resigning” state and the poor people in loss of marks, the environment is deteriorating and is increasingly struggling to ensure quality habitats (Trefon, 2000).

All in all, the current ecological issues are at the origin of multiple arguments in favor of sustainable urban planning (Chalot, 2015; Da Cunha, 2015). The implementation of such urban planning requires a retrospective analysis of urban settlement practices, especially in African cities such as Kinshasa. This analysis, which can be envisaged under multiple thematic and methodological entries, cannot skip the need of the green systems review. In order to achieve a better quality of life in the urban landscape, vegetation has undeniable importance since the urban environment is subjected to the phenomena of heat islands, various pollutions, climatic changes and its corollaries (floods, erosion ...) (Botkin & Beveridge, 1997). The present study then proposes to carry out a survey of the green landscape evolution in Kinshasa. This study specifically seek to understand how the vegetation cover is described by the populations over the time and how it is described in the existing documentation? The given meaning to the “green landscape” is the plant component of the urban and peri-urban fabric considered its spatiality and its contribution to the quality of the habitats.

MATERIALS AND METHODS

Starting assumption: statement and rationale (justification)

Several authors have previously, in many ways, studied the evolution of African urban landscapes and Kinshasa in particular. Lelo Nzuzi (1989) analyzed the evolution of urbanization and urban planning in West and Central Africa.

He recognizes three major periods in Negro-African urbanism: the imitation period (1960-1970); the revision period (1970 to 1980) and the innovation period with integration of socio-cultural aspects (1980 to present).

By re-reading the genesis of spatial planning in Congo-Kinshasa, Mutambaï (1971) distinguishes three

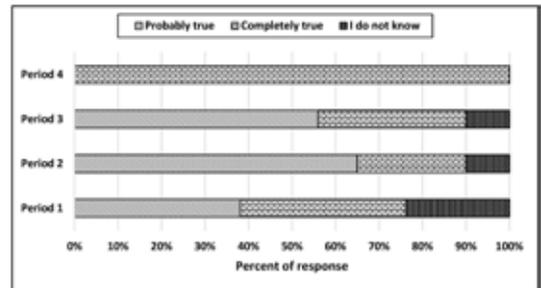


Figure 1: Distribution of respondents' responses according to their adherence to the hypothesis of four periods of evolution of the green landscape of Kinshasa. Period 1 – before 1881: original green landscape; period 2 – Belgian Congo (1881 - 1960): imported green landscape; period 3 – postcolonial Congo (1960 - 1980): mimetic green landscape; period 4 – contemporary Congo (1980 to the present): unbalanced green landscape.

important periods. This is the Leopold period (1885 - 1910); the post-Leopold period (1910 - 1960) and the first decade of Independence period (1960 - 1970).

De Maximy (1984) also describes the path of the Kinshasa urban project in three periods in his book entitled “*Kinshasa, ville en suspens*”. He distinguished successively the Belgian project resulting in an alienated city; the Zairian project that has maintained an abandoned city and the Kinois project, engine of a city in search of identity.

The evolution of the Kinshasa green landscape cannot be in margin of the periodizations previously mentioned. The place of the plant in the development is indeed strongly related to the ideals and priorities of the moments (Mehdi et al., 2014). The present study on the city of Kinshasa, was then based on a hypothesis of periodization in four phases of the evolution of the Kinshasa green landscape:

- (i) the period of original green



Figure 2: Photo in the European neighborhood of Kinshasa (Ministry of the colonies, 1951)

- landscape (before 1881, date of creation of the city);
- (ii) the period of green landscape “imported” into the Belgian Congo (1881 - 1960)
- (iii) the postcolonial period with mimetic and unfinished green landscape (1960 - 1980) and finally
- (iv) the contemporary period with an “unbalanced” green landscape (1980 to the present).

Methods

The study uses a mixed approach of historical and descriptive reading of the territory based on the paradigm of “trace-écart» (Occhiuto, 2005). Such an approach has the advantage of allowing a «ladder interlocking» analysis. In addition, it is based on the need to browse, listen, and understand the territory in order to build an image of it (Secchi 2000 quoted by Leloutre & Vigneron, 2015).

The mixed research approach was employed involves:

- Unstructured and informal interviews with 100 people over a one-year period from July 20, 2016 to July 20, 2017. Only people aged 30 or over who had lived the different phases of landscape change. Only one question was asked to the surveyed: «how can you describe the key elements of the green landscape of the city of Kinshasa over the four periods distinguished in the basic hypothesis?» The question was made out like such in order to having the possible elements of major differences to check the starting assumption. Thus, according to the respondents’ responses, their agreement with each of the four periods of the basic hypothesis was classified according to three increasing agreement degrees: “I do not know”, “probably true” and “completely true”. The frequencies of the agreement degrees were then computed for each period and tabled graphically.
- Bibliographic research: it consisted in reviewing the historical and present documents about the city in terms of green landscape, in particular the textual documents (monographs, correspondences, ...), cartographic and photographic. The analysis carried out was to identify the distinguishing elements of the four hypothetical periods in order to check if they stand or not.
- Direct observation: it consisted of journeys through the city to understand the current realities of the green landscape.

RESULTS AND DISCUSSION

What the population knows about the evolution of the city green landscape

Among the four hypothetical periods only the last one, corresponding



Figure 3: Photo of an avenue in the European neighborhood of Kinshasa (Ministry of the Colonies, 1951)

to the present time, is indeed the best known. On the other hand, the first three periods that require retrospection are therefore described with inaccuracies. However, the survey results show a real tendency to confirm the latter with 75-90% of cumulative proportions of confirmatory responses (Figure 1). The respondents are therefore largely tend to confirm the hypothesis of the description in four periods of the evolution of the green landscape of the city.

In the first period, the respondents describe the landscape as a mosaic of forest-savannah with remarkably dominant species such as palm trees (oil palm ...) and baobabs. According to the respondents, the landscape in the second period remained abundantly green. In the third period, after Independence, the dual green landscape of the colonial period was maintained for a moment. However, according to the respondents, the maintenance of the vegetation was not well assured. The green device of the city center has regressed sharply. In the

last period, the regressive situation of the green landscape which started since Independence has worsened. Indeed, many garden spaces are replaced by buildings. The trees felling has become recurrent, especially in peripheral areas.

The evolution of the Kinshasa green landscape through the existing historical documents

The review of the existing historical documents helps us to distinguish at least four consecutive periods in the history of the green landscape of the city. Although the limits of the periods have proved to be indicative, discriminating elements have been found and are discussed below.

Kinshasa originally (before 1881): malebo landscape

The first writings describing the landscape of Kinshasa are obviously those of its creator Stanley in his letters addressed to the King of the Belgians. In his letters he described a luxurious vegetation that characterizes the Congo Basin. There are few

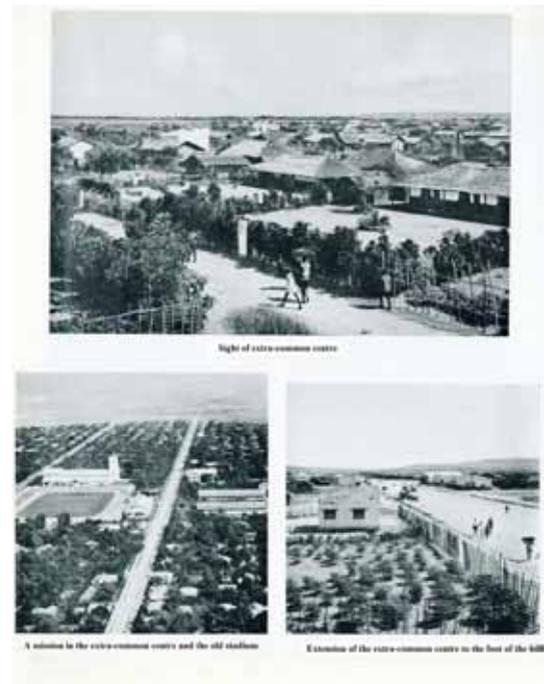


Figure 4: Photos illustrating the organization of indigenous neighborhoods (Ministry of the Colonies, 1951)



Figure 5: Photo of an avenue in an indigenous neighborhood (Ministry of the Colonies, 1951)

pictorial documents that talk about the landscape of the period before the colonial installation. However, all authors agree that the natural vegetation of the Kinshasa region was composed of dense dry forests, savannas and aquatic and semi-aquatic formations in the valleys and around the *Malebo* Pool (Kikufi and Lukoki, 2008; 1984). In contrast, the hills had sub-steppe-like open savannas because of the high permeability of the Kalahri sands that make up their soils (Miti et al., 2004). In any case, the authors all agree that the city's landscape was originally beautiful and dominated by palms (*Malebo* is in vernacular language) (Fumuzanza Muketa, 2008) and baobab (Lelo Nzuzi, 2008).

Kinshasa of the Belgian Congo between 1881 and 1960: "imported" green landscape

In this period there was not any development plan. Originally installed at Kitambo Bay, Kinshasa still resembled in 1907-1910 "a sleepy village on the banks of the Congo River buried

under the shade of a 100-year-old baobabs and borassus with big red berries that will earn it the nickname of "Kin-malebo" (Pain 1984: 15). With the decree of 21 February 1949 on urban planning in the Belgian Congo (Ministry of the colonies, 1951), the city green landscape will undergo profound changes by the intervention of the local urbanism plan (1950). The review of the Kinshasa land cover maps in 1950 and 1957 by Pain (1984) and that of the green areas proposed by the Ministry of the Colonies (1951) clearly reveal the radical double dualization of the green landscape that has occurred. Obviously, with the urbanization of the plain, the forest vegetation that existed there was degraded into savanna whose dominant grass was *Loudetia demeusei* or *Loudetia simplex*. On the other hand, the hills that bordered the plain from east to northwest were still largely covered with forests. Apart from this dualization due to the topography of the site, there is a second dualization due to the separation of the living area between the "whites" (or "*mundele*" in Lingala) and the "indigenous" made up of African natives (Ministry of the Colonies, 1951).

At that time, the *mundele* area was rich with modern green amenities (parks, public gardens, squares, green walkways) (Figures 2 and 3). For European neighborhoods, the primary need was to preserve a pleasant environment created by space and trees of local and new species (Bruyere, 1952). Willing or not, those amenities would contribute to import the European green landscape of that time. This is reflected in the autobiography of the city's native writers about their experiences in the white area (Lelo Nzuzi 1989, Feignond, 1997).

Beside this paradise-like green landscape in the European city, a rather "wild" but "hygienist" green landscape has developed. Structured in vast monotonous flat spaces, African neighborhoods were organized



Figure 6: Comparative situation of planned and spontaneous cities in 1968. New district of the 1930s-1950s in the West and spontaneous extension area from the 1960s to the East. Maintain the orthogonal plan but net difference in density of habitats and vegetation (Pain (1977) in Flouriot et al., 1978)

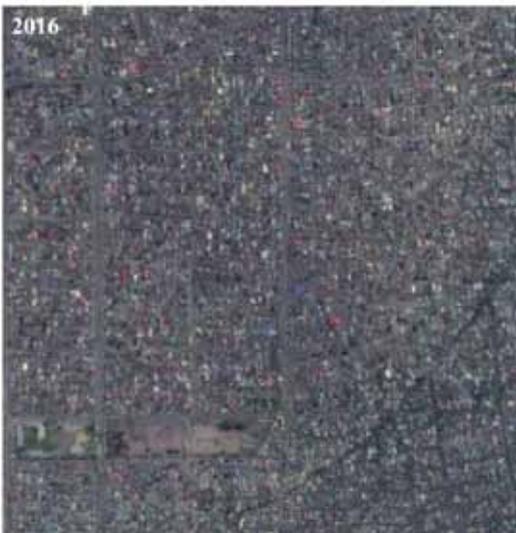


Figure 7: Green situation of planned and spontaneous cities in 2016. A new city district of the 1930s -1950 in the West and district of spontaneous extension of the 1960s in the East. Densification of buildings and low vegetation cover. (Image Extracted from Google Earth) Figure 7

according to strict standards (Figures 4 and 5) based on the preservation of native trees and living fence (Bruyere, 1952).

Kinshasa in postcolonial period between 1960 and 1980: mimetic and unfinished green landscape

Exceeded by the growth of the city after the Independence, local authorities appealed to the Belgian expertise to produce the regional plan of 1967. This plan (which quickly become obsolete) that aimed to limit the urbanization at the level of the plain, had the merit of promoting agricultural green spaces. In this same logic of the imitation of urbanization in the plain, a Master Plan of Urban Development (MPUD) will be elaborated in 1975 with the support of French experts. Although never applied, its reviewing reveals the importance of green spaces and the natural conditions of the environment (Flouriot et al., 1975). It is certainly under the influence of the MPUD that the rulers of that epoch would continue to maintain for at least a moment, a green landscape similar to that of the European cities to assert their supremacy. Meanwhile, the hills are quickly occupied and their forest cover largely degraded into savannah of *Loudetia demeusei* or *Loudetia simplex*. The report is striking on the situation of land cover in 1968 vs. that of 1957 (Pain, 1984).

On a much smaller scale, it is observed that in this period, planned neighborhoods more or less dense, still preserved a significant vegetation cover. In contrast, the new, less dense neighborhoods had only low vegetation cover (Flouriot et al., 1978) (Figure 6).

Although visibly, the green landscape after the Independence had not yet profoundly changed compared to the colonial period at least in the urban area, it is certain that it was marked by an undergone mimicry. The failure of the successive plans drawn up for the city, reveals that the visions and the green infrastructures remained unfinished.

Kinshasa in contemporary period (after 1980): “unbalanced” green landscape

CONCLUSION

Today, in many ways, the city is abandoned to itself. As proof, it was only recently (in 2014) that a Strategic Planning Guidelines for Kinshasa (SOSAK) was developed. Focused on large infrastructures, this SOSAK envisions the greening of the city only through the vegetable gardens. It is certainly an answer to the real need to feed the city but an answer that will not favor the establishment of a multifunctional green network.

At the same time in spatial extension and in densification, the territory of Kinshasa presently has a green landscape strongly contrasted between its urban area and that peri-urban. In its urban area, roads previously lined with trees are lacking. Most important green interstices are replaced by petroleum product sales outlets that leave only symbolic lawns. Urban neighborhoods that were once densified into domestic trees are almost completely devoid of them (Figures 6 and 7). However, it is striking that the least empty space in the urban area is valued by vegetable crops.

Constituted for most spontaneously settled neighborhoods and on the hills, the peri-urban area presents collective green spaces only as market gardens. Nevertheless, this zone appears strongly green on the aerial views because of the strong presence of domestic trees (Sambiéni et al., 2017).

It appears that a green potential still exists in the city. However, this potential is in constant decline and is poorly distributed and composed, because of the laissez-faire system. It is in this sense that the expression “unbalanced green landscape” is used to explain how it is abandoned to itself and does not adequately respond to the socio-spatial needs of the population.

From a fascinating city to an unbridled city, that is the widely recognized pathway in Kinshasa. The present study confirms and repaints the same regressive course for its vegetal cover. From a natural green landscape to a desired green landscape, the green landscape of the city is currently suffering and abandoned in a real imbalance. This reveals a landscape where there is a tension between the natural conditions of the environments, the urban and peri-urban settlements and the socio-spatial needs of the populations. This conflict is becoming more and more acute with the widespread wounds that the territory undergoes. For example, there are many ravines and piles of rubbish visible in the city and the increase of flooding of banks of bare rivers.

On the other hand, in this conflict landscape, there is still a residual green potential that can play the role of reconciler. In a context of impoverishment of populations where the state is “powerless” or “resigning”, reconciliation can only be based on the strength of the people. And, this strength lies in the local practices and the co-participation of the inhabitants to enhance their living environment by the establishing a landscape, rather a green system adapted to their needs and their socio-cultural and identity context.

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What Landscape for Kindele (Kinshasa, DRC)? Environments and Communities with Natural/ Human Interrelations to Reconcil/Reinvent by the Project

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Keywords:

Informal Settlements; Erosion Landscape, Geomorphic Agents, Landscape Awareness, Local Knowledge.

ABSTRACT

After independence (1960), Kinshasa (DRC) experienced a population explosion leading to massive urbanization of the hilly and sandy suburban area. These unplanned settlements, spread out on a water marked relief, imposing a square mesh urban model on unstable lands. Soon, in the slope of KINDELE appeared erosions. The study of the joint actions, natural and human interacting on this site makes it possible to affirm that the erosions are the visible sign of the existing conflict, and still ongoing, between the way of living and the geomorphological and landscape capacity to accept this urbanization. The investigation of the territorial equilibrium has set out the importance of intervening on the geometries of the street networks and parcels to readapt to the relief in order to regulate the speed of water flows and to decrease the impact of this natural force on the stability or gully soils: an urban rehabilitation. This results in a methodology based on hypotheses-projects that make it possible to envisage urbanization as a factor of landscape coaction to be accompanied over time. The objective of this contribution is not to study modes of new settlements, but rather to bring out the logic to follow in order to restore to these sites conditions favoring true sustainability.

INTRODUCTION

The current housing situation in Kinshasa is marked by a crisis that

continues to result, informally, not only in new occupations of hill sites, but above all, in several forms of densification. In the upper city, with sandy soil, low road structure (earth roads) and high risk of erosion, these processes lead to serious environmental problems related in particular to the management of runoff water as a result of increase of impervious surfaces.

The study of a good sanitation of rainwater begins with the parcels allotment (S.M.U.H., 1977: 35). Adaptation to topography involves preventive control of erosions, a well-designed sanitation network and paths with practicable slopes (Ibid.: 48). In KINDELE, checkerboard developments, devoid of stormwater collection and management structures, receiving water from impervious soils of upstream housing estates and heavily waterproofed plots, have created, with walking, ways for runoff water. These muddy streets turn into real torrents at the time of showers and cause great ravines where the slopes exceed 12.5% (VAN CAILLIE, X., 1997, KAYEMBE M. & WOLFF E., 2015: 126).

How, for a framework already built, in full transformation and strongly degraded by erosions such as that of KINDELE, recreate housing spaces guaranteeing a high quality of life at the collective level? To state hypotheses of progressive transformation of the territory, based on the revision of road and parcel meshes, would make it possible to reconcile the housing with its environment. This urban rehabilitation would provide an opportunity to replace, on the basis of the adopted "project-based approach"¹, the landscape at the center of the development system in these areas.

THE URBAN MODEL WITH SQUARE MESH OF THE KINDELE VALLEY: A HISTORICAL RECALL

The area concerned by this study is

PHOTOGRAPHIE AERIENNE



Figure 2.2. Air photo of a part of KIMBONDO District, one of Kindele area, with highlighted roads and buildings. (Source: Emeritte Kaleka N'kole)

1998: 186, 188). The interaction of these climatic conditions with the nature of the sandy soil and the geomorphological conditions of the site offers a variety of natural phenomena.

Indeed, the highly rugged terrain of our study site is the key factor in its risk exposure (Figure 3.1.) because of slopes that are greater than 15%. A sharp talweg is located exactly on BUKAVU Avenue where the most dangerous and active erosion of the KINDELE valley is currently located (figure 3.2).

The slope is therefore a factor that acts on the force of the water moving downwards and is largely involved in the rate of erosion. The steeper and longer the slope is, the more intense and rapid erosion is. The combination of low and high altitudes leads to areas of high risk of erosion. (KAYEMBE J. 2010-2011: 41.) These coincide with the thalweg lines. The presence of dwellings in upstream areas has greatly reduced

the infiltration coefficient of the water in the soil and as a result has increased runoff which is becoming one of the main causes of erosion in low elevation areas. On the other hand, steep slopes consisting of high altitude areas (426m to 642m) with slope values ranging from 15% to 20% are threatened by erosion mainly because of the combined effects of precipitation and topography. (Ibid.: 49)

Moreover, regarding the movement of masses on a slope, in soil mechanics, infiltration water can modify the physical state of the soil passing from the solid state to the plastic state and from there to the completely free state under which it can flow under its own weight. This change of state is a function of the exceeding of the thresholds or the limit values of the slopes which are related to the water content in the soil. For sandy soil such as that of Kinshasa, this threshold is around 12% to 16% (MELLIER

PLAN PARCELLAIRE ET SA TOPOGRAPHIE



Figure 3.1. Parcel plan and topography, the earthen streets arranged perpendicular to the contours increase erosion risks. Juxtaposition of individual self-built plots. (Source: Emeritte Kaleka N'kole)

GERARD, 1968). Earth roads exceeding 12% are therefore highly exposed to erosion phenomena created not only by the strength of the runoff water but also by their own weight as a result of exceeding the limit values of change of state.

Regarding the land use, when the subdivision concerns hill sites, the implementation of roads in the slope can be done in two major ways: perpendicular and/or parallel to the contour of the ground.

When roads are installed perpendicular to the contours, the earthworks are minimal, but the access slope can be difficult to practice. In tropical environments, steep earth roads are the most problematic, and cause and accentuate the erosion phenomenon the most. This is unfortunately the case of our study site (Figure 3.3 and 3.4).

On the other hand, roads drawn parallel to the contours of gently sloping

terrain require more or less large earthworks depending on their length and height differences. On a steep slope, stabilization of created slopes is necessary.

In addition, several processes contribute to the transformation of this built environment: the addition of houses, parcel division and construction on detached parcels and superposition (Figure 3.5). In the upper city, with sandy soil and high erosion risk, this process leads to serious environmental problems, particularly related to the management of runoff water due to the increase in impervious surfaces. In addition, walking on these steep earth roads contributes greatly to creating furrows towards which runoff water is concentrated.

In total, the combination of all the physical conditions (valley, talwegs, steep slopes, ...) with the climatic conditions and the human activities (implantation of the roads, the



Figure 3.2. BUKAVU Avenue completely transformed into a natural gutter. More than 20 plots of this avenue are washed away by this great ravine. (Source: Emeritte Kaleka N'kole)

buildings and the people, the mode of transformation of frame built etc.) on a sandy soil of KINDELE produced erosions. The presence of erosions in these environments visibly reflects the conflict between the way of living and the geomorphological and landscape capacity to accept this urbanization. This investigation of the territorial equilibrium by the drawing makes emerge the importance to intervene on the geometries of the street and parcel networks to readapt the relief in order to regulate the speed of flow of the waters and to reduce the impact of this natural force on the stability or gully soil.

REINVENTING THE ENVIRONMENTS BY THE PROJECT: THE NATURAL ENVIRONMENT AS THE GENERATOR OF THE URBAN MAILLAGE

Urbanism as a planning tool seeks “the best possible spatial organization of men and their activities. Its primary objective is the improvement of living conditions. The social is the driving force.” (RAFFAUD, 2003: 21 cited by DOURNEL S., 2010: 86). For a built environment strongly degraded by

erosion, such as that of KINDELE, this improvement can involve renovation, restoration, rehabilitation, etc.

If the notions of renovation, restoration and rehabilitation characterize very precise actions, the logics of rehabilitation reveal the impetus character of the actions of improvement, coordination, control of use and their future, and animation which emanates of urbanism. The approach devoted to the hill sites strongly degraded by the erosions is primarily an urbanistic initiative, inscribed in its mode of operation and intervention on the space. However, the ubiquitous aesthetic aspect also underlines the importance of the landscape dimension.

Peoples around the world and the ages have invented very effective techniques to try to control the erosions spatially in rural areas. Examination of some examples leads to the development of appropriate techniques to suburban and urban environments, to examine new conditions of sustainability and environmental balance. By examining the fanya juu technique of the Kambas ethnic group of Kenya, a spontaneous peasant innovation that appears around the 1950s (MOLLARD,

PLAN D'OCCUPATION DU SOL

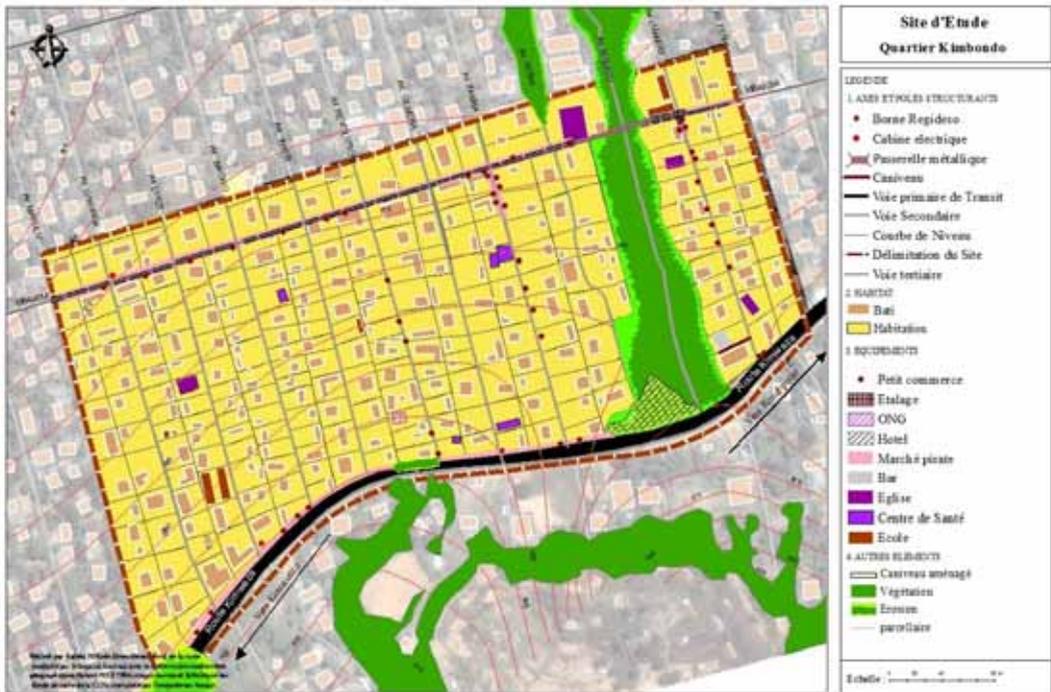


Figure 3.3, Reproduction on hillsides of hippodamian plans left by colonizers. (Source: Emeritte Kaleka N'kole)

É. et WALTER A. (dir). 2008), the Tabiâ technique developed by the Berber tribes and Phoenicians who lived in the arid regions of Tunisia even before the arrival of the Romans in Tunisia (ibid) and the technique of the isohypse trench formerly used to the mountainous region of North Kivu of the Democratic Republic of Congo



Figure 3.4

by the farmers (TONDEUR, G. 1954: 82-84) to capture and manage the water, it is observed that the principle remains the same: subdividing slopes in strips, constituting slope obstacles by concentration, accumulation and rapid infiltration of runoff waters into the soil.

Contours were critical elements in the design and implementation of runoff management structures. The logic is to block the way to the water at the same level (following contour lines) while avoiding that one point of the structure is more stressed than the others. Subdivision of the slope reduces the speed of runoff (figure 4.1). The question is: how to reconcile the area with its environment? State hypotheses of progressive transformation of the territory, based on the revision of the roads and parcels meshes could allow it.

The first step/hypothesis would be to consider the earth streets as these obstacles. And as such, these streets will have to be dug following the

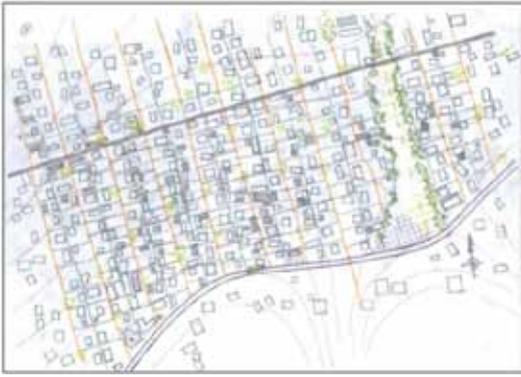


Figure 3.5. The hatched buildings are new constructions reflecting the transformations of the built frames. (Source: Emeritte Kaleka N'kole)

contours (figure 4.1). This hypothesis attempts to build the connivance between mobility, mobility support and anti-erosion control in these environments where walking on steep tracks contributes greatly to amplifying the phenomenon of erosion by the fact that it traces furrows on the slope. How can mobility contribute to stormwater management?

Walking is a practice that helps maintain and dig ditches. It tends to compact and move the soil by lateral effects. Rains, on the other hand, tend to reshape the excavated surfaces by bringing back the displaced soil by walking in the ditch. Contoured streets can help capitalize on this process. To do this, it would be necessary to insert structuring axes along the contours (taking the width of the existing islands) for protection against erosion. These axes will theoretically participate in the management of runoff by acting as isohypse trenches or slope obstacles. Indeed, the interposition of these “dug streets strewn with fruit trees and herbaceous” we call “structuring axes” or “green cords”, subdivide the slope into as many bands. And each band defines new logics of implantation which, progressively, could evolve towards new parcel configurations. The system results in a modification of the relief of the soil (an environmental remodeling). Its role is to slow down the movement of water (reduce the speed



Figure 4.1. Simulation of the streets carved in contour lines (restructuring of the road); KIMBONDO district in the KINDELE valley. (Source: Emeritte Kaleka N'kole)



Figure 4.2. Simulation of a reconfiguration of the plots (this induces an environmental remodeling); KIMBONDO in the valley of KINDELE and possible regroupings of the buildings. This operation can induce in some places memories and the insertion of new parcels. (Source: Emeritte Kaleka N'kole)

of flow) while increasing its infiltration into the ground, and also, to make easier the mobility of people in this neighborhood while reducing at the same time their negative effects.

Specially designed to adapt to an urban and suburban environment and to improve the existing facilities, the “structuring axes” or “green cords” are part of the large family of slope obstacles: ditches and steps built on a slope, called to curb runoff, collect and store, and recharge the water table. They also store sediments.

Implementation: these axes are true “green cords” insofar as they are sprinkled mainly with fruit trees for economic and ecological reasons, and isohypse hedges made of vetiver groves for reasons of slope stability. The

CONCLUSION

effectiveness of these devices depends essentially on the care with which they are established and the plant space used, public spaces par excellence

How it works: placed across the slope, these axes (in continuous lines) become filtering obstacles, letting the water running on the slope, but braking and spreading sheet. They cause sedimentation and retain colluvium, plant and organic debris which upstream, in some cases, eventually form a thin strip of fertile soil. The runoff is slow and the water is concentrated. Fruit trees are then associated of the slopes and grasslands on the ground to create, as in the oases, a microclimate that condenses and retains rainwater when it occurs while increasing their infiltration into the soil by rice effect.

The axes thus conceived, define new logics that offer the possibility of changing this fabric to new parcels configurations, and induce in some places, re-allotment and the insertion of new parcels. These axes will become new ways of circulation, the buildings being fixed elements: a soft rehabilitation. The requalification of certain axes makes it possible to remove pitfalls such as the loss of certain houses and parcels.

The second approach/hypothesis consists in imagining possible networks with the existing supply and electrical networks and new structuring axes.

Houses are grouped at 3, 4 or 5 following the existing logic that is to say towards the joint ownership by releasing the front of the plot; Initiate collective actions around these groupings: organize groups in order to emerge a collective way or contradictions. This is the most crucial phase as it will lead to new organizations, pooling the fight against erosion. (Figure 4.2)

The study of the interaction between the physical conditions, the climatic conditions and the anthropic activities made emerge a conflict having like manifestations the erosions and the necessity to intervene on the geometries of the road networks and parcels to readapt to the relief by marrying the contours, regulate the flow velocity of water and reduce the impact of this natural force on the stability or gully of soils. Nevertheless, the requalification of certain axes, which was not the subject of this study, makes it possible to solve the question raised by the insertion of new structuring axes.

The approach by the project adopted in the change of perception on the territory: no longer a medium-object to be treated only technically, but an environment expression of the cultural conflict engendered by communities plagued by poverty. From there springs the landscape consciousness of the inhabitants. Resolving conflict then means acting on the existing in long term by helping residents to recognize the values and needs of the landscape, to transform as well as the mode of implantation and the forms of societal visions on these environments.

NOTES

¹ The "project-based" approach essentially consists in maintaining a permanent and progressive questioning between the space and the project, thus making it possible to test the structure and the urban fabric by project hypotheses, in order to highlight the existence of levels of coherence or territorial equilibrium to which it is relevant to address in order to control the urban form and future changes.

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Waging War in a Peacetime Landscape 1896-1941: United States Army Corps of Engineers (US-ACE), The Clinch River Watershed, and the Tennessee Valley Authority's Norris (Dam) Project

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Keywords:

Tennessee Valley Authority, United States Army Corps of Engineers, The Norris Project, multi-purpose land planning, public works employment 1931-1941

ABSTRACT

This paper explores key factors that contribute to varied levels of success in resolving conflicts between participants from the public and private sectors in the Clinch River watershed landscape. The location of the case study is The Norris Project, one of the first major hydroelectric dams Tennessee Valley Authority (TVA) constructed during the US New Deal Era.

Topics discussed include: 1) US-ACE's long-term role in the Clinch River landscape and strategies the Corps employed to manage and limit participation of core personnel in domestic infrastructure projects, 2) the four-way partnership between major United States Government Departments that shaped public sector participation, 3) objectives brought to The Norris Project by personnel from these four departments, 4) the suitability or lack thereof of the US-ACE logistics and operational culture for coordinating and resolving conflicts between multiple objectives in the public and private sectors, and 5) how collaboration and resolution of conflict between military and civilian cultures and personnel contributed to TVA's distinct multi-purpose planning approach.

Examination of The Norris Project reveals that the military culture and operational practices of US-ACE directly influenced Tennessee Valley Authority (TVA), as well as landscapes the Authority developed and managed. Positive

outcomes of the conflicts include modernization, workforce training, job creation, and construction of energy, recreational and industrial infrastructure. Immediate losses were more often social. Less expected was the planning approach that emerged over time at TVA from the collision of civilian ethics with military practices, providing a long-term foundation for multi-objective watershed-based management in this region of the United States.

**Waging War in a Peacetime
Landscape 1896-1941:
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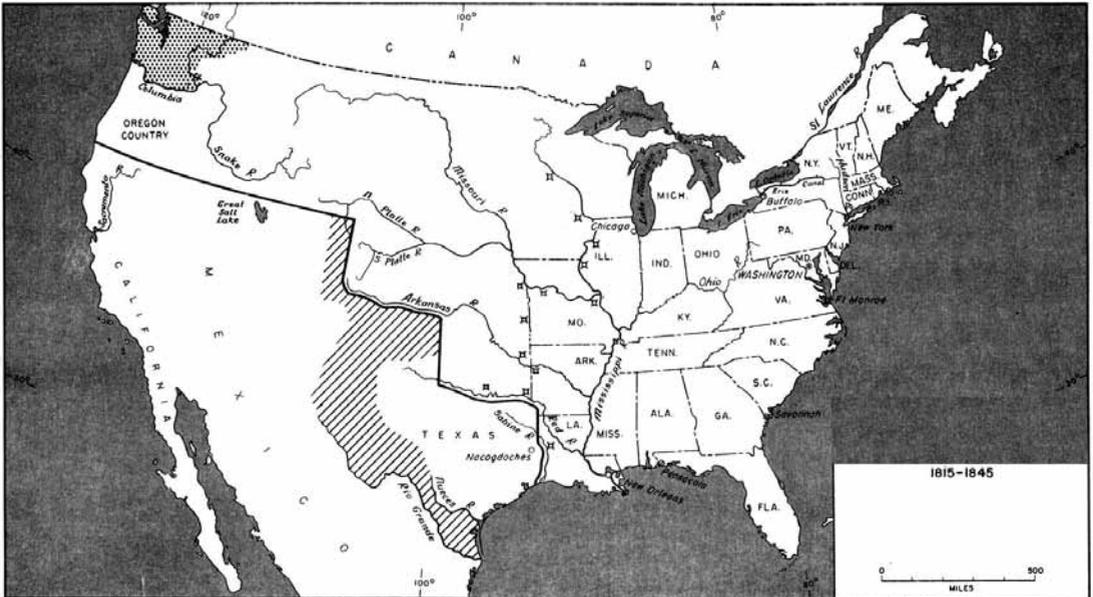


figure 1. Location of the State of Tennessee and Mississippi River, USA.
source: author's edit of the map 'Westward Expansion 1815-1845', from the map collection, University of Texas: Perry-Castañeda Library.

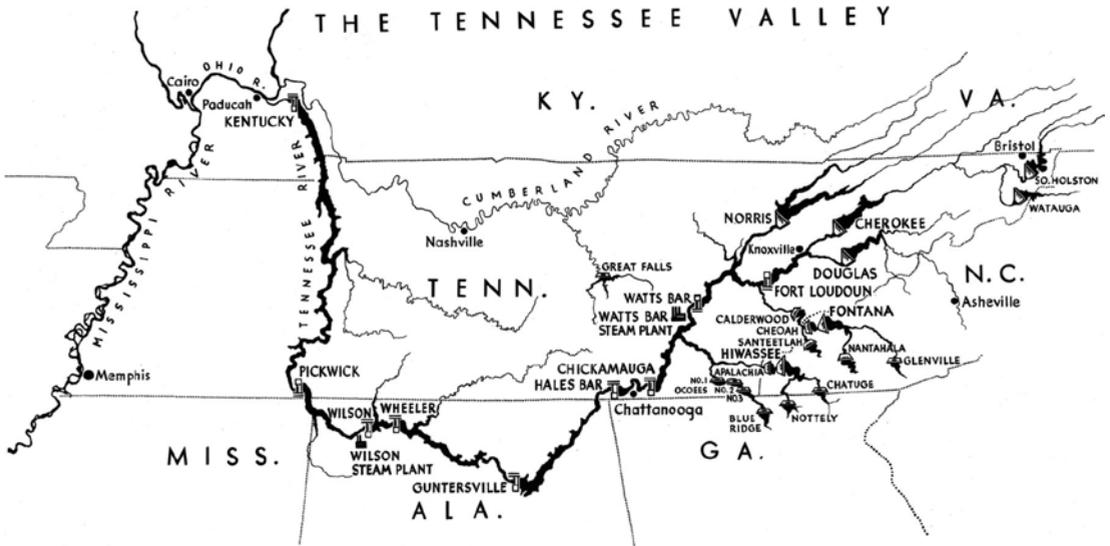


figure 2. System of Dams and Reservoirs on the Tennessee River, TVA authority. date unknown. source: <http://jsah.ucpress.edu/content/ucpjsah/74/1/13/F1.large.jpg>

INTRODUCTION

scope of the study

This paper explores how economic, ecological and social mission conflicts between military and civilian cultures, practices and ethics were resolved in the newly established The Tennessee Valley Authority (TVA). Established in 1933, the Authority was instrumental in transformation of cultural and ecological landscapes in the Tennessee River Watershed, USA. The Norris Project, one of the first major hydroelectric dams TVA constructed during the United States New Deal Era serves as a case example for the discussion (see figure 3 in Appendix I. Location and Layout of Norris Dam).

While 'The Norris Project' officially lasted from the Authority's creation in 1933 until completion of the dam in 1941, United States Army Corps of Engineers (US-ACE) a key contributor to the TVA operational culture begins work on the project over 100 years earlier. In 1828, the Corps does its first survey of the river and land resources in the Tennessee River watershed. Subsequent US-ACE surveys and reports include the 1930 '308 Rivers and Harbors Act' Report prepared for the US Congress House of Representatives. The US-ACE 308 Report anticipates the mission of the Tennessee Valley Authority 'covering navigation, flood control, power development, and irrigation'. This report also presents a detailed rationale for the need for, potential effectiveness, and contributions to agricultural and industrial development structures for flood control, navigation, and power production a dam system could make in the valley. (U.S. Congress. H. Doc. 328, 1930).

In the early 1930's, US-ACE also prepares further reports to identify potential locations for a hydroelectric dam on the Clinch River for the US Interior Department's Bureau of Reclamation. Hydraulic engineers

working for the Bureau of Reclamation are actually responsible for design of the dam later known as Norris Dam. Their work starts before the Authority is established.

When TVA is formed in 1933, the US Army Corps of Engineers quickly transfers formal control of the work in progress to the new Authority. However, the US Army Reserves remain engaged in the Norris Project in other roles, providing management for Civilian Conservation Corps camps where many workers for the project were housed. Replacement active military with reserves is a strategy US-ACE historically uses to reduce commitments to domestic projects. (Walker, 2008)

Aims, source materials and method of approach to the study

The aim of this investigation is to better understand the sources of organizational structure and operational logistics that allowed the engineers, politicians, managers, skilled and unskilled workers that TVA recruited from private sector, military, and government organizations to work effectively together and resolve conflicts between their respective missions, preferred practices, values and expertise. The goal is not to outline and discuss specific conflicts, but rather to focus instead on how the TVA culture allowed for creative management of conflict. In resolving their conflicts, personnel at the new authority evolved the distinctive TVA multiple-objective planning approach. This investigation relies on examination of source materials and internal histories from the archives of Tennessee Valley Authority, the United States Army Corps of Engineers, the United States Department of Agriculture's Forest and Soil Erosion Services, and the United States Department of Interior's Bureau of Reclamation.

SUMMARY OF RESULTS AND DISCUSSION

productive resolution of conflict in the public sector

Examination of literature on the emergence of TVA and its first project, The Norris Project, reveals several factors that supported a culture that encouraged productive resolution of conflict.

First, while the Authority was new, many of the new administrators, managers, and engineers of the Authority worked together in other organizations, and shared a common body of operational logistics, technologies and workflows that supported a cooperative, collaborative working environment. In turn, this culture created an environment in which the very different sets of missions, preferred practices, values and expertise new hires brought to the organization informally hybridized.

Second, many aspects of the Authority's inaugural project, Norris Dam, were resolved during earlier work by the Army Corps of Engineers and the hydraulic engineering design group in the Department of Interior's Bureau of Reclamation. The Bureau of Reclamation group had just completed the Hoover Dam in Black Canyon, and thus brought considerable expertise to The Norris Project. In addition, through the Civilian Conservation Corps program, the War Department (US Army and Army Reserves) managed logistics of setting up and running housing for workers. Thus, many of the logistics for construction of Norris Dam were resolved before TVA took control by engineers and organizations with considerable expertise in construction of hydraulic infrastructure (see figure 4 in Appendix II: Cooperative Scheme for Public Works).

Third, organizations that provided expertise and completed earlier work on The Norris Project had little investment in retaining control of further work on the Norris Project or in competing with TVA for projects. While domestic public infrastructure projects

had provided a means for the Army Corps of Engineers to retain personnel and operational capacity since the American Revolution (Walker, 1981), the primary mission of the Army Corps of Engineers was supply of engineering support for US Army warfare. Thus, the Corps traditionally divested itself of administrative responsibility for peacetime projects as soon as its work was complete. The Department of Interior's Bureau of Reclamation was similarly restricted. The hydraulic engineering design group that worked on Norris Dam was also physically located 1,330 miles west of the dam site in Denver, Colorado in the center of the Bureau's primary operational territory in the Western United States. The Bureau needed to concentrate their efforts where their political support base was located and thus had limited interest in expanding operations to the Eastern United States.

Finally, the organizations with interest, facilities and missions in Appalachian region, the scientists from United States Department of Agriculture's (USDA) Forest and Soil Erosion Services had a vested interest in cooperating with TVA because TVA had a resource that both agencies needed – title to public land in the eastern United States. A primary part of the mission for both Services was to produce educational projects accessible to visitors, that demonstrated the best practices for conservation of their respective resources. Demonstration projects also yielded research results that helped scientists evolve improved practices. (see figure 5 in Appendix III: Conservation Objectives, The Soil Erosion Service and TVA). However, because they were public agencies, the US Forest Service and US Soil Erosion Service were legally restricted to locating projects on land parcels in public ownership. In the eastern United States most land parcels were in private ownership, so if these services wanted access to TVA's publicly owned

lands, cooperation with TVA was advantageous. (Helms, 2008) (Forest Service, 1933)

TVA's multi-objective planning approach

“To improve the *navigability* and to provide for the *flood control* of the Tennessee River; to provide for *reforestation* and the *proper use of marginal lands* in the Tennessee Valley; to provide for the *agricultural and industrial development* of said valley; to provide for the *national defense* by the creation of a corporation for the operation of Government properties at and near Muscle Shoals in the State of Alabama, and *for other purposes.*” from the Tennessee Valley Authority Act (State Department 1933.)

TVA's fusion of military logistics with navigation, flood control, water and land management, as well as energy, and social objectives yielded an approach land management and planning that was distinctly new to the United States in 1933. TVA's initial mission integrates objectives important to all of the major government partners in the initiative. *Navigability* and *flood control* are important objectives for the Department of War's Army Corps of Engineers and the Department of the Interior's Bureau of Reclamation. *National defense* is an important objective for all Services in the Department of War. *Reforestation*, *proper use of marginal lands* are important objectives for the Department of Agriculture's Forest and Soil Erosion Services, and finally *agricultural and industrial development* is a primary objective for both the Department of Labor and the Department of Agriculture. Although not explicitly stated in the introductory mission statement from the Tennessee Valley Authority Act, 1933 (above) TVA objectives to produce hydro-power and electrify the valley are essential elements of its *agricultural and industrial development* mission.

It is important to note that it is the fusion of objectives from four major Departments in the United States Government that is new in 1933, not necessarily the concept of multi-objective planning. At various points in the history of public land and hydraulic management in the United States, multiple-objective planning for public lands and waterways is advocated. Uses and practices applied to land in floodplains (variously referred to as flood-prone, swamp low-lying, bottom-land, or fertile agricultural land in different documents) are a frequent topic in these discussions. (Ferrell, 1976). Particularly between 1890 and 1912, when many early advocates for conservation management of resources including John Wesley Powell, Fredrick Haynes Newell, Gifford Pinochet, John Muir, and Theodore Roosevelt are active, multi-objective planning is frequently discussed. Although, the set of objectives advocated for changes somewhat with each advocate.

The outcome of this fusion is TVA's multi-purpose planning approach: wholistic scope and coordination of objectives; planning districts organized by watershed; habitual internal consultation between personnel with a broad range of expertise and objectives; demonstration of forest and soil conservation; and model housing villages for public use. This approach, the TVA mission and its work on the Norris Project are strongly influenced by internal advocates with strong conservation and public welfare ethos. Planning, mission, and work also bear a strong imprint from the aforementioned military style practices that provides a clear structure of responsibility; emphasize flexible, feasible planning; requires clear, frequent and complete exchanges of information between divisions. TVA also followed the military practice of strongly discouraging inter-division competition in favour of a fierce loyalty to the larger whole of the Authority.

Resolutions of conflict in the private sector are less successful

Turning to the private sector, TVA's resolution of conflicts between citizen and public interests is not cooperative and not collaborative. For private citizens, benefit and loss largely depended on an individual's social and cultural demographic – and the location of their family 'home-place' land. Unlike public sector participants, the landowners, tenants, and rural merchants living in the areas of the Clinch River watershed identified for 'acquisition' had no organization to advocate for their objective suffered the greatest consequences.

Private landowners and residents in the Clinch River watershed had no desire to participate in The Norris Project, and no control over the decision to participate. Land for the Norris Project was acquired under eminent domain. TVA surveyed the land, assessed its value, purchased land, dismantled towns and farms, relocated homes, businesses, churches, graveyards, roads, railways. Landowners who persisted could sometimes keep a church or graveyard site intact, but most negotiations resulted in decision in favor of the Authority. Older residents who never travelled more than a few miles from their homeplace felt profoundly displaced. They lost not only a home and land but also a tightly knit set of kinship and community relationships, their church and family cemetery, and memories. (McDonald, 1982)

Private citizens whose family lands were not taken by eminent domain or who migrated to Tennessee from other parts of the United States for jobs experienced more positive outcomes. Young men of working age and the families they supported experienced the most positive outcome. Less tied to the old ways of life, younger people were more open to the transformations. For these citizens, TVA brought good jobs, modern houses, electrification and the excitement of modernization and new

recreational opportunities in the new 'landscape of lakes'.

CONCLUSION

Unexpected solutions, hybrids and approaches often emerge from conflict. Despite the potential for competition and conflict between the various objectives of politicians, government departments, civilian and military engineers, scientists, and others Tennessee Valley Authority's emergent culture was at the grass roots level of implementation largely collaborative, cooperative and effective. As discussed above, the foundation of TVA's culture derives from an effective civilization of implementation of military-style operational culture. Cooperation also occurs because the initial partnerships and structure of The Norris Project largely avoided direct competition of interests between partners and provided incentives to cooperate. Finally, many of the engineering and operational logistics for the first project were already resolved by experts in the US Army Corps of Engineers, and Bureau of Reclamation before the project is passed to the new Authority. This simplifies the first major project, and allows TVA to grow into its role as a comprehensive authority.

Decisions and practices implemented by TVA in The Norris Project in 1933 do not reflect the contemporary ethos and social concerns. From the current perspective, the operational culture TVA achieved in 1933 is overly authoritarian and the use of eminent domain inappropriate. As well, many engineering land use decisions and conservation practices the Authority implemented 85 years ago are easy to question and contest. The preferred science, technology, construction and land management practices of 1933 could be overly invasive and damaging to land health, local communities, economies and ways of life. Yet, examination of how

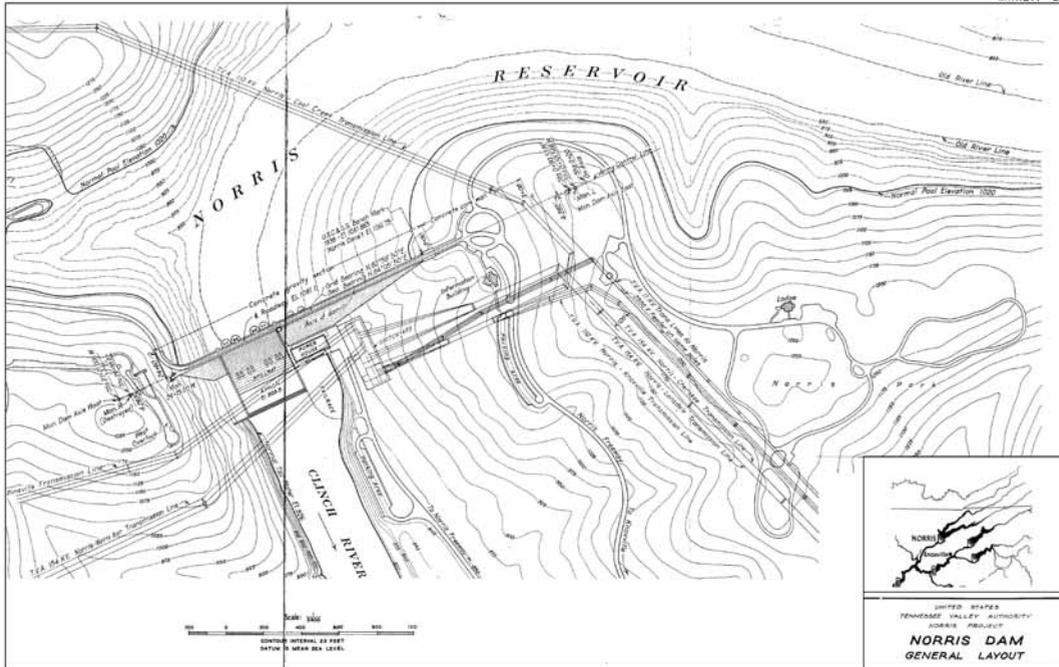


figure 3. Location and Layout of Norris Dam Project. source: edited illustration by author based on Exhibit Drawing No.2 (Tennessee Valley Authority, 1940)

the Authority was organized and operated does yield some lessons for establishing an effective culture amid conflict.

APPENDIX I: LOCATION AND LAYOUT OF NORRIS DAM

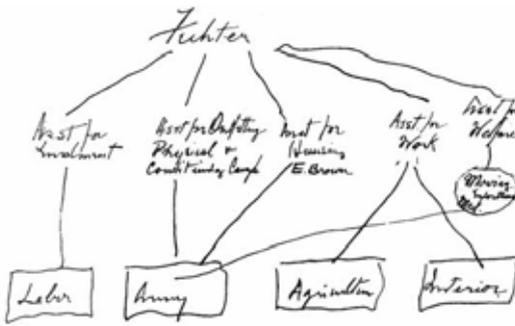
Norris Dam is located on the Clinch River in the headwaters of the Tennessee River System, approximately 30 miles (48 kilometers) north of the city of Knoxville. The Norris Project included two primary elements – a large hydro-electric dam and a model worker' village. This paper refers only to the dam portion of the project. In a compact area that increases speed and efficiency of work (an army objective) and minimizes the land impact of work (a conservation services objective), 'The Norris Project' includes 1) a 'high dam' that retains a reservoir to store large quantities of water, 2) a hydroelectric powerhouse and distribution grid facility, 3) facilities for producing the concrete, timber form work etc. required to build the dam. Around the perimeter of the reservoir and in upland areas of the dam reservation the Soil Erosion and Forest Services completed a

number of projects demonstrating good land management, reforestation, tree farming, and erosion control. After construction of the dam was complete, TVA and CCC workers built visitor and recreational facilities including parking, rest-rooms, visitor centers, scenic overlooks, a marina, lodge and resort village.

APPENDIX II: COOPERATIVE SCHEME for PUBLIC WORKS

figure 4. 136 An Emergency Conservation Work Chart prepared by Roosevelt, April 3, 1933 source: [13:OF 268:AS:Photostat]

In April of 1933, while advocating for The Emergency Conservation Work Act, Franklin Delano Roosevelt sketches a chart on a napkin that summarizes an administrative integration of US Government Departments of Labor, War (Army), Agriculture and Interior. This administrative integration is remarkably similar to partnerships that support the Tennessee Valley Authority. The Act establishing the Tennessee Valley Authority, Public Law 73-17, 48 STAT 58 Tennessee Valley Authority Act of May 18, 1933 in enacted slightly over a month later on May 18, 1933. (



I want personally to check on the location scope etc of the camps, sign work to be done etc.

Fechner

figure 4. 136 An Emergency Conservation Work Chart prepared by Roosevelt, April 3, 1933. source: [13:OF 268:AS:Photostat] (Roosevelt, 1957)

“The date of this chart is approximate. Roosevelt may have sketched it at a White House conference held on April 3, 1933, at which a plan of enlisting the unemployed and of getting them to the camps was decided upon. (It will be noted that he misspelled Fechner’s name.) Those present

were Horace Albright, director of the National Park Service, John D. Coffman, fire control expert for the Park Service, William G. Howard, of the New York State Conservation Department, Forester R. Y. Stuart, Assistant Forester C. M. Granger, Col. Duncan K. Major, Jr., of the War Department, and W. Frank Persons, of the Labor Department (New York Times, April 4, 1933, p. 15). By Executive Order 6101, April 5, 1933, Roosevelt appointed Robert Fechner Director of Emergency Conservation Work and established the agency’s form of organization. (A four-page memorandum from Acting Judge Advocate General Rucker to the Chief of Staff, March 27, 1933, commenting on a draft executive order to carry out the law, is present, OF 268.) Fechner (1876-1939), a machinist by trade, was from 1913 to 1933 executive officer of the International Association of Machinists. His appointment was intended to be an assurance to labor that it had nothing to fear from the Emergency Conservation Work Act.” (Roosevelt, 1957)

APPENDIX III: CONSERVATION OBJECTIVES, THE SOIL EROSION SERVICE and TVA

figure 5. ‘Regional Soil Erosion Areas, 1933’. (p.11. Helms. 2008)

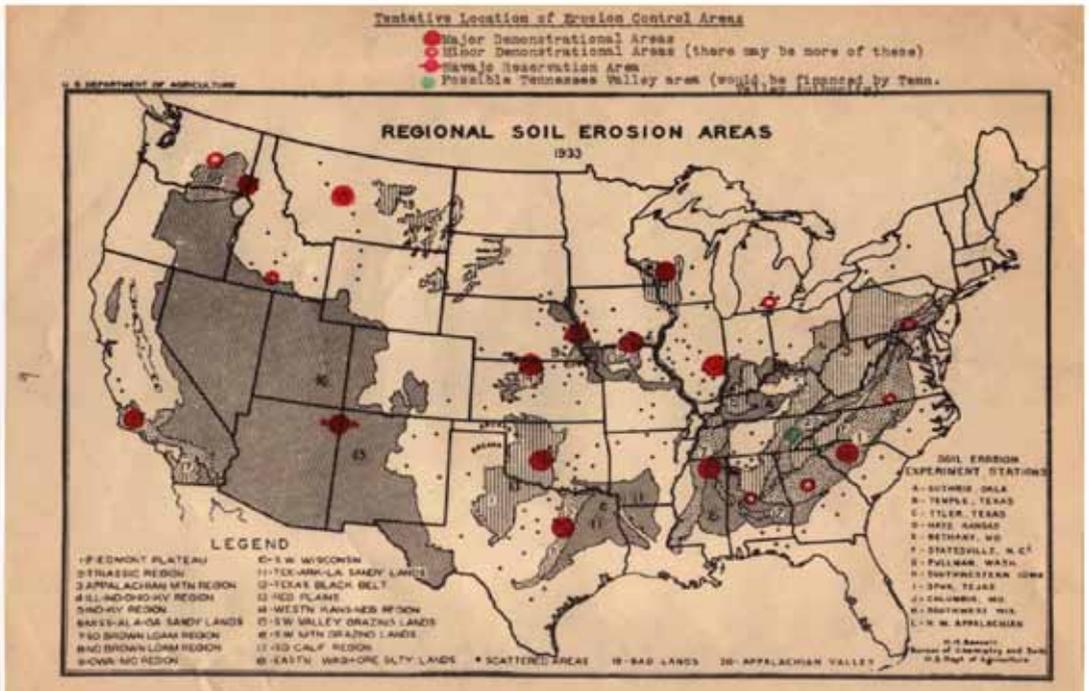


figure 5. ‘Regional Soil Erosion Areas, 1933.’ source: (p.11, Helms, 2008)

Typed annotation at top of page reads:
 “Tentative Location of Erosion Control Areas,
 Possible Tennessee Valley area (would be
 financed by Tenn. Valley Authority)”

The following text is an excerpt from
 an enclosure to WARD SHEPARD’s letter to
 President Franklin Delano Roosevelt, dated
 May 29, 1933. The Enclosure is titled ‘Ending
 Forest Devastation Through Industrial Control’
 (Roosevelt 1957)

“Prevention of Devastation in the
 Tennessee River Project ... An immediate
 approach toward public regulation to prevent
 devastation of these forests is presented by
 the Tennessee Valley Project. The large public
 investment already made there and to be
 made in power production, stream regulation,
 etc., demands protection against the evils of
 deforestation. The Federal Government, as
 already pointed out, has constitutional power to
 regulate the exploitation of private forests needed
 to protect the flow of the Tennessee River and its
 tributaries, as well as all other navigable streams.
 The Government should proceed to delimit these
 forests into Protection Forest Zones, wherein
 destructive lumbering would be prevented. The
 Tennessee Project would be a proving ground for
 working out the principles of protection forests,
 and the results should be rapidly applied to all
 main forested river basins in the United States...
 The Gordian knot of fruitless controversy
 should be cut by action in the Tennessee Valley
 by recognizing that forests are important in
 themselves, and that the common sense of
 mankind has long recognized their importance in
 preventing erosion and silting and in regulating
 stream-flow.

Respectfully submitted by: WARD SHEPARD,
 Fellow of the Carl Schurz Memorial Foundation of
 Philadelphia, 29 May, 1933. [13:OF I—C:T]

Shepard, formerly assistant chief of research
 in the Forest Service, was at this time forestry
 investigator for the Carl Schurz Foundation. The
 program here outlined by him was endorsed by the
 Society of American Foresters. Franklin Reed, its
 executive secretary, said that the plan would make
 effective the most important part of the society’s
 “Principles of Forest Policy for the United States,”
 and that the full support of the trained foresters of the
 country could be relied upon to carry it out (Reed
 to Roosevelt, June 10, 1933, OF I—C). Shepard’s
 memorandum was acknowledged by McIntyre,

June 19, 1933 (OF I—C), who said that the President
 had taken the matter up with the Secretary of
 Agriculture.” (Roosevelt 1957)”

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INTRODUCTION

Interactive Knowledge Production in Self-Organized Urban Areas

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Keywords:

collaborative and interactive knowledge production, self-organised urban areas, co-production, dual- design strategy, process-oriented and systemic design

ABSTRACT

This paper reflects on how collaborative design workshops focussed on interactive knowledge production can serve as mediums for co-production and as catalysts for urban transformation. Focussed on the self-organised occupation of Solano Trindade in Duque de Caxias, Brazil, this paper discusses how the production of integrated knowledge in common ownership for housing, infrastructure and open space, interlinked with non-human knowledge - represented by natural components, flows and capacities - can lead to adaptive scenarios and micro- interventions aimed at local solutions. Based on experimentation, mutual learning, and knowledge transfer from the fields of urban metabolism, urban ecology, and social production of space, the German-Brazilian summer school "Interactive knowledge production in self-organised urban spaces" is presented as a platform to stimulate systemic and process-oriented design. The central focus is given to the role of transdisciplinary approaches in linking different types of life-world experienced knowledge from local actors with conceptualized knowledge from experts in landscape architecture, urban design and spatial planning. By drawing on this collaborative work, the paper concludes with a discussion on the aspects of co-production for urban commons, collaborative and interactive knowledge, and process-oriented, systemic design outcomes.

Megacities worldwide continue to face the pressures of complex urbanisation processes. These threats are characterised in landscapes by increasing environmental and economic vulnerability, poverty, social injustice, insecurity, and conflict. As a response and to ensure survival, spontaneous development often occurs powered by self-organisation, activism and livelihood (Roy, 2011). Self-organisation is expressed through community-based regulation of settlement areas and self-constructed infrastructure, which in turn, depends on urban housing policy and the implementation of slum upgrading projects. In 2009, the introduction of the national social housing program 'Minha casa, minha vida' (my home, my life) provided social housing projects with financial support for the inclusion of social movements, self-organization of housing and income generation. These actions were recognised by the UN-Habitat (2012, p.31) as a milestone in positioning social housing programs as central issues in national urban policy. According to Lago (2018), the occupation of abandoned public areas and buildings is lawfully supported if the purpose of the occupation is housing, socio-cultural and economic development. These forms of land and building occupation thus challenge the power and influence that the private sector has in land-use in Brazil. In Rio de Janeiro, self-organised production of housing is represented by the National Movement for Housing Rights (MNLN) in 5 cases (Ibid.). This paper focuses on one of the occupations led by the MNLN, the occupation of Solano Trindade in Duque de Caxias.

THEORETICAL CONCEPTS TOWARDS CO-PRODUCTION

Urban commons

Ranging from the Global North to



Figure 1: Joint discussion of micro-interventions in Solano Trindade, Photo Kathrin Wieck

examine current bottom-up socio-spatial activities on different urban scales, 'commons' are defined as a triad of: 1) material or immaterial resources, objects and spaces, 2) institutionalized practices of regulation, appropriation and commoning, and 3) actors, communities or people who use the resources (Kip et al., 2015, p.13). Kip et al. (2015) states that the discussion about urban commons is influenced by the experiences of cities from the Global North; however, experiences in metropolises of the global South can also be reflected in this way. Worldwide perspectives towards increasing bottom-up socio-spatial activities is also discussed by Rosa et al. (2013, p.18) with regards to collaborative actions of dwellers that improve their urban environments while confronting the incapability of today's cities to cope with the complex challenges of urbanization, climate change and migration. Rosa's perspective provides an understanding of how different actors '[...] build a collective space, collectively' (Ibid., 18). From the perspective of the production of space, urban commoning is marked by the interactions of actor-networks as well as the close relationship between dwellers and their settlement areas and open spaces (Wieck, 2018, p.18). In Lefebvre's thinking, the social space concept creates an interactivity of the space, implying both actions and knowledge of space (Lefebvre,

2008 [1974], p.173). Expanding theoretical contributions to the concept of urban commons enables more neutral perspectives that bridge the gap between the formal-informal dichotomy, while providing a complex understanding of how self-occupation processes develop from a variety of actors and as platforms for sharing knowledge.

Collaborative and interactive knowledge production

Developing knowledge in common ownership (Giseke et al., 2015, p.49) is a challenge for advancing capacities in the stimulation of urban transformation processes. Transdisciplinary approaches targeting the development of complex problem-solutions connect scientific and life-world knowledge from different actors to produce problem-knowledge, target-knowledge and transformation-knowledge (Ibid., pp.40-49; Bergmann et al., 2010; Hirsch-Hadorn et al., 2008). Collaboration represents a learning process for all participating actors through transdisciplinarity. Methods of mutual learning are key tools for integrative knowledge production as they foster more transparency, visualization and the transfer of scientific and experienced knowledge. By taking natural flows and spatial elements as actors for knowledge production into account, assemblage thinking enables another methodological way to identify interactive knowledge production. This includes not only collaborations between actors but also relationships between humans, nature and space as acting components. Mc Farlane's concept of learning as process of translation, coordination and dwelling, implies possibilities for socio-material configurations of human and non-human components (Mc Farlane, 2011, p.16, p.19). Here, 'dwelling' as a sub-concept of learning offers a way of inhabiting urban spaces 'through

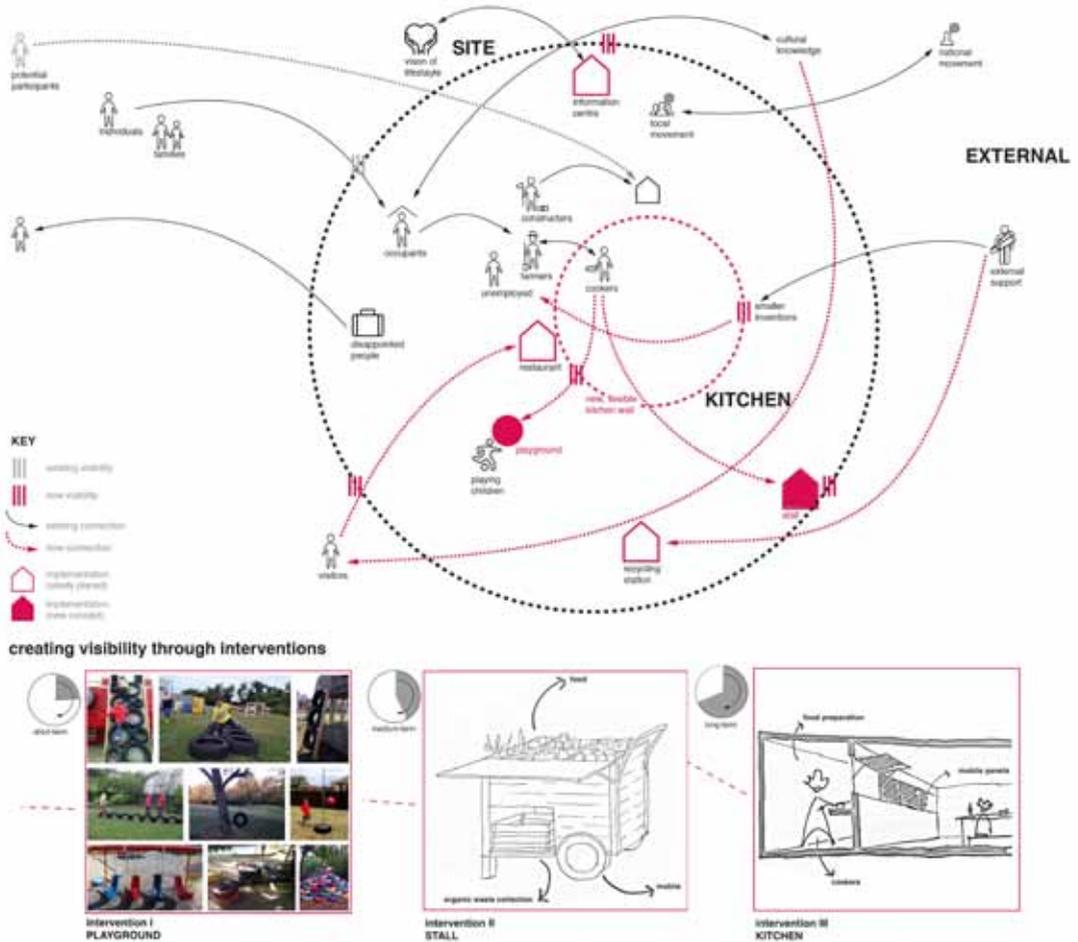


Figure 2: Visibility Group 1 - Creating visibility through interventions crossing scales and times

a practised ability to notice and to respond to changing contexts' (Ibid., p.21, p.23). This emphasises the need for people to interact with themselves and with the environment.

INTERACTIVE KNOWLEDGE PRODUCTION OF THE SUMMERSCHOOL

Co-production in Solano Trindade
Solano Trindade in Duque de Caxias exists since 2014 when a group of people within the MNLM movement occupied a building, located in an abandoned area of 45.000m² in Duque de Caxias. Several actions implemented in the occupation involve, among others, the social movement, inhabitants, different groups of

academics from the Federal University of Rio de Janeiro (UFRJ) and the cooperative Liga Urbana. Currently, around 100 families are registered for a housing project and most of them participate in its progress (Canedo, 2017). The Faculty of Architecture and Urbanism (FAU/UFRJ) has been carrying out an expansion program towards innovative social technologies for the development of collaborative forms of work and production through cooperation between students, scholars and social movements since 2016 (Ibid.; Da Silva Andrade, 2016). Additionally, a collective from UFRJ named MUDA focuses on agro-ecological projects. A partnership with MNLM, MUDA and the dwellers carried out six agro-ecological experiences. Three projects have been



Figure 3: Mandala Group 2 – Collaboratively planning and constructing the Mandala knowledge space, Photos Kathrin Wieck

implemented over the last year, e.g. a mandala garden, a composite system for organic waste, and a collective kitchen based on the principles of food security. The latest proposal concerns the implementation of an evapotranspiration basin for the sewage disposal from the bathrooms and kitchen (Petrus, 2018).

Objectives and project partners

The main objective of the summer school was to develop conceptual approaches aimed at improving co-production of housing, open spaces and infrastructure. Its core was a collaborative on-site workshop that included the participation of students, lecturers, residents and the locally active cooperative. The project engaged 13 German and 15 Brazilian students coming from the fields of architecture, landscape architecture, urban and spatial planning, and urban design. Inter- and transdisciplinary knowledge was shared by experts from the Technische Universität Berlin, the Brandenburg University of Technology Cottbus-Senftenberg, the FAU/UFRJ, the University of Applied Sciences Potsdam, members of MUDA/UFRJ and MNLM, as well as the dwellers of Solano Trindade.

Inter- and transdisciplinary knowledge transfer

To open the student's minds towards adaptive ways to approach

'wicked problems' (Brown, et al., 2010), conceptualized expert inputs from the German team dealt with topics of assemblage thinking, systemic design, urban metabolism, and subversive urbanism. Such inputs also aimed at inspiring creative thinking in different scales and different time spans. The expert input brought by the Brazilian partners discussed urban informality in Brazil, favelas as tactics of resistance and transformation, informality in popular housing in Brazil, self-management and social movements, and sustainable sanitation. Additional knowledge on systemic thinking in the context of informal settlements was also given. This provided a contextualised example of linking urban ecology and urban informality for systemic approaches towards understanding and visualizing urban informal ecosystems (Quintero, 2018).



Figure 4: Transition Group 3 - Collaboratively crafted design during a celebratory community event, Photo Kathrin Wieck

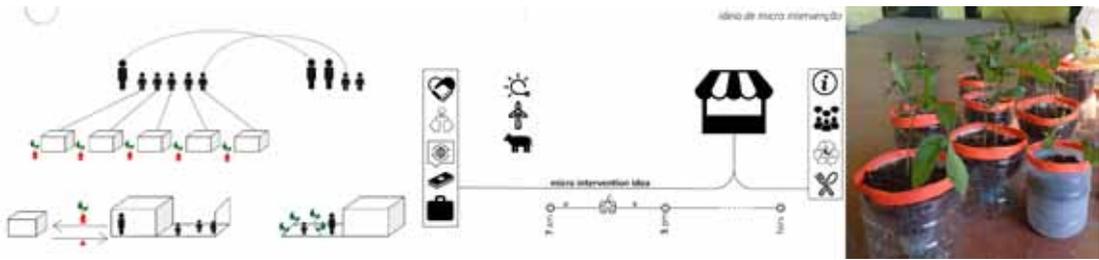


Figure 5: Electricity Group 4 – Micro-intervention idea of bridging tool kit, Photo Bianca Nagel

Local actors represented historical, personal and situational knowledge from their life-world contexts. Their origins, process of arrival and different positions in the community, as well as the role of the women, were particularly relevant for the student's proposals.

Collaborative workshop and dual design strategy

The focus of the summer school was on fostering systemic and process-oriented design work to stimulate an integrative production of transformation knowledge. This included conceptualized interdisciplinary knowledge and contextualized experienced knowledge. By implementing a dual design strategy, the students were asked to envision systemic scenarios for the future development of Solano Trindade as well as ideas for the implementation of a 1:1 scale micro-intervention. While the process of scenario making implicated multiple opportunities of dialogue with the community and academic experts over the entire process, the construction of the micro-interventions involved collaborative physical work from all the participants of the summer school. Both the scenarios and interventions involved interactions with non-human actors: spaces, metabolic systems like food, water, waste, nature, information, political wishes and fears. The interests of the dwellers with their acceptance of the proposals were fundamental for going forward with the construction. Proposals had to consider their needs, the political agenda of the movement



Figure 6: Joint lunch and knowledge exchange in the community kitchen, Photo Kathrin Wieck

and the availability of materials.

The arrival of the summer school group stimulated collaborative work towards a process-oriented design. Moments of mutual learning were generated by mapping the place, where students had their first contact with the inhabitants and their living situation. Their experienced knowledge was communicated through story-telling, demonstrations and presentations from the organizational leaders. Other important moments took place in the kitchen where student's views on information flows and problem insights were discussed with the dwellers while eating together. Further stimulating collaborative processes were developed by proactively supporting ongoing MUDA and dweller's projects: the construction of a sanitation system, planting activities, jointly preparing vegetarian meals and playing with the children (Figure 7). In an interdisciplinary manner, the students developed short-term future scenarios with systemic approaches to link metabolic flows, actor's involvement, and space.

Linkages of the scenario ideas and the micro-interventions were presented to the social movement's activists and dwellers and jointly discussed for the implementation at useful spaces. The organization and purchase of material, ground preparation and clearance, recycling of construction materials as well as the construction of the interventions were jointly executed as outcomes of the materialized knowledge production.

Process-oriented and systemic design outcomes of the summer school

The collaborative results of the workshop considered systemic and process-oriented design that stimulate further interactions between metabolic flows, actors and differing types of knowledge. They are intimately related to the daily needs of the local dwellers. The strategy of **Group 1** was to encourage the role of the community kitchen as the heart of the site. An important aspect was the reappraisal of initial interpretations of the occupation with their transformed understanding of the situation after speaking with the dwellers. Through understanding the threats to the community, they could comprehend their introverted character. The approach was based on physically and symbolically improving the visibility of the community. Correspondingly, three interventions on different scales and times were proposed: A short-term intervention included a playground and common space for children and adults that serve as a catalyst for change. Its strategic location, decided with the dwellers and MNLM representatives, revealed potentials for establishing relations with the local school. Following the wishes of local women, the intervention was coupled with the creation of versatile containers to collect and transport food from the garden. This intervention was also linked to the gardening project initiated by MUDA. For the medium-term, a

selling stall at the entrance was created that would improve their livelihoods while acknowledging the community as a strong entity. Finally, the long-term proposal contemplated stronger visibility through the re-design of the kitchen (Figure 2).



Figure 7: Learning the knowledge of Mandala - Photo Kathrin Wieck

The proposal of **Group 2** inspired in the Mandala included a space for dwellers to foster interactions and share political knowledge (MNLM), cultural knowledge (dwellers), technical knowledge (MUDA) and non-human knowledge (Mandala garden). Combined with the construction of the playground, the community space was built with tires in different sizes found at the occupation, cut in half and set in a circle or semi-circle. Multiple configurations were also proposed to create a transformative place (Figure 3).

Group 3 also focused on the topic of visibility and political expression based on a participatory approach (Figure 4). They proposed three places as transition zones in a spatial sequence, providing experiences of knowledge transfer through visual forms such as street art at spaces with specific significance. Their intervention included graffiti with political messages on strategic elements and places in Solano Trindade.

Group 4 developed scenarios by acknowledging the fluctuations originating from energy supply,



Figure 8: Common space collaboratively made, Photo Priscilla Xavier

its interconnections with material cycles, economic and socio-spatial relationships. Food production processes were identified as part of a material cycle providing the self-sustaining base for a scenario of exchange, independence and self-sustainability. Based on discussions with dwellers and a focus on self-efficiency, the team strategy was to create an intervention that could transfer local capacity in food production to areas outside of Solano Trindade. Interactions with the school, the exchange of gardening knowledge, and self-produced products were central to the proposal. The result was a minimalist intervention consisting of kits with seedlings and an embedded irrigation system made of recyclable material. This displayed information about the plant, planting techniques, the movement and the occupation (Figure 5).

CONCLUSIONS

Reflection on the collaborative and interactive knowledge production

In this paper, it is argued that the nature of Solano Trindade as well as the new dynamics established by the summer school represent different forms of urban commoning. This emphasizes the self-managed attributes as an important contribution to the growing definition of self-organisation – one that goes beyond the known categories of informal, illegal or irregular

occupation forms. The collaborative process of the summer school is presented as having reciprocal impacts in the community, approaching the commoning by directly interacting with their daily routines. Central hierarchies of actors and decision-making processes are here linked with spatial dynamics. In this sense, the community kitchen represents a significant common space, which not only serves for joint meals and discussion but as central place for making decisions and organizing knowledge in common ownership (see Figure 6). The arrival of the summer school group, for instance, stimulated opportunities for better organisation in the kitchen, thus generating new dynamics. Furthermore, main collaborative decisions regarding micro-interventions were discussed during meal preparations and intake, owing to the role of the kitchen as common. By linking knowledge from all the involved summer school actors as well as their practices, the construction of micro-interventions (Kip et al., 2015, p.13) enhanced the potential of interactive spaces (Lefebvre, 2008 [1974], p.18).

The 'special moments' as agencies of collaboration were the most empowering moments for all the participants. These moments represented by gatherings of different participating actors, fostered process-oriented design work where different inputs during the design process had consequential influences in the design outcomes. Acting together was fundamental to understand the place, build trust, and further envision collaborative forms of work for the interventions. Physical interactions with the space, nature and infrastructures facilitated the process of grasping community challenges on daily bases. Owing to their life experiences, dwellers are used to adaptively deal with natural hazards (rain, flooding), external unforeseen impacts (soil contamination by an ecological crime)

or criminal pressure from paramilitary, drug traffickers, infrastructural deprivations (collapse of the sanitation system) or even state institutions. The summer school proposals included these adaptive capacities to elaborate a network of knowledge by setting up visualizations, discussions, presentations and joint constructions.

Reflections on the dual design strategy

A key issue in acting in self-organised and informal settlements is the idea of sensibly 'leaving something behind' that is realistic and feasible. Creating interactivity of space was an outcome in Solano Trindade by implementing the micro-interventions related to systemic design scenarios. The dual design strategy played a crucial role in reflecting how jointly produced knowledge can be physically 'spatialised' for the stimulation of further community empowerment. Regarding Mc Farlane's (2011) concept of dwelling through thinking, designing and constructing, the 'spatialisation' of knowledge brings interpretations about urban spaces into being. This process should comprehensively combine expert and local community knowledge with intrinsic knowledge in landscapes that is stored in its materiality. Embedding such integrated knowledge in Solano Trindade from MUDA, UFRJ projects and the summer school activities showed capacity to foster maintenance and the responsibilities of local dwellers and activists.

Design solutions defined strategic interfaces for connecting different infrastructure systems and socio-spatial challenges by organizing for example flows of energy, food and waste. The process-oriented and systemic design approaches worked therefore as a method to open windows for mutual learning of knowledge in common ownership. Additionally, systemic design visualizations where scenarios and actor-networks where displayed

in different times and scales, provided an immediate communication format to enhance dialogues, discussions and negotiations of the solutions to be implemented. Here is argued that such communication tools can enable capacities for maintenance and urban transformation in the long-term. Most importantly, the dual strategy presented in this paper shows the potential of stimulating strategic solutions towards sustainable urban transformation by directly intervening in the built environment. In this sense, the design outcomes lead to a materialization of the jointly produced knowledge. The summer school allows the inclusion of knowledge of the mandala garden as part of an urban food system (Group 2), the plant pot as an agent to produce further interactions between the community and the school (Group 4) and the joint construction of the playground as a first step towards a community space (Group 1 + 2). A significant aspect of the micro-interventions is their potential in achieving a broader acceptance of the community in the neighbourhood of Duque de Caxias for long-term development.

Preparing approaches for ongoing mutual learning and urban commons empowerment through collaborative activities are considered a step forward in knowledge-exchange between Global South and North and vice-versa. They are valuable opportunities for furthering co-production in self-organised urban areas and allow the expertise of students and scholars to contribute to the creation of 'space[s] of possibilities' (Stavrides, 2014, p.83) and 'sharing spheres' of interactive knowledge.

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5.2. PLANTING DESIGN AND ECOLOGY

GROUP B

Treescape: intertwining Trees and Forest in an Urbanized Territory

Bjoke Carron

The Root of the Problem: Addressing the Conflicts between Spontaneous Vegetation and Built Landscape

Simon Colwill

Merging Practice and Science to Improve Biodiversity in the Planting Design of Public Green Spaces

Cláudia Oliveira Fernandes

Attractive, Climate-Adapted and sustainable? Public Perception of Non-Native Planting in the Designed Urban Landscape

Helen Hoyle

Analysis of Solar Access and Daylight in Outdoor Sites for Planting Design

Shruti Soni

PECHA KUCHA PAPER

Treescape: Intertwining Trees and Forest in an Urbanized Territory

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Keywords:

urban forest, urban territory, urban green infrastructure, urban open space, forest ecosystem services

ABSTRACT

Urbanized territories are looking for concepts and strategies to integrate trees and forests for the indispensable provision of (forest) ecosystem services (ES). This is also the case in Flanders (the northern part of Belgium), one of the least forested areas in Europe with a standstill in forest expansion. The hypothesis for the Treescape research project is that urban forest configurations – i.e. additional urban trees and forests intertwined in the built-up fabric in combination with other urban land use systems – can provide a wide range of ES.

In this paper, an approach to map and identify urban open spaces where trees and forests potentially can be integrated, is presented and applied in a case study area. The results show that both in the densely built-up part as well as in the suburban fringe of the study area, there is quite some unbuilt open space where trees and forests can grow.

Looking at the type of land use, the largest potential is to be found within 'housing', with gardens of detached dwellings as major group. In closed/half-open building blocks in the densely built-up part, inner areas can be of great value as well, especially because of the densely populated context.

INTRODUCTION

Urbanizing territories are looking for approaches and strategies to integrate trees and forests for the essential provision of (forest) ecosystem services (ES). This is also the case in Flanders (the northern part of Belgium), which

is historically a region poor in forest (Tack et al., 1993). Today, Flanders continues to be one of the least forested areas in Europe (EEA, 2016). Despite a clear policy ambition, an increasing awareness and research results that clearly show the importance of trees and forests for people, deforestation continues and the net forest balance is nearly zero (Bos+, 2016). Forest expansion policy has little success because of the absence of a long-term vision on the importance of trees and forests (Muys and Verheyen, 2014), complex planning processes and the secondary position that forestry holds compared to agriculture (Van Gossum et al., 2008). Furthermore, a very sectorial forestry approach completely ignores the dynamic and heterogeneous nature of the small scale urbanized Flemish landscape (Bomans et al., 2010; Leinfelder and Allaert, 2010) and does not consider the landscape as a whole.

To open up new avenues for urban forestry and the supply of forest ES, new spatial concepts are needed to intertwine trees and forests in an urbanized territory.

The aim of the Treescape research project is to generate new spatial concepts for urban forest expansion in relation to other land uses in a fragmented urbanized context. The research hypothesis is that urban trees and forests can be intertwined in the built-up fabric in combination with other urban land use systems. Through a smarter use of available land, new urban forest configurations – i.e. the spatial combinations of trees and forests with other land uses – can emerge as ES providing units for an integrated woody urban green infrastructure or Treescape.

In this paper, an approach is presented to map and identify urban open spaces where trees and forests can be potentially integrated. First an outline of the methods is given and the results of the application in a case study area are presented. Then the results,

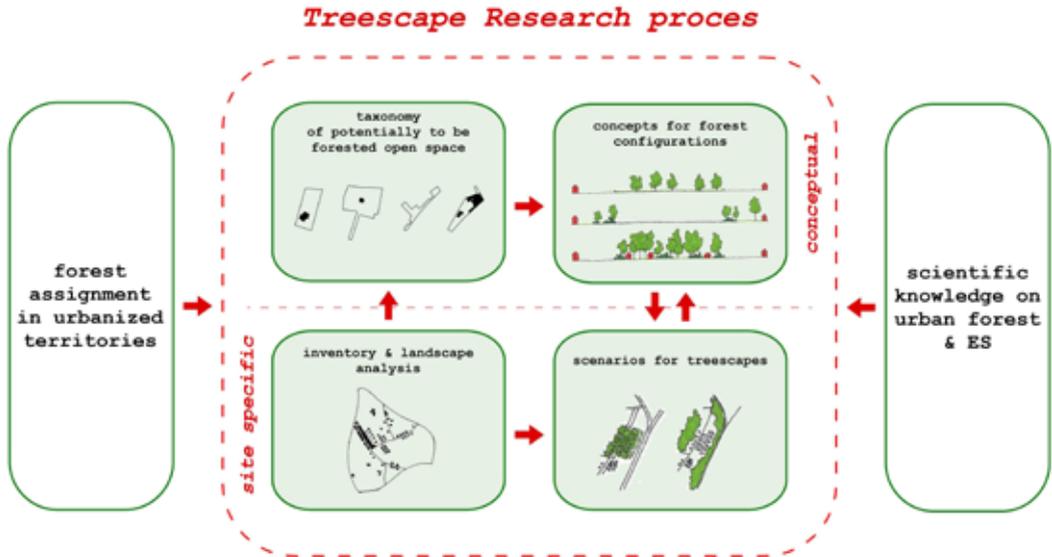


Figure 1. Stages of the Treescape research project

the advantages and limitations of the applied methods are being discussed.

METHODOLOGY

In this paper, the focus lies on two stages of the larger Treescape research project (Figure 1). It includes the screening, inventory and typology of potentially to be forested urban open spaces. The results will provide the basis for the next stages, notably the development of abstract concepts for forest configurations and site-specific Treescape scenarios for the case study area.

The case study area

The area where the case study is conducted, is a part of the city region of Ghent, more specifically the north-eastern municipalities Sint-Amandsberg and Oostakker. The study area is characterized by a large landscape heterogeneity and a multitude of land use types – typical for medium-sized cities in Flanders. The area shows a typical cross-section of a Flemish city, ranging from a densely built-up urban fringe, a half-open suburban fringe with mainly (semi-)detached houses and allotments, to a mixed and fragmented

open landscape. The total surface of the case study area is approximately 1300 hectare.

Due to the clear forestation policy objective of the City of Ghent and the difficulties to implement it, the City Council was willing to collaborate in the case study research. Different city departments participated, provided information, and gave feedback on the research results.

Urban open space mapping and classification

To find the area's potential of the urbanized territory to intertwine trees and forests, a screening, inventory, and typology have been done for the case study area.

Mapping method

Through a qualitative mapping, all urban open spaces with a potential to be forested are detected. The execution has been done in two steps: 1) a spatial screening, and 2) an inventory of potentially to be forested urban open space plots and components.

The mapping has been done from a spatial-morphological viewpoint, and not in view of for example optimal site conditions for forest growth. Urban

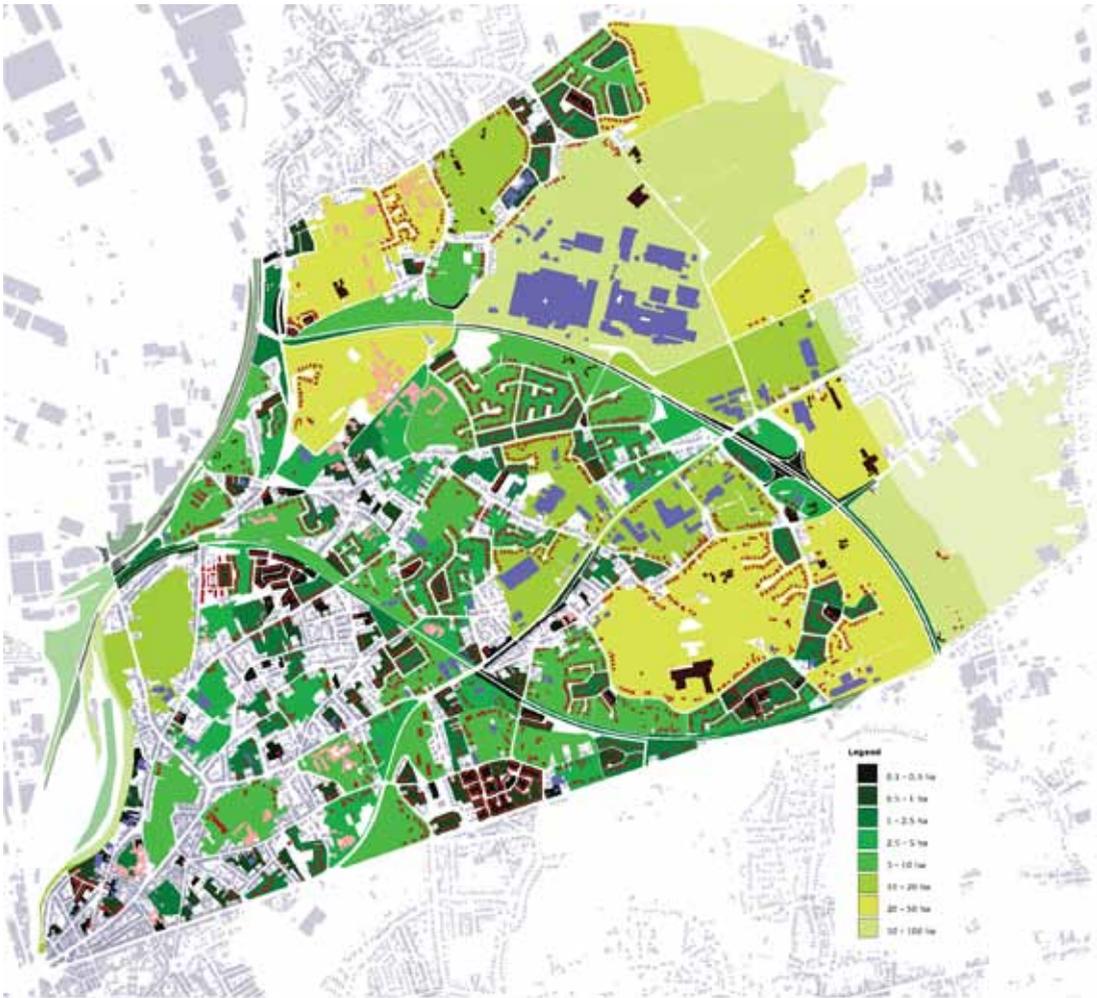


Figure 2. Size of urban open space components

open spaces are very diverse, ranging from large fragments and smaller plots, to parks and green areas, gardens and semi-private outdoor space, verges, cropland and grassland, etc. They basically encompass all morphologically open (unbuilt) space within an urbanized territory. This means both public and private space and the many semi-forms in between, irrespective of legal, sectorial, public or private property features.

The spatial screening is based on inclusive criteria (allowing forestation) and exclusive criteria (excluding forestation), and shows all potentially to be forested urban open space. From a physical point of view, this is in principle all unbuilt land where woody vegetation

can grow. In order to keep the possibilities for the continued Treescape research as wide as possible, this morphological inclusive criteria is taken as a clear outset and the exclusive indicators are limited to buildings, road and railway infrastructure, large water surfaces and existing forests.

The inventory consists of a selective mapping of single urban open space plots, that together can form larger open space components within the urban built-up fabric. Based on GIS data and qualitative field surveys (through field observations and aerial photos), potentially to be forested urban open space plots in the study area are manually mapped and digitalized at a detailed level, the scale of the

individual parcel. The extent of the mapping is overall, what means that all open space is been assessed. On the scale of the plot, 500 square metre is taken as minimum area. For residential gardens, 700 square metre is taken as minimum, assuming a dwelling of 100 to 200 square metre on average and 500 square metre of open space. Included in the inventory as well, are specific types of urban plots that offer possibilities for trees and forests on medium-/long-term or after for example, the reduction of paved surfaces.

In a next step, all mapped plots that form continuous areas with built-up area in between, are merged together in order to detect larger urban open space components. The components are then classified according to their size. The total surface is without principal buildings, but with (semi-)paved areas and small constructions included, because they are potentially removable or can be integrated within forest vegetation.

The results of the screening and inventory are site-specific and will be the basis for the development of Treescape design scenarios for the case study area.

Classification method

The typology consists of a classification of the potentially to be forested urban open space plots from the inventory. Characteristic of urban open space, is the strong functional relationship with other types of urban land use, often associated with the built environment. Examples are gardens (associated with dwellings) or verges (associated with infrastructure). Because of this entanglement, the classification is done according to different types of land use that relates to the urban open space. For each type of land use, an indication of the total surface is given (in order of magnitude).

The results of the typology are abstract morphology types, which will be used to develop generic concepts

for forest configurations that can be implemented in various spatial situations.

RESULTS AND DISCUSSION

The area's potential of the urbanized territory to intertwine trees and forests

Hypothetical maximum field

The spatial screening reveals the hypothetical maximum field for trees and forests within the urban fabric of the study area. This means the entire territory without buildings, road and railway infrastructure, large water surfaces and existing forests (as there are no new possibilities for new trees or forests here).

Especially in the densely built-up part of the study area, the screening contains a relatively large proportion of (semi-)paved areas such as parking areas, entranceways, road infrastructure on private domain, storage space of companies, etc. These areas are considered as potentially to be forested urban open space as well.

Urban open space morphology types

According to the type of land use related to the urban open space, different morphology types are identified.

The following land use types are present in the study area: housing, mobility, agriculture, recreation/sport, community facilities, industry/services/trade.

The following urban open space morphology types are being identified in the study area:

- garden of detached dwelling
- manor house estate
- open space in housing complex
- open space related to transport infrastructure
- parking area, parking area with garages
- agricultural cropland or grassland

- park, green area, allotment garden
- playground, sports field
- open space related to schools, residential care facility or community centre
- industrial, business or commercial site.

Noteworthy in the densely built-up part of the study area, is the presence of many private parking areas with garages in inner areas of closed/half-open building blocks, and the mix of housing and (historical) economic activity with rather old infrastructure. Within the suburban fringe of the study area, the presence of allotments with oversized road infrastructure and large parking areas of retail shops is notable. After an eventual demolition or reduction of paved surfaces, on medium- or long-term, these types of urban open spaces offer possibilities for trees and forests.

Urban open space inventory

The inventory contains a selection of potentially to be forested urban open space plots and larger components.

Table 1 shows the land use types, the urban space morphology types with an indication of their respective surfaces.

Based on the type of land use, the largest potential of space is to be found within 'housing' (280 hectare, with gardens of detached dwellings as major group), followed by 'agriculture' (250 hectare). For the separate morphological types, the largest potential of space can be found on agricultural cropland and grassland (250 hectare), followed by gardens of detached dwellings (180 hectare) and industrial, business or commercial sites (95 hectare).

Size of urban open space components

In order to detect larger urban

open space components, all mapped single plots are merged together and classified according to their size (total surface). Figure 2 shows that in the study area:

- Urban open space components from 0.1 to 2.5 hectare are mainly found in the densely built-up part and consist of open space related to transport infrastructure, gardens in housing estates and of detached dwellings in allotments, parking areas with garages and industrial sites within inner areas of closed/half-open building blocks.
- Urban open space components from 2.5 to 10 hectare are mainly found in the suburban fringe and consist of open space related to schools and residential care facilities, gardens of detached dwellings in allotments, industrial sites within residential areas, larger parks and agricultural land along transport infrastructure.
- Urban open space components from 10 to 100 hectare are mainly found in the open landscape and consist of commercial sites along a major road (almost all between 10 and 20 hectare), agricultural land, sports fields, and open space related to schools and residential care facilities, all with adjacent gardens of detached dwellings.

Discussion

One of the characteristic features of urbanized territories, is a large amount of open unbuilt space which is considered as part of other land use types. This urban open space remains invisible with for example, the notion of 'land take' (Poelmans et al., 2016), or sectoral zoning in planning and policy.

In order to investigate the area's potential within a context where nearly every square metre of land is intensively used, a review of all the urban unbuilt open space where a tree can grow is

needed. With a settlement pattern of a lot of (semi-)detached dwellings with gardens, Flanders has for example, a large area of gardens. Dewaelheyns et al. (2014) estimate that 8% of the Flemish area is covered by domestic gardens. By comparison, the total area of forest is around 12% (INBO, 2018). In an urbanized context, these open spaces are essential elements in an urban green space strategy and they can make a difference for the provision of a wide range of urban ES.

With the method of qualitative manual mapping, these 'hidden' urban open space resource can be revealed and included in urban green space strategies.

A qualitative manual mapping of these urban open spaces has the following advantages:

- high level of detail in mapping (which can make a difference for ecological corridors in a urbanized context);
- mapping aimed at the possibility of identifying and shaping larger open space components;
- different scale levels can be crossed, ranging from the individual plot to the scale of the city region;
- private garden plots can be included (there are no spatially explicit data on private gardens in Flanders) (e.g. ongoing research project 'The Garden Monitor – GARMON', Belspo, 2017-2019);
- unknown opportunities can be revealed (such as e.g. the parking areas with garages in the study area).

The qualitative mapping approach has some limitations in that it is a subjective approach, and it requires substantial time to complete. The subjectivity is partially mitigated through the verification of the research results together with the city departments.

Another limitation of the method

for the selective mapping is that it gives only an indication of the potential. This means that the real possibilities may be much larger because not all the urban open space is selected. Within the selected urban open space, however, the real possibilities may be smaller because of the technical and hypothetical nature of the approach the presence of (semi-)paved areas and small constructions. Desirability or feasibility of trees or forests on a specific location are not considered, nor is the demand for ES. However, the interest and engagement of the city departments shows the need for such an approach to open up new avenues in a context of a standstill in forestation.

CONCLUSION

The results of the inventory show that both in the densely built-up part as well as in the suburban fringe of the study area, there is quite some unbuilt open space where trees and forests can grow. These urban open spaces can form the basis for an integrated woody urban green infrastructure, which can provide a wide range of urban ES.

Looking at the size of the open space components, the largest potential is to be found in the largest components in the open landscape further away from the densely built-up part, with mainly agricultural land and industrial, business or commercial sites. Looking at the total surface of separate morphological types, here as well, the largest potential of space can be found on agricultural land. However, looking at the type of land use, the largest potential of space is to be found within 'housing', with gardens of detached dwellings as major group. In closed/half-open building blocks in the densely built-up part, inner areas (with for example, a parking area with garages, an industrial site and a few gardens) can be of great value as well, especially because of the densely urban context.

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TABLES

Table 1. Land use types, urban space morphology types with and surfaces

land use type	urban space morphology type	surface in hectare	surface in percent
housing	garden of detached dwelling	180 ha	
	manor house estate	70 ha	
	open space in housing complex	30 ha	
	total for housing	280 ha	34 %
mobility	open space related to transport infrastructure	80 ha	
	parking area, parking area with garages	13 ha	
	total for mobility	93 ha	11 %
agriculture	agricultural cropland or grassland	250 ha	
	total for agriculture	250 ha	31 %
recreation/ sport	park, green area, allotment garden	50 ha	
	playground, sports field	17 ha	
	total for recreation/sport	67 ha	8 %
community facilities	open space related to schools, residential care facility or community centre	28 ha	
	total for community facilities	28 ha	4 %
industry/ services/ trade	industrial, business or commercial site	95 ha	
	total for industry/services/trade	95 ha	12 %

The Root of the Problem: Addressing the Conflicts Between Spontaneous Vegetation and Built Landscape

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encroachment, built landscape, vulnerability,
monitoring

ABSTRACT

Built landscapes are under relentless attack from both spontaneous urban vegetation (plants that colonise naturally without cultivation) and the gradual encroachment (spreading) of existing plantings onto adjacent surfaces. The location, spread and rate of this growth is highly influenced by microclimatic factors, the availability of soil and propagules, and the frequency of disturbance. Spontaneous urban plants are highly adapted to the harsh urban environment and colonise the built landscape both overground through seed dispersal and underground by means of regeneration from rhizomes. The encroachment of plantings beyond planned boundaries onto surrounding surfaces often occurs due to unrestrained growth and the insufficient removal of rooting substrate from the border area between soft and hard landscape. This paper discusses these conflicts by analysing the causes and effects of this growth over time, pinpointing areas of weakness and vulnerability, diagnosing the underlying issues, and developing optimisation strategies.

Current research at the Technische Universität Berlin is focusing on analysing the processes of patination and subsequent deterioration of built landscapes over time. A low-threshold and non-destructive monitoring method to 'read' and decipher these traces of time is being developed in order to determine and analyse the agents of landscape transformation. The principles of construction pathology are used to identify relationships between the observed

'visual signs and symptoms' (effects) and 'pathological conditions' (causes). This enables causes to be determined and recommendations for the most appropriate course of action to be made. This paper will focus on developing optimisation strategies for the areas of weakness and vulnerability identified, and therefore aims to enhance the durability of our built works.

INTRODUCTION

'And what is a weed? A plant whose virtues have yet to be discovered ... Time will yet bring an inventor to every plant' (Emerson 1879: 3)

Hard surfaces are considered harsh substrates for vegetation due to the general lack of rooting space, low moisture availability, minimal soil volumes, soil compaction, climatic stress and regular disturbance from human activities such as trampling and maintenance (Lundholm 2014: 93; Kowarik 2003: 293-308). Spontaneous plants are however highly adapted to this harsh urban environment (Del Tredici 2014: 206). Colonisation takes place **overground** through seed dispersal using the wind, gravity or water, animal droppings, or by attaching to animals and being carried away. Dispersal can also occur through human trampling, maintenance operations or by being transported by vehicles (Darlington, 1981). Spontaneous colonisation can also take place **underground** by means of regeneration from rhizomes (underground stems). The **location, spread and rate of spontaneous urban vegetation** is highly influenced by microclimatic factors, the availability and quality of rooting substrate, moisture availability and the frequency of disturbance from use or maintenance (Lundholm 2014: 94; Lisci & Pacini 1993: 16, 23; Del Tredici 2010: 4).

The most common conflicts involve **damage from roots** due to **spontaneous urban vegetation** growth

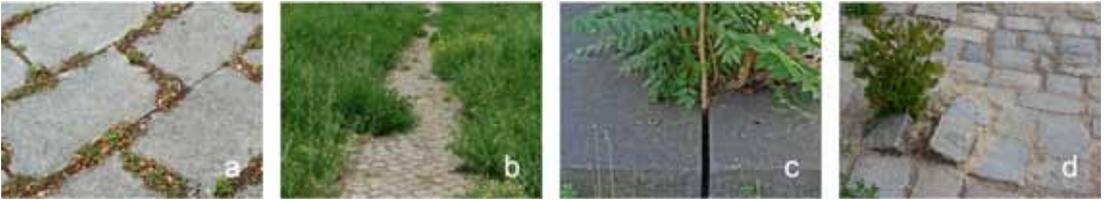


Figure 1: Consequences of spontaneous urban growth on the built landscape. a) Filling of joints, cracks, fissures and recesses, b) Encroachment and spreading of plantings over surfaces and boundaries resulting in the veiling of structures, c) Leverage effects through root wedging and heave leading to further weathering, d) Loss of functionality, usability, stability or safety.

directly onto the built landscape and the **encroachment of existing plantings** over planned boundaries onto neighbouring surfaces. Furthermore, the **biological staining of materials** was identified together with **drainage conflicts** due to the build-up of sediments and spontaneous growth. The consequences of spontaneous urban growth on the built landscape range from surface patination to subsurface damage which can become severe over time, see Figure 1 (Loidl-Reisch 2016).

METHODS

Current research at the Technische Universität Berlin (TU-Berlin) is based on the hypothesis that it is possible to optimise design, detailing, construction and maintenance techniques by monitoring and evaluating project development at regular intervals after completion. The processes of patination and subsequent deterioration of built landscapes highlight the weak points of the design as well as deficiencies in detailing, construction and maintenance. A low-threshold and non-destructive monitoring method to 'read' and decipher these traces of time is being developed in order to pinpoint the agents of landscape transformation and identify points of weakness and vulnerability in built landscapes. In order to obtain uniform and comparable research results in terms of climate, culture and contextual conditions, and to achieve the required design, material and constructional bandwidth, the research focuses upon landscape details (e.g. steps, paths,

drainage elements, tree grids, seating and walls) in typologically different public or semi-public open spaces in Berlin. The current often desolate state of many of these projects reflects the reduced resources of the city, a fact that increasingly applies to cities throughout Europe (BMUB 2015: 12, 33, 74). The research method is based on empirical inquiry following the case study methodology involving both qualitative and quantitative evidence (Yin 2014: 109). Each of the case studies resulting from the field research represents "a contemporary phenomenon within its real life context" (Ibid: 13). Photographic recordings were taken at regular intervals over a 5-8 year period from the time of project completion. Through comparisons between the original state and successive recordings process-dependent changes become visible. The principles of construction pathology are used to identify relationships between the 'visual signs and symptoms' (effects) observed and 'pathological conditions' (causes). This enables causes to be determined and recommendations for the most appropriate course of action to be made (Watt 1999: 1-7, 159-165). Frequently occurring points of conflict highlight areas of weakness and vulnerability that need especial attention in design, detailing, implementation and maintenance.

SPONTANEOUS GROWTH TYPOLOGIES

The main typologies of pronounced spontaneous urban growth in the built landscape identified through this field research are shown in figure 2. The

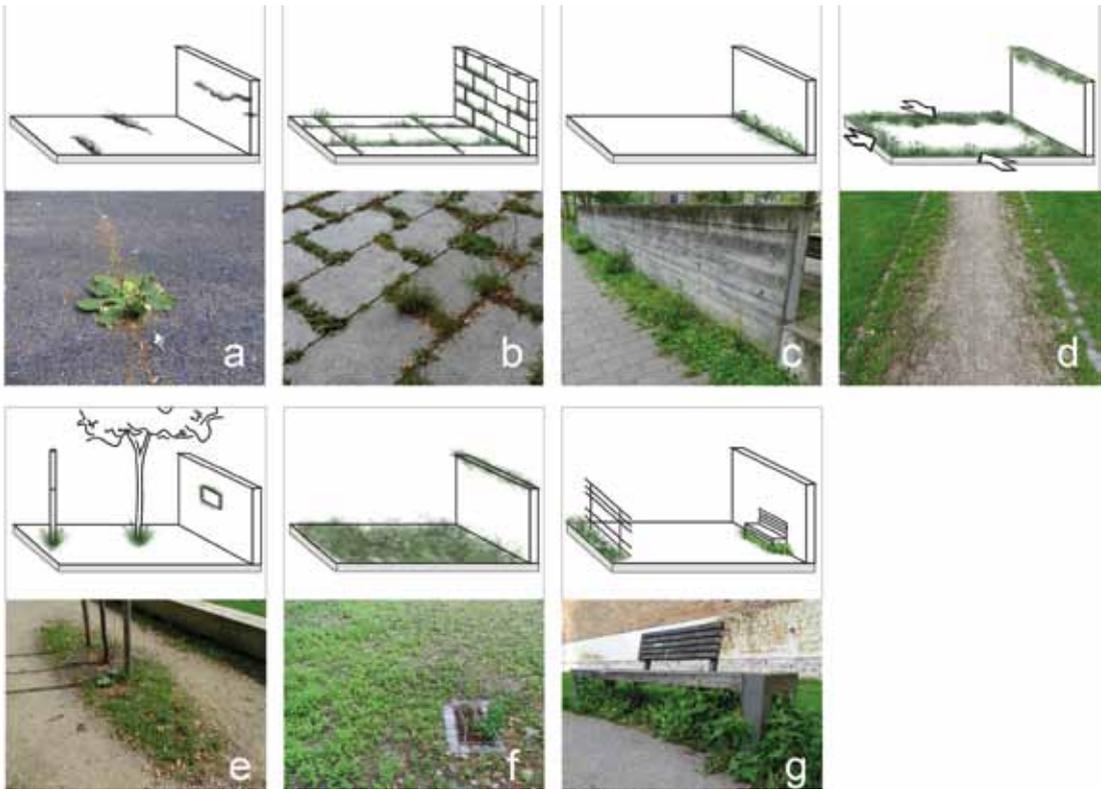


Figure 2: Spontaneous urban growth typologies. a) Cracks and fissures on horizontal or vertical surfaces, b) Paving or walling joints and seams, c) Junctions between horizontal and vertical surfaces, d) Peripheral encroachment over surfaces, e) Areas surrounding fixtures in horizontal or vertical surfaces, f) Surface area growth, g) Undisturbed areas due to inadequate maintenance or as a result of insufficient usage (under benches, behind railings etc.).

increased frequency and intensity of spontaneous growth in these areas suggests points of high vulnerability.

Many of these vulnerable areas arise because they are particularly difficult to maintain and require meticulous attention to detail, which is often not possible due to financial constraints. Some can however be optimised by selecting more appropriate materials, finishes and constructions for the specific location and function. Spontaneous growth was repeatedly found at the periphery of paved areas, surrounding trees, manhole covers, lighting fixtures and other obstructions. Construction work in these areas is impeded which may result in a lower quality of construction and consequently to an increased vulnerability to spontaneous growth.

COLONISATION OF THE BUILT LANDSPACE

Horizontal surfaces offer less hostile growing conditions and therefore generally lead to an increased vulnerability to spontaneous growth (Lisci & Pacini 1993: 20). The main difference to vertical surfaces is the presence of disturbance through trampling or handling which leads to the relocation of substrate, direct damage and substrate compaction (Lundholm 2014: 94-96; Segal 1969: 239-240). Surface colonisation begins with the formation of rooting substrate. The deposition of airborne sediments such as dust, dirt, organic matter (falling leaves, blossom, etc.) and other atmospheric contaminants is increased on the lower-velocity lee of vertical elements such as walls, edgings and plantings as well as on structured surfaces and in corners, joints and gaps. This accumulation of parent material together with actions of climatic



Figure 3: Sequence a-d: The encroachment of planting from embankment onto paving surface over 8 years. a) Year 1. b) Year 2. c) Year 6. d) Encroachment of vegetation promotes further spontaneous growth, Year 8.
Sequence e-h: The encroachment of lawn onto a self-binding gravel surface over 10 years. e) Year 1, f) Year 3. g) Year 5. h) Almost complete vegetation cover, Year 10.

factors and biota (bacteria, fungi, worms etc.) slowly breaks down and decays over time leading to soil formation (Bot & Benites 2005: 13; Loidl-Reisch 1987: 63-80). In turn this provides the perfect physical and hydric conditions for spontaneous plant growth (Bot & Benites 2005: 13). Initial spontaneous urban growth leads to the establishment of further microclimatic niches which promotes further growth. Continued growth over time leads to a process of succession in the plant communities that develop. The successive stages of spontaneous vegetation develop deeper and more extensive root systems which can gradually have an impact on the effectiveness and performance of the surface (Antos & Halpern 1997: 97). These more resilient communities (e.g. improved drought resistance) may damage the construction through physical penetration of roots, acids produced by the roots and direct contact (Lisci & Pacini 1993: 25; Lundholm, 2014: 101).

In general, more aggressive woody plants that can severely damage a construction require higher levels of substrate (Jim 2008: 359-366; Lisci & Pacini 1993: 24). Growth is however often maintained in a perpetually early-successional state due to usage (trampling, contact with hands etc.) and maintenance regimes such as cleaning, brushing or the salting of surfaces (Lundholm 2014: 96, 99).

Plant encroachment onto surrounding surfaces occurs due to the insufficient removal of organic debris and rooting substrate from the border area between soft and hard landscape

through regular maintenance (e.g. brushing). Creeping and groundcover plants with a lateral growth habit that spread from suckers, rhizomes or stolons are particularly prone to rapid encroachment [Fig. 3a-d] (Niemiera 2012: 2). Surfaces adjacent to lawns are also at risk due to the accumulation of clippings at the periphery which degrade rapidly to become rooting substrate. This build-up of substrate allows the grasses to creep over edgings and encroach onto the paved surface by sending out shoots, rhizomes or seeds as shown in Figure 3e-h.

Conflicts concerning encroachment can be optimised through the selection of less rampant, invasive species together with an increased intensity and frequency of maintenance. The implementation of wide or raised edgings surrounding vulnerable plantings such as lawns, meadows and groundcover helps to suppress encroachment and allows for increased maintainability.

VERTICAL SURFACES

Vertical elements such as walls, facades or lamp posts are generally more difficult for plants to colonise due to gravity, wind currents and precipitation runoff. As Darlington (1981: 17) observed, vertical elements interrupt horizontal air currents leading to an increased deposition of sediments and propagules which, due to gravity and runoff, leads to an increased rate of soil formation at the base. The increased levels of rooting substrate, moisture and



Figure 4: Conflicts around fixtures. a) Impeded maintenance access when in use, year 7. b) Inaccessible spontaneous growth, year 8. c) Growth around street lamp, year 4. d) Hindered maintenance of covered surface, year 7.

low evaporation levels (due to shading) in this area often lead to an increased rate of spontaneous growth [Fig. 4] (Darlington 1981: 5; Lisci & Pacini 1993: 20). Furthermore, this niche is seldom disturbed by human trampling and is particularly difficult to maintain, which enhances growing conditions. (Lundholm 2014: 95-96).

Conflicts can be reduced by implementing fixtures with as few supports punctuating the surface as possible. A permanently elastic grouting material needs to be used for the joints immediately surrounding each support in order to allow for structural movement whilst sealing the joints against spontaneous growth. The maintainability of vertical elements in unbound materials (gravel, hoggin etc) can be improved by paving surfaces immediately surrounding the supports.

Covered surfaces and areas that are inaccessible for maintenance equipment should be avoided wherever possible. Where necessary, these surfaces either need to be intensively maintained or implemented with joint-free poured surfaces or paving units with sealed joints (e.g. polymer resin or cement based) in order to minimise spontaneous growth.

SUBSURFACE DAMAGE

The fine roots of spontaneous urban plants and encroaching vegetation penetrate into the joints, crevices and niches of horizontal or vertical surfaces of the built landscape in search of water, air and nutrients which may result in **root wedging**. Continued root growth over time leads to an increase in root girth thus exerting pressure and forcing materials apart. This in turn can result in increased moisture penetration, increased spontaneous growth and sustained damage through both root and frost wedging. Many spontaneous plants also develop tap roots or extensive fibrous root systems below the surface which, in time, can also exert subsurface upward or outward pressure. This 'root heave' can cause extensive damage by displacing or fracturing surfaces, resulting in safety issues such as slip and trip hazards. Subsurface roots are protected from the harsh surface climate, disturbance through trampling and maintenance activities which allow spontaneous plants to regenerate from the root base even after dieback or removal of the vegetation above ground. Seeds of spontaneous vegetation can also regenerate after many years of dormancy (Del Tredici 2010: 10. Wittig 1991: 68-69). This makes maintenance measures for the permanent removal of spontaneous growth and the repair of root damage to hard landscape



Figure 5: Spontaneous growth between short walls over 8 years. a) Spontaneous growth at the base of short walls, Years 3. b) Year 6. c) Removal of growth in year 7. d) Rapid regrowth of vegetation in year 8.



Figure 6: Images a-d: Increased vulnerability to spontaneous growth in shade. a) Limestone setts in full sun/full shade of a building, year 3. b) Increased spontaneous growth due to overhanging tree, year 3. c) Spontaneous vegetation adjacent to hedge, year 3. d) Spontaneous growth on compacted gravel surface below tree, year 4. Images e-f: Conflicts with drainage elements. e) Encroachment of vegetation from neighbouring embankment, year 3. f) Growth within gully in compacted gravel surface, year 8. g) Blockage of slit drain due to organic debris and spontaneous growth, year 3. h) Minimal gradient leading to sedimentation and growth on surface, year 10.

elements especially laborious.

Spontaneous urban vegetation therefore needs to be removed with their roots at a young age before the subsurface root systems can establish. Management of spontaneous vegetation by mechanical means achieves immediate results, however *'cannot eliminate the basal portion of the vegetation, so that the weeds soon re-grow, resulting in the need to repeat the operations at considerable expense several times during the year'* (Benvenuti 2004: 349). Figure 5 shows the development of spontaneous urban vegetation which was eventually removed in year 7, however one year later this vegetation had significantly regrown from its subsurface root system.

The most effective method of non-chemical weed control depends on the spontaneous plant species present, maintenance standard and cost effectiveness (Marble et al. 2015a: 854). The best results are achieved when employing a variety of methods such as mowing, brushing, hand-pulling, hoeing and thermal control techniques (Rask & Kristoffersen 2007: 374-377). Knowledge of the flowering periods of the predominant spontaneous species allows for maintenance to take place before the seeds become viable and are dispersed into the surrounding built

landscape (Benvenuti 2004: 349, 351).

Environmental (exposure to light, intensity of use), technical (paving type, joint width and material), and construction design (design, finishing) factors influence the intensity of spontaneous plant growth on hardscapes (Boonen et al. 2012: 4-12). Therefore, preventative weed control strategies need to be commenced in the design and detailing phase by selecting appropriate materials (e.g. jointing materials) and construction techniques (Boonen et al. 2012: 2-12; Rask & Kristoffersen 2007: 371, 378) that are tailored to the requirements of the specific site conditions.

SHADED LOCATIONS

[Fig. 6a-d].

Hardscapes in the shade of buildings, trees and overhanging vegetation are especially vulnerable to spontaneous plant growth and encroachment. Shading protects hardscapes against evaporation and sun exposure which increases the level of humidity and provides cooler temperatures (Lisci & Pacini 1993: 24, Wittig 1991: 154). A student assisted field study at the TU Berlin comparing exposed and shaded paved surfaces revealed that tree shade reduced maximum surface temperatures by up to 19°C.

Surface humidity was measured to be constantly higher in shade than on exposed surfaces during daylight hours. The study concluded that shaded hardscape surfaces therefore provide significantly better conditions for spontaneous vegetation growth than exposed surfaces. Spontaneous growth is particularly intense in shaded areas below or adjacent to vegetation due to the increased abundance of organic matter [Fig. 6a-d, Fig. 8e-h].

DRAINAGE CONFLICTS

[see Fig. 6e-h]

Organic matter shed by plants such as leaves, fruit, flowers, seeds or sap together with other debris such as dirt, litter and mulch is transported to the lowest points of built works through the surface runoff of natural precipitation and erosion (Colwill 2017: 296). This debris therefore accumulates where drainage inlets (gullies, linear drains etc.) are located which often leads to conflicts due to enhanced spontaneous growth and blockages. This is especially problematic on unbound surfaces where, during heavy rainfall, surface runoff can wash out surface or jointing materials thus causing the increased sedimentation of drainage systems. Gullies with a low intake capacity or narrow inlet (slot channel drains) are especially susceptible to blockages [Fig. 6g]. Conflicts due to insufficient surface gradients were also identified. Low surface gradients reduce the flow rate of surface precipitation resulting in an increased deposition of sediments and the retention of moisture, thus providing ideal conditions for spontaneous growth [Figure 6h].

These conflicts can be reduced through increased surface gradients, the regular removal of debris from the surfaces of built landscapes (e.g. by brushing) together with frequent sediment removal from the inlets, channels and sediment filters of drainage elements. Furthermore, drainage inlets need to be planned away from the niches and corners of the built landscape where increased sedimentation and spontaneous growth is inevitable e.g. at the base of walls, the foot of steps or adjacent to abundant vegetation.

THE COLONISATION OF MATERIALS

[see Fig. 7]

Contributing factors for the colonisation of materials include the degree of exposure, surface structure and roughness, surface wetness, and the specific material properties such as chemical composition, water absorptivity and porosity (Rindi 2007: 623). Furthermore, the deposition of fruit, sap, insect honeydew (excreted by aphids) and other organic substances by plants onto the surfaces of built elements leads to an increased level of **surface colonisation**. Rougher surface materials retain and trap particles of debris more readily allowing for increased soil formation and spontaneous growth. Porous materials are more easily colonised due to their water retaining capacity and the facilitation of substrate formation (Lisci & Pacini 1993: 22). The presence of surface moisture, for example in shaded areas, enables airborne deposits to adhere to surfaces more readily thus

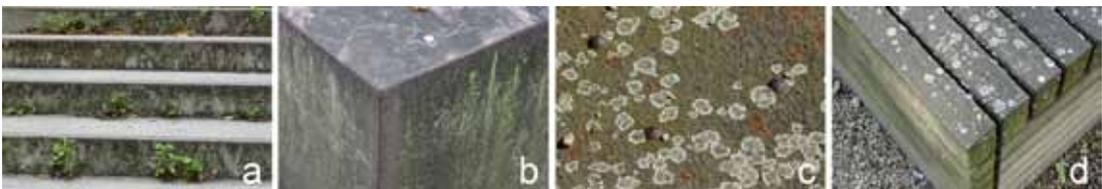


Figure 7: Primary succession of materials. a) Concrete steps, year 7. b) Natural stone, year 8. c) Aluminium alloy, year 11. d) Wood, year 7.



Figure 8: Spontaneous urban growth. a) Growth in jointing material of paving, year 3. b) Vegetation in open joint between surface and wall, year 7. c) Growth in joints of steps, year 7. d) Spontaneous growth in gravel joint at the foot of an inclined wall, year 6. e) Growth surrounding tree in self-binding gravel surface, year 3. f) Self-binding gravel surface in full shade of trees, year 5. g) Tree in self-binding gravel surface, year 7. h) Increased growth in gravel joints of paving beneath a tree, year 8.

promoting the processes of surface colonisation. As a result, materials that are prone to moisture-related defects such as rot or rust require surface protection in these locations. Water-resistant materials such as granite or concrete which remain permanently moist are susceptible to biological surface growth (algae, moss, fungi, and lichens). This biological growth retains moisture for a long period of time after rainfalls which results in reduce traction and risk of slipping. Therefore surfaces prone to moisture, such as areas in deep shade, need to be implemented with slip resistant surfaces.

Unbound materials such as self-binding gravel and surfaces with a high proportion of aggregate joints are particularly prone to spontaneous growth, especially in shaded areas. The irregular granular surface layer leads to a rapid accumulation of sediments and enhanced conditions for spontaneous vegetation growth. The distribution of this spontaneous growth reflects patterns of disturbance through maintenance and usage, see Fig. 8e-g.

Jointing materials are also prone to spontaneous growth, see Fig. 8a-d. Seeds, dirt and detritus that land on surfaces can be washed or blown into these recesses thus improving growing conditions. Research at Ghent University highlights the following factors in order to reduce spontaneous

urban growth in paving joints:

- Bedding layers should have a high permeability
- Joints should be narrow to reduce the surface of attack
- Narrow joints should be filled with fine-grained jointing sand (grain size <2mm). Wide joints should be filled with coarse-grained materials in order to reduce the amount of water available for vegetation growth (grain size <6,3mm)
- Reduce the level of organic pollution from surrounding areas through regular sweeping (De Cauwer et al. 2014: 157-161)

Materials and their surface treatments therefore need to be selected by taking not only the form and function into consideration but also the specific microclimatic factors of the location. The predicted intensity of use, the foreseen level of maintenance and the presence of organic matter also need to be duly considered.

DISCUSSION

'From a horticultural perspective, a truly sustainable landscape design is one that is in balance with the financial resources available to maintain it' (Del Tredici 2006: 52)

Maintenance plays a major role in all the conflicts depicted as case studies presented in this paper. The frequency and quality of maintenance operations together with the quality of design and construction have a huge impact on how a project will change, develop and eventually degenerate throughout the project lifecycle. Many authorities are however under financial constraints that limit the ability to maintain public space sufficiently (Kühn 2006: 58). Poor maintenance, however, may also result from reduced maintainability due to poor design and detailing. It is therefore essential to optimise maintainability in the design and construction phase by addressing the key points of weakness and vulnerability. This is also crucial in understanding how an object may fail, thus allowing for optimisation in the planning process.

Poor or improper maintenance can also result from the lack of skills of maintenance staff or supervisors, the quality of workmanship and the availability of suitable equipment. In the interests of optimising maintainability and durability, essential information on the availability of skills and equipment for the construction and maintenance of the project needs to be considered in the design and detailing process.

Traditional maintenance concepts aim to completely remove all spontaneous growth leading to high costs. It is however possible to create aesthetical and ecological performative spaces by allowing for the growth of spontaneous vegetation (Seiter 2016: 30). Combining spontaneous plants and ornamental plant would help to make spontaneous vegetation more attractive to the public (Kühn, 2006: 64, 65). More research is however necessary in order to generate a thorough understanding of planting design and maintenance strategies involving spontaneous vegetation.

CONCLUSIONS

'Feedback into the growth or decay of a landscape allows the landscape architect to have a positive, creative role in its development, rather than a negative, mitigating view of change, which is encompassed in the notion of "maintenance"'
(Raxworthy 2013: 193).

The results of our field research depict evolving conflicts between hardscape and spontaneous growth over time thus highlighting many frequently occurring points of weakness and vulnerability. The most common conflicts involve the growth of spontaneous urban vegetation directly onto hardscapes and the encroachment of existing plantings over surrounding structures.

The reduced budgets available for maintenance operations (Kühn 2006: 58) force landscape architects to focus more on the maintainability of their projects in the design and detailing phase of the project. This process should aim to predict points of weakness and vulnerability, and focus on optimising or resolving these. Management and maintenance strategies also need to consider the long term guiding image of the design. Insufficient maintenance leads to the development of successive stages of spontaneous vegetation which can become damaging over time as more aggressive, woody plants establish. Effective maintenance relies on the regular removal of potentially damaging, or particularly resilient root systems at regular intervals before they can establish. Integrated control strategies should focus on preventive measures in the design and detailing phase as well as remedial maintenance measures such as brushing or flaming during occupancy (Boonen et al. 2012: 12). Alternatively, a long term guiding image of the design allowing for the growth of spontaneous vegetation may be pursued. The necessary budget for

long-term maintenance of the project should be secured in advance as part of lifecycle management.

The field research forming the basis for this study demonstrates how the monitoring of the development of built works over time allows for continuous learning through an improved understanding of design, detailing, and material performance through time. Observation and analysis of project development allows for increased opportunities to carry out alterations before damage or more significant failure can arise. The findings need to be fed back to the profession, thus providing practitioners with a tool for forecasting points of weakness and vulnerability, informing judgments on future projects and avoiding repeated failure.

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Merging Practice and Science to Improve Biodiversity in the Planting Design of Public Green Spaces

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ABSTRACT

The Landscape Biodiversity Planning & Design System (LBPDS) is a method of quantitative measurement of potential biodiversity that allows the development of detailed estimates of the performance of design solutions in terms of biodiversity benefits. In this research we tested the applicability of the LBPDS to the design of public green spaces of the city of Porto, Portugal. The methodology implied: 1) Assessment of local ecosystem attributes; 2) Calibration of LBPDS scoring system; 3) Measurement of existing relevant benchmark LBPDS scores; 4) Measurement of alternative master plan scenarios. An area of oak forest was selected as reference habitat to calibrate LBPDS indicators that were then applied to a public garden, to calculate the existing Landscape Biodiversity Index (LBI) score. Subsequently, a planting design project was developed aiming at promoting biodiversity and increasing the LBI score originally obtained. The planting strategies outlined in the project allowed an increase in the LBI score from 1.82 to 2.32, which corresponds to an increase in biodiversity potential of more than 25%. The LBPDS proved to be of great potential for analysis and planting design in Landscape Architecture by enabling to test different hypotheses for better integration of biodiversity into design and planning.

INTRODUCTION

Climate change, habitat loss and fragmentation and many other drivers of change increasingly point out to a shift in biodiversity conservation strategies around the world. Within this context, landscape design and planning paradigms also need to change, and instead of focusing solely on minimizing impacts on protected species and fragile ecosystems, they should be more wide-ranging and aim to boost biodiversity and to promote interaction between urban population and the natural environment.

A public space design with ecological concerns (ecological design), can contribute not only to protect, but also to improve local ecology and biodiversity, especially in an urban context. The main goals of eco-design are to create adaptive, resilient, self-regulating and self-renewing landscapes, maintaining the *status quo* for the future generations and improving the biological integrity of existing conditions (Rottle & Yocom, 2010). In order to do so, it relies largely on Habitat Design, that is, on the creation of dynamic communities of flora and fauna whose interaction will develop over time (Gilbert, 1998).

Urban public parks and gardens are the urban green space where the encounter and interaction between man and nature are most effective. Simultaneously, they can also be one of the types of green spaces with greater species richness (Qiu et al., 2013), wherein it is mostly composed of exotic species, especially regarding the flora. As for the effects of the multiplication of exotic flora, several studies have shown contradictory results. Most tend to conclude that the introduction of these species contributes to the impoverishment of ecological integrity and to a “biotic homogenization” (Lockwood and McKinney, 2001). Others state that most of these species have a neutral effect on the native

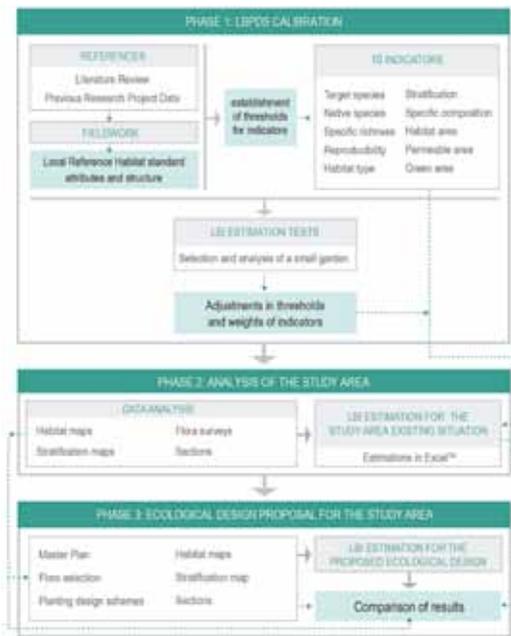


Figure 1: Methodology.

ecosystems they inhabit and, in some cases, may play important social and ecological functions (Standish et al., 2013; Hobbs, Higgs and Hall, 2013), referring, in this case, to the “Novel Urban Ecosystems” in which combinations of native and exotic species emerge as opportunities to adapt to global changes. These factors compel us to look at urban parks as central points of high specific richness and to recognize the remarkable component of exotic species in terms of floristic diversity.

Specific richness and specific habitat qualities seems thus to be influenced both negatively and positively by the presence and diversity of exotic species. However, the use of native species seems to promote more complex faunal communities (Farinha-Marques et al., 2011).

Landscape Biodiversity Planning & Design System (LBPDS)

In order to encourage a better link between urban biodiversity and the native biodiversity surrounding cities and to seek strategies for the protection and improvement of local ecology, AECOM¹ has developed the Landscape

Biodiversity Planning & Design System (LBPDS) as a method of quantitative estimation of biodiversity potential, by estimating the value of Landscape Biodiversity Index (LBI). According to Brown et al. (2013), through this system it is possible to assess the biodiversity of a given area in a quantitative way using a reference model ecosystem or habitat with native biodiversity. Such estimates allow the development of detailed performance assessments of distinct design solutions in terms of biodiversity improvement.

Although, as mentioned, the exotic biodiversity can provide ecological benefits, this system was not designed in order to measure the biodiversity in terms of maximizing the species richness. The essential principle for the application of LBPDS is that the biodiversity of a planned landscape is estimated comparing to a local reference ecosystem with native biodiversity. This reference ecosystem / habitat functions as a “buffer” corresponding to the maximum LBI value (= 5). The greater the similarity of the area of intervention to this ecosystem or habitat in terms of its structure and pattern, the higher will be its LBI. This idea implies that ecosystems with high specific richness may or may not achieve a high LBI value depending on whether their biodiversity is a native or exotic biodiversity. For this reason, it is common for an urban green space to point to a LBI value considered low, usually between 0 and 2 (Brown et al., 2013), because in these spaces may predominate species of exotic flora and artificialized areas.

From a regional calibration, regarding local ecosystems, it is possible to apply the system throughout a whole biogeographic region without the need to change parameters and thresholds’, meaning the system is fit to compare the performance of several design alternatives with respect to the biodiversity boost effect.

The aim of this research was to

ATTRIBUTE	INDICATORS	METHODS	ASSESSMENTS
Habitat Priority	Target species	% target species	 Native species characteristic of local ecosystems are valued, i.e., species identified in the reference habitat. The higher the value of the ratio between the number of target species, if they exist in the study area, and the total number of species, the greater the similarity to the reference habitat, and therefore the higher the value of the LBI.
	Native species	% native species	 Native species are expected to be more adapted to disturbance patterns and enable the provision of ecological services in the near or immediate future, unlike alien species. The higher the value of the ratio between the number of native species (whether these are target species or not) and the total number of species, the higher the LBI.
	Specific richness	total # species	 LBPDS was not designed to measure biodiversity in terms of maximization of total specific richness, however, it is assumed that floristic diversity, whether native or exotic, contributes to the promotion of biodiversity. Thus, the lower the specific richness of the intervention area, the lower the LBI.
	Reproducibility	# years required	 In ecology, the term reproducibility refers to the possibility of quickly reestablishing a community or ecosystem after disturbance, without any noticeable changes. Thus, habitats with low reproducibility, that is, those that need more time to reach a degree of composition and structure similar to the reference habitat, will have a lower LBI.
Habitat Diversity	Habitat type	general category of habitat	 Each habitat of the intervention area is assigned a urban habitat category (UHC), according to the adopted habitat mapping methodology. All habitats, even artificial ones, should be placed in a habitat category, and the closer to the UHC of the reference habitat in terms of structure and composition, the greater the LBI value of the habitats under analysis.
Habitat Quality	Stratification	# existing strata	 Whether the vegetation existing in a given habitat is native or exotic, the system assumes the importance of stratification for native biodiversity. The percentage of plant strata in the intervention area is determined in relation to those of the reference habitat, and the higher this percentage, the higher the LBI value.
	Specific composition	% target species in each stratum	 Similarly to the indicator "target species", the ratio between the number of target species and the total number of species is calculated, but in this case for each stratum. Again, the higher this ratio, the higher the LBI.
Habitat Dimension	Habitat area	habitat area (m ²)	 The greater the habitat area, the greater the core area and, consequently, the higher the LBI value. Taking into account the subjectivity of this indicator, the thresholds are calibrated based on local ecological characteristics, such as target species needs, or key variables observed in the reference habitat.
Percentage Non-Artificial Area	Permeable area	% permeable area	 Percentage of permeable area in relation to the impervious area of the entire intervention area. The higher this percentage, the higher the resulting LBI.
	Green area	% green area (permeable area + phanerophyte cover)	 Percentage of green area (permeable + phanerophyte covered area) in relation to the impervious area of the entire intervention area. Also, the higher this percentage, the higher the resulting LBI.

Figure 2: Attributes and indicators of LBI adapted to the study area (Source: Brown et al., 2013).

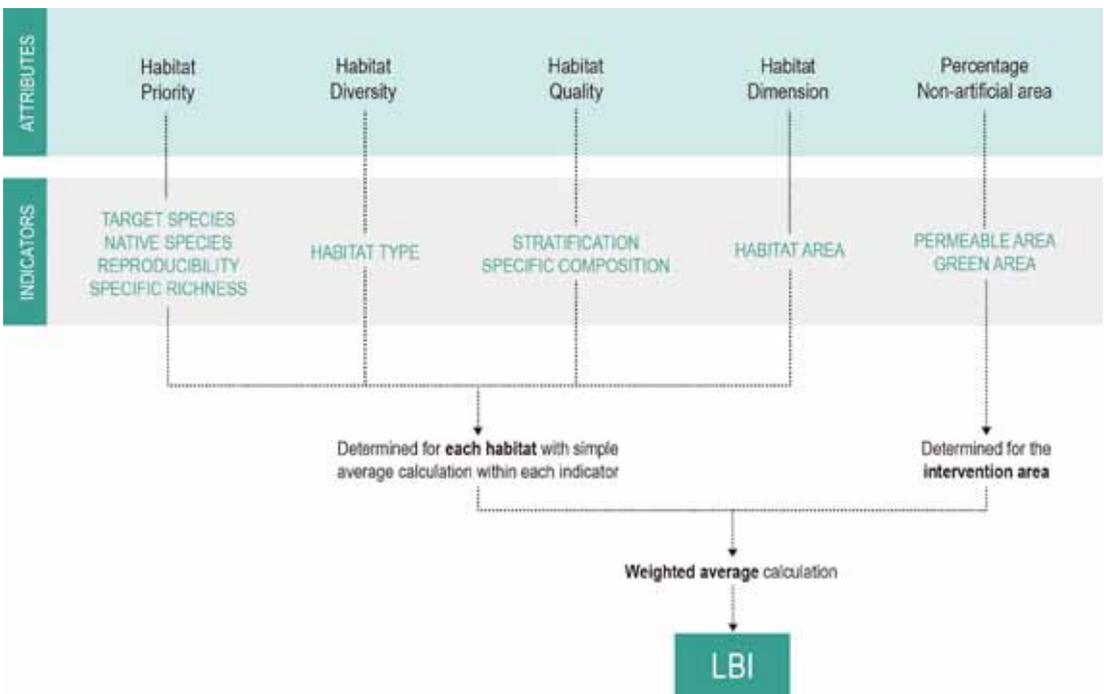


Figure 3: LBI estimation process.

test the applicability of the LBPDS in an edaphoclimatic Mediterranean / Atlantic transition context using as a case study the requalification of a garden in the city of Porto, Portugal.

MATERIAL AND METHODS

The implementation of the LBPDS involves seven distinct phases of application (Brown, 2013), some optional. However, considering several factors such as the characteristics of the study area and the exploratory character of this work, it was developed in three phases (figure 1) that summarize (1)

LBPDS calibration for the biogeographic region; (2) analysis of the study area and estimation of the LBI value for the existing situation (3) ecological design proposal for the garden and estimation of the LBI value for the proposed situation.

The first phase consisted in calibrating the LBPDS to the local ecology through: 1) Selection and mapping of a natural reference habitat, from which target species were identified, and other structural characteristics such as stratification and specific composition; 2) Establishment of thresholds for LBI indicators, based on the priorities previously established, data selected from the literature, values obtained in the framework of a previous urban biodiversity research project (FCTC: PTDC/AUR-UR/104044/2008) and from key attributes observed in the reference habitat.

For this research a total of 10 indicators were selected, some of them adopted from the original model, others adapted to the context of the intervention area and the existing databases. These indicators are divided into five attributes which fall into three

categories (figure 2).

In the second phase of the study, before proceeding to the application of the model in the study area, a small garden was tested in order to assess and adjust some values. The data on habitat types, stratification and specific richness of flora and fauna in the study area collected in the scope of the project mentioned above were analyzed; and the already calibrated model was applied in order to calculate the LBI for the existing situation. This score was performed by analyzing the AutoCAD™ databases and Excel™ sheet estimations.

Each indicator was analyzed for each habitat (Farinha-Marques, 2017), except the indicators of the attribute “Percentage Non-Artificial Area” (figure 3) that were determined for the intervention area. The average of the values obtained was then calculated; first within each indicator (i.e. between habitats) and secondly between indicators by a weighted average. The result of this weighted average constitutes the LBI value of the study area. The weight of each of the indicators was determined based on project priorities.

INDICATORS AND THEIR THRESHOLDS FOR LANDSCAPE BIODIVERSITY INDEX (LBI) ESTIMATION									
ATTRIBUTES	INDICATORS	Weight (%)	Score 1	Score 2	Score 3	Score 4			
			Score 1	Score 2	Score 3	Score 4			
1	Habitat Priorities	Target species	15	0 - 5 (0-19%)	Percentage of species in the intervention area in relation to the species surveyed in the reference habitat 0 - 11 (0-30%)	12 - 16 (40-50%)	17 - 22 (66-79%)	23 - 28 (80-100%)	
		Endemism	10	0-19%	Calculation: number of native species / total number of species (flora). Not only the target species are considered.	20-30%	40-50%	60-79%	80-100%
		Specific richness	15	0 - 5 (0-19%)	Number of existing species (not necessarily target species). Considering the ref habitat with spp = 20	6 - 11 (0-30%)	12 - 16 (40-50%)	17 - 22 (66-79%)	>23 (80%)
		Reproducibility	5	>30 years	An Atlantic oak habitat will take 30-40 years (ideally) to reach the development stage in which it was mapped.	20-29 years	10-19 years	5-9 years	<5 years
2	Diversity of habitats	Habitat type	10	all categories SPV	all categories ADE with vegetation and all HER	all TRV except FFHDEC, FFHDECENR and FFHDECOCN	FFHDECENR and FFHDECOCN	FFHDEC	
		Stratification	10	0 layers	Quantity of existing plant layers	1 layer	2 layers	3 layers	4 layers
3	Habitat quality	Stratification	10	0 species	Based on the larger species in each layer. It is assigned a score to each of the four and then calculated the average of these values. Tree Layer (FFHCPN): 0 = 10m	1 species	2 species	3 species	4 (100%)
		Specific composition	10	0 species	Sub Tree Layer (TRV, MPH): 0.8 x 0.8 x 3 m	1 to 2 species	2 to 4 species	5 to 8 species	7 (100%)
		Specific composition	10	0 species	Shrub Layer (LPH, SCH): 0.25 x 0.5 x 0.8 m	1 to 2 species	3 to 5 species	6 to 8 species	8 (100%)
4	Dispersion and shape of habitat	Habitat area (metric unit)	5	0 species	Herbaceous Layer (all categories HER)	1 to 2 species	3 to 5 species	6 to 8 species	8 (100%)
		Permeable area (percentage)	10	0-19%	Measurement of the habitat area in relation to the reference habitat (2200 m ²). Artificial habitats are always classified with LBI = 1.	470 to 620 m ²	640 to 800 m ²	1430 to 1670 m ²	>1670 m ²
5	Percentage area (landscape)	Permeable area (percentage)	10	0-19%	Measurement of the permeable area in relation to the impermeable area (pavements and built structures), and calculation of its percentage.	20-30%	40-50%	60-79%	80-100%
		Green area (percentage)	10	0-19%	Measurement of the green area (permeable + trees and shrubs crown diameter) in relation to the impermeable area and calculation of its percentage.	20-30%	40-50%	60-79%	80-100%

Figure 4: Final result of the LBPDS calibration, with thresholds and weights assigned to each indicator.

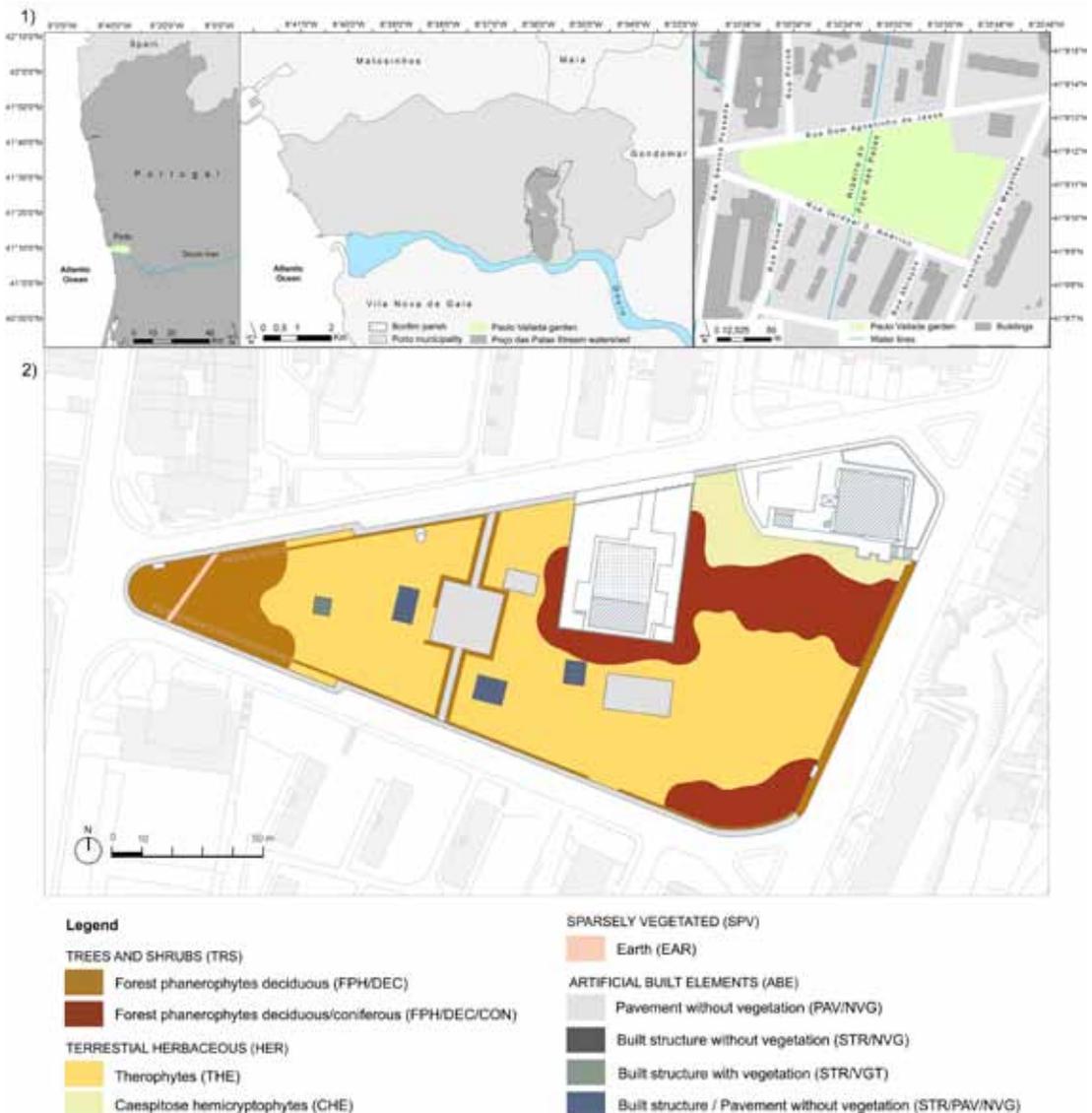


Figure 5: 1) Location of Paulo Vallada garden, in the city of Porto. 2) Map of habitats.

In the third phase, a design proposal was developed for the study area, based on ecological design and habitat creation principles. The LBI value of the new design was subsequently estimated and compared to the value of the existing situation.

RESULTS AND DISCUSSION

LBPDS Calibration

In biogeographic terms, the intervention area is located in the Douro Litoral and Cantabro-Atlantic province (Costa et al., 1998), which is

characterized by the natural distribution of *Quercus robur*. These oak forests are the repository of a high floristic and faunistic biodiversity, with numerous rare species and occasionally even endangered ones. An oak forest with approximately 1 ha, located in the Couce valley (a Natura 2000 Network area), Porto Metropolitan Area, was selected.

This oak forest was mapped and inventoried, enabling to identify several species as common oak (*Quercus robur*), plymouth pear (*Pyrus cordata*), the green olive tree (*Phillyrea*

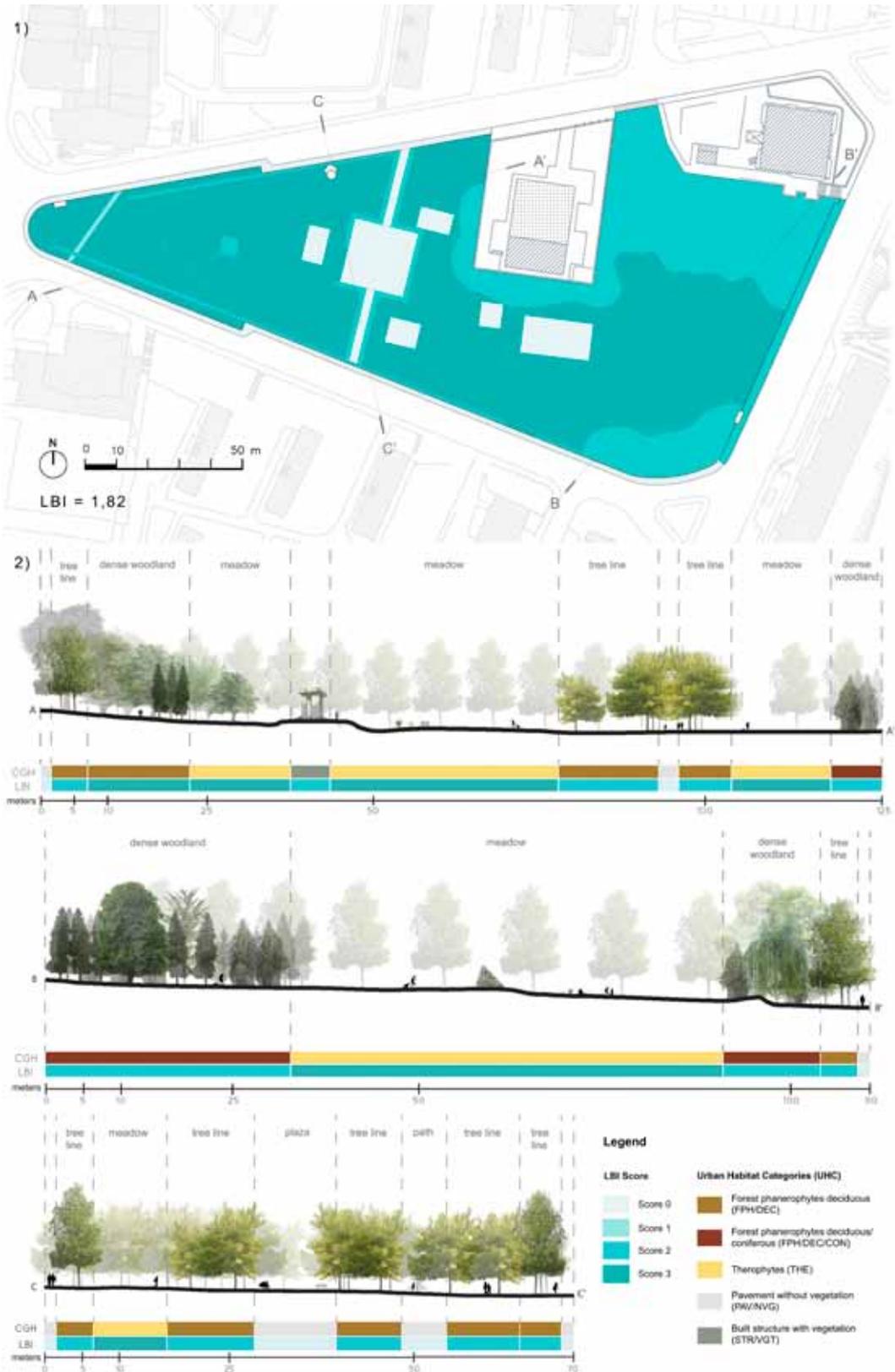


Figure 6: LBI scores of the existing habitats of Paulo Vallada garden: 1) Map of habitats. 2) Sections AA', BB' and CC'.



Figure 7: 1) Master plan of the proposal for Paulo Vallada garden. 2) Map of the proposed habitats.

latifolia), black alder (*Frangula alnus*), hawthorn (*Crataegus monogyna*), arbutus (*Arbutus unedo*), molar heather (*Erica arborea*), honeysuckle (*Lonicera periclymenum*), common smilax (*Smilax aspera*), anemone (*Anemone trifolia* subsp. *albida*) and elegant male-fern (*Dryopteris affinis*). In total, the selected reference habitat comprises 29 plant species, which is the target number for the 'target species' indicator.

For each indicator, 5 thresholds corresponding to the LBI scores of 1 to 5 were determined. For example, for the target species indicator, 29 is the number corresponding to the target priority and thus the LBI = 5. As the number of these species in the intervention area diminish, the LBI value also decreases. For most indicators,

which are estimated by percentages, the thresholds have been established across equal parts over the 5 LBI values, which means an approximate value of 20% for each threshold. All artificialized habitats, like pavements and built structures without vegetation, always receive zero marks on all indicators (figure 4).

LBI for Paulo Vallada garden - Existing Situation

Paulo Vallada garden is located in Porto city center (figure 5). It has a triangular shape and approximately 1.57 ha registering a high permeable area percentage of 99%. It consists essentially of short irrigated meadows for recreation and dominated by annual plants (therophytes). This habitat



Figure 8: LBI scores of the proposed habitats of Paulo Vallada garden. 1) Map of habitats. 2) Sections AA', BB' and CC'.

occupies about 0.87 ha, equivalent to more than half of the total area. In spite of the reduced stratification, it reveals an interesting specific richness value in the tree layer, due mainly to the mixed deciduous and conifers woods (*Fagus sylvatica* 'Laciniata', *Aesculus hippocastanum*, *Sophora japonica*, *Acer pseudoplatanus*, *Ginkgo biloba*, *Chamaecyparis pisifera*, *Juniperus oxycedrus*, *Cedrus libani*, among others).

The application of the LBI estimation methodology to the existing Paulo Vallada garden situation resulted in a value of 1.82 (figure 6). This seems reasonable considering: the absence of target species; the high presence of exotic species; low specific richness in most habitats; the reduced stratification of present habitats; the reduced diversification of habitats. The factors favoring LBI were the number of habitats dominated by species of deciduous forest phanerophytes, and the high permeable and green area percentage, both close to 100%.

Ecological Design Proposal for Paulo Vallada garden

The design proposal (figure 7) seeks to value both ecological and social dimensions, with the main purpose of combining recreation and access to nature opportunities. Special emphasis was given on the design of new habitats that resemble, in terms of composition and structure, the reference habitat or other natural and semi-natural habitats of northwestern Portugal mainland. General ecological design guidelines that could contribute to improve LBI scores were also considered.

An organic layout was chosen, preserving a large part of the tree cover. The space remains structured in two large recreational clearings with mixtures of native grasses adapted to the local edaphoclimatic conditions. Overall, it was preferred to combine stratification and composition, through

the design of multi-layer edges and mixed borders. The tree layer was reinforced with native deciduous species; many identified in the reference habitat or associated with natural oak forests (*Quercus robur*, *Pyrus cordata*, *Quercus suber*, *Acer pseudoplatanus*, *Prunus avium*). The central area of the garden was emphasized with a lake by proposing the renaturalization of an existing section of the Poço das Patas stream. In the lakeshore it was proposed a riparian forest inspired by the natural wetland habitats of *Alnus glutinosa*.

Regarding the new designed habitats, there is a clear prevalence of deciduous forest phanerophytes (FPH/DEC), in different arrangements: dense forest, sparse forest, riparian forest. Habitats of this category, even if not dominated by native vegetation and / or target species, are the closest to the reference habitat in terms of structure and / or composition, contributing to a LBI improvement. Also habitats of caespitose hemicryptophytes (CHE), corresponding to recreational meadows, contribute to a higher LBI value. Some habitats of low phanerophytes (LPH), mostly perennial, correspond to the mixed borders (shrub and subshrub strata) and the multi-layer edge habitats are constituted by hydrophytes (HYD) and helophytes (HEL).

LBI Estimation of Paulo Vallada garden - Proposal

The new design allowed an increase in the LBI from 1.82 to 2.32, which corresponds to an increase in biodiversity potential of more than 25% (figure 8). The fact that this value surpassed a score of 2, which is a very rarely achieved result in urban areas (Brown et al., 2013), surpassed the initial expectations. This increase in LBI is due to several factors taken into account when drawing up this proposal for an ecological design, namely:

- 1) Prioritization of target species

at the level of species selection. The planting design scheme proposed for the alternative scenario comprises, in total, 22 of the 29 species of the reference habitat, and each habitat presents an average of 2 target species. The percentage of native species increased from 47% to 91%. The average percentage of native species within each habitat rose from 35% to 56%;

- 2) A much higher specific richness (45% improvement) compared to habitats mapped in the existing situation.
- 3) The bid on the stratification. 15% of new habitats support 4 layers, while in the existing situation none of the habitats exceeds two layers (herbaceous and / or trees);
- 4) The preservation of a high percentage of permeable area and green area.

CONCLUSIONS

The LBPDS is a biodiversity assessment method of great potential within Landscape Architecture, as it allows the development of design alternatives in order to test different hypotheses and establish new strategies and good practices for a better integration of biodiversity.

Despite the recognized qualities as the valorization of native species and the protection of rare species; the possibility to explore the aesthetic potential of lesser-used native species; the opportunity for people to easily access and interact with the natural heritage, in particular to oaks and landscapes with good ecological integrity; the enhancement of connectivity thus contributing to the city resilience, some aspects of LBPDS deserve further consideration in order to make the model more expeditious.

Among those aspects one can mention: the difficulty of establishing a reference habitat when the landscape is already deeply altered; the difficult calibration of some indicators; the challenge of incorporating the social component in particular because all built structures substantially reduce the value of LBI; the devaluation of certain habitats such as aquatic habitats which are essential to the promotion of biodiversity; the devaluation of exotic species, although indicators such as the specific richness make possible the inclusion of these species within the LBPDS.

In addition, the inclusion of other indicators not explored in this research would strengthen the model. Depending on local characteristics and priorities, it is recommended that biodiversity strategies should be calibrated within a broader view emphasizing other ecosystem service benefits such as carbon sequestration, water quality improvement, mitigation of the urban heat island effect, or other sociocultural benefits.

The most ambitious challenge is to evolve from a small and medium scale and apply this model on a large scale, that is, to move from the study of individual spaces to the study of networks of green spaces or even the urban green structure. In this way, it will be possible to better understand the matrix and to promote ecological connectivity and integrity along a metropolitan area, as well as its relation with the rural and natural landscapes that are within it and / or in the vicinity.

The fact that the LBPDS has been calibrated on the basis of only a mesotrophic oak forest reference habitat in this work contributes to a slight devaluation of other important natural and semi-natural habitats such as riparian forests and aquatic habitats. In this way, it should be emphasized that it is not only the similarity of the study area to the reference habitat that dictates the potential of biodiversity in a

given scenario. Other types of habitats, as well as other strategic measures such as the maintenance of organic matter in the soil and the construction of dry stone walls also contribute to a biodiversity promotion.

NOTES

¹ AECOM - Architecture, Engineering, Consulting, Operations & Maintenance

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INTRODUCTION

Attractive, Climate-Adapted and Sustainable? Public Perception of Non-Native Planting in the Designed Urban Landscape

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climate change; urban green infrastructure; cultural relevance; non-native species; public perception

ABSTRACT

Throughout Europe climate change has rendered many plant species used in contemporary planting design less fit for use in public greenspaces. A growing evidence base exists for the ecological value of introducing non-native species, yet urban policy and practice guidance continues to portray non-native species negatively. There is a lack of research focusing on the cultural relevance of non-native species in the urban landscape. To address this we surveyed 1411 members of the UK public who walked through designed and semi-natural planting of three levels of visual nativeness, whilst completing a site-based questionnaire. Semi-structured interviews were carried out with 34 questionnaire participants. Respondents recognised the three broad levels of nativeness. A majority (58%) of our respondents would be happy to see more non-native planting in UK public spaces, rising to 75 % if it were better adapted to a changing climate than existing vegetation. Acceptance and rejection of non-native planting was driven by *aesthetics*; *locational context*; *historic factors and inevitability*; and *perceptions of invasiveness and incompatibility with native wildlife*. In the context of a changing climate, focus should be placed on the potentially positive role of non-invasive, climate-adapted, aesthetically pleasing species within urban planting schemes as these could be well-received by the public.

In much of contemporary urban policy non-native plant species are presented as being of little value or even harmful. This perspective feeds an overriding presumption within many planners and landscape professionals that the sustainable urban green infrastructure of the twenty first century should consist exclusively of native planting (Davis et al. 2011; Hitchmough, 2011). Policy guidance such as BREEAM UK New Construction non-domestic buildings technical manual (2014) reinforces this stance, advocating the exclusive use of native plant species to 'minimise impact on existing site ecology'. The main argument used in defence of this position is the assumed invasiveness of all non-native exotic plant species yet many of the claims which drive this perception of the aggressive invasive alien are not backed by data (Davis et al., 2011). Within our own time climate change has already had a profound impact on the distribution of plant and animal species throughout the world, with species migrating as temperatures rise (Hickling, Roy, Hill, Fox & Thomas, 2006; Parmesan, 2006). Climate change will render some native species (such as *Betula pendula* in Southern England) increasingly poorly fitted. There is a need to incorporate new (non-native) species within designed urban landscapes with potential utility in terms of 'fitness' to this warming climate. This raises questions of what is culturally acceptable (Hitchmough, 2011.) To date however there appear to be few studies that have examined how important notions of nativeness in landscape planting are to European citizens. An issue central to this is the capacity of lay people to distinguish between native and non-native plants in practice in the landscape. Alien plants have been important in European culture for so long, that public understanding of what is native and non-native have often become very confused (Davis et



Figure 1: The Mediterranean Bank, Abbotsbury Subtropical Gardens.

al., 2011). The study discussed here focused on public reaction to actual woodland, shrub and herbaceous planting in designed urban landscapes composed of native and non-native plant species. (Hoyle, Hitchmough & Jorgensen, 2017). Participants walked through areas of planting characterised by one of three *species characters*: *strongly non-native*, *intermediate* or *strongly native*. We asked: 1) How accepting are people of non-native planting in the designed urban landscape? 2) Can people distinguish between native and non-native planting in these settings? 3) What are the key factors that drive acceptance and rejection of native and non-native planting in these settings? 4) Do these perceptions change when seen against a background of climate change?

MATERIALS AND METHODS

Specific case study sites (e.g. Figure 1) were selected to representing the three species characters: *strongly non-native*, *intermediate* and *strongly native*. Site users (n=1411) were guided to walk through planting at 31 sites throughout England whilst participating in a questionnaire survey. Statements referring to participants' aesthetic reactions to the planting

and the degree to which they found it restorative to walk through were used to identify the factors driving the acceptance and rejection of non-native species. Perception of familiarity with the planting was assessed to gauge whether people did in fact find planting in the category 'strongly native' the most familiar. The questionnaire also captured participants' beliefs about non-native species and climate change. A section focusing on the respondents' demographic characteristics was included. Semi-structured, in-depth interviews were then carried out with 34 of these original questionnaire participants.

RESULTS AND DISCUSSION

How accepting are people of non-native planting in the designed urban landscape?

Before considering the implications of climate change, 58% of our large sample of questionnaire participants (n=1411) agreed or agreed strongly that they would accept more non-native plant species in UK parks and gardens. This shows that in contrast to the strong nativism paradigm which persists in current policy and practice guidance on biodiversity management, most people in our study



Figure 2: Native woodland, Fairlands Valley Park

saw a role for non-native species in public places.

Can people distinguish between native and non-native species in these settings?

We chose sites to represent three broad levels of ‘visual nativeness’. Our participants recognised these three levels. Strongly native and intermediate planting were associated with a significantly higher level of perceived native biodiversity than strongly non-native planting. Participants in a Swedish study (Qiu et al., 2013) engaged with planting at a similarly broad scale, and also recognised differences in overall biodiversity between 4 visually distinctive habitat types. Earlier studies (Fuller et al. 2007; Dallimer et al. 2012) involved participants’ estimating specific numbers of different species of birds, butterflies and plants at a study location and generated conflicting evidence about people’s ability to assess biodiversity accurately. It may be that the public can perceive a general resolution of biodiversity or ‘nativeness’ but is less-equipped to identify ‘nativeness’ at a species-specific level. Although our participants recognised broad categories of ‘nativeness’, this was not a factor driving their perceptions of the attractiveness of

the planting. The view expressed by this interviewee was typical:

“No, no, I like plants for what they are..where they come from I don’t think really matters..”

What are the key factors that drive acceptance and rejection of native and non-native species in these settings?

Four key factors emerged as drivers of our participants’ reactions: i) aesthetics; ii) locational context in relation to existing planting and habitats; iii) historical factors and inevitability; and iv) perceptions of invasiveness and incompatibility with native wildlife.

Considering aesthetics, questionnaire data indicated that in the case of our participants, planting strongly non-native in character was perceived as significantly more colourful, attractive and interesting than planting of strongly native or intermediate character. In contrast, planting strongly native in character which forms the familiar background planting in public outdoor spaces in the UK such Fairlands Valley Park in Stevenage (Figure 2) was perceived as the least colourful, attractive and interesting of the three levels of species character, and associated with the



Figure 3: Eucalyptus grove, RHS Wisley

lowest perceived invertebrate suitability.

In the interviews, at the species-specific level, in the case of woodlands, four of the five interviewees who selected strongly non-native woodlands as potentially the most attractive to walk through chose the *Eucalyptus* grove (Figure 3). Interviewees appreciated the form of branches, bark and foliage, seeming to appreciate the eucalypts specifically because their appearance was unfamiliar:

“Indeed, and I think these tree shapes and these bark patterns and the way the light plays upon the bark... and through the foliage is absolutely beautiful.”

“This has got a strange...almost an eeriness about it...it’s just a bit different, isn’t it? It’s something we’re not accustomed to seeing, and I would find this interesting.”

The strongly non-native herbaceous planting that generated most comment in the interviews was the Mediterranean Bank (Figure. 1). Several interviewees expressed the opinion that this was attractive, and appropriate for planting in UK public parks. For some UK residents it evoked positive memories of holidays spent in warmer climates:

“There are sort of hot things going on. It makes you think more of warmer climates. It would be nice to be in a climate where it was permanently... lovely and warm!”

These findings suggest that in urban environments in the UK, people actually find non-native species more attractive and interesting than native ones.

Locational context was another factor driving interviewee responses to non-native planting. Many responses seemed to involve implicit thoughts on the inappropriateness of non-native species to the English countryside, rather than within a designed urban context, as was suggested by the researcher. Some interviewees saw Mediterranean planting more suited to particular regions of the UK than others:

“I think we already see that in places like Cornwall. We do see that, which to me is fine in places like Cornwall and Tresco in the Isles of Scilly... Certainly I couldn’t see it in Scotland. I think in Sheffield it’d sort of be a bit of a step too far at the moment.”

Interviewees also demonstrated an awareness that historically plants had been brought into the UK from all over the world, and that many plants

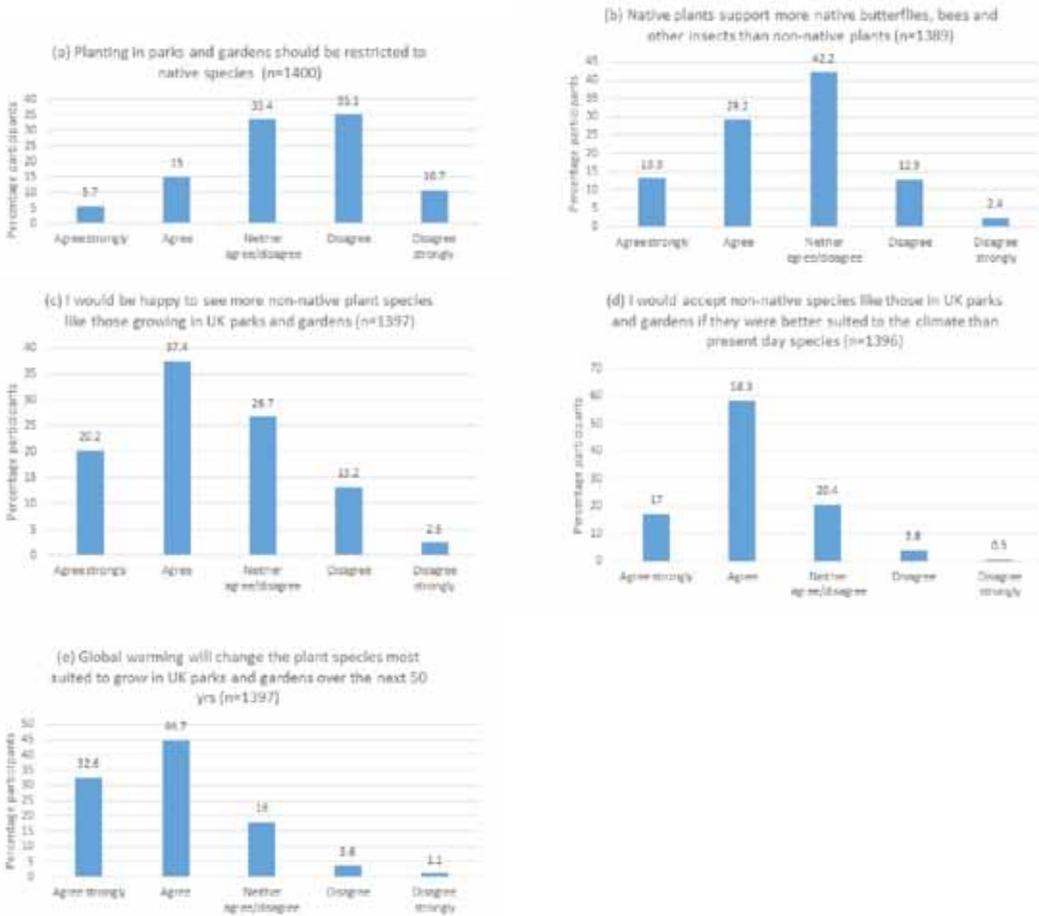


Figure 4: Questionnaire respondents' thoughts about non-native plant species and climate change

commonly considered 'native' have been imported:

"...it's been happening for hundreds of years. Victorian botanists went out and they collected everything they could find...and they brought it back and tried it. And some of what we term as our 'British' species are in fact imports from abroad."

Along with this awareness of historic context came an assumption of the inevitability of future migrations in an increasingly interconnected world:

"We've got loads of parakeets round our way now. It's just the way the world goes, with transport nowadays, everything can get round the world, and the same with seeds and plants, and course everyone brings them in."

Many interviewees who were positive about non-native planting

because it was attractive or climate-adapted still had reservations about its introduction in UK urban areas because of perceptions of invasiveness and concerns about incompatibility with native wildlife. In contrast, some demonstrated a heightened awareness of the compatibility of non-native plants and native wildlife:

"Insects like non – native plants as well, not just the natives. People always think, 'You've got to plant native plants', but you don't, because they are also attracted to non-native plants. There is an awful lot of misunderstanding. Yes, when I look at my own garden and I see the plants with butterflies and things on them, they're not always natives! I mean, wasn't buddleia introduced?"

A clear body of evidence now exists that invasiveness is not a fundamental property of non-native

plant species but rather a characteristic of both native and non-native species possessing certain ecological traits (Didham et al. 2005; Gurevitch & Padilla, 2004; Sagoff, 2005; Thomas & Palmer, 2015; Thompson et al. 2003). A growing minority within ecology now see hostility towards non-natives as a diversion from the real issue of maintaining diversity in ecosystems, a role towards which non-native species can make a positive contribution (Davis et al. 2011; Gleditsch & Carlo, 2010). Owen, (1991) and Smith, et al. (2006) have shown that non-native plant species are equally valuable as food sources for many native animals and more so in some cases than native species. Non-native plants can also provide specific benefits to native invertebrates such as the extension of pollen and nectar availability beyond the flowering season of native plant species (Salisbury et al. 2015).

Do these perceptions change when seen against a background of climate change?

Questionnaire evidence indicated an increase in acceptance of non-native species in UK parks and gardens from 58% to 75% when participants were asked if they would accept these species if they were better suited to the climate than present day species (Figure 4).

This indicates that most of our large sample of over 1400 members of the public was already aware of at least some of the ecological implications of climate change (Hickling, et al., 2006; Parmesan, 2006) and were able to understand the implications for plant species growing in urban public spaces. This is convincing evidence that climate change is a major driver of acceptance of non-native plant species. Amongst interviewees awareness of the implications of increased dryness for urban planting was heightened, with one interviewee describing the introduction of non-native species as

‘evolution in action’. Others expressed a clear preference for introducing climate-adapted planting:

“I think I’m more concerned that our parks and gardens are more sustainable, so we grow plants that grow happily and look after themselves, rather than having lots of bedding or stuff that needs loads of resources”

“We have to change our ideas... plant what would tolerate dryness”

CONCLUSIONS

Our work suggests that there is a schism between sustainable urban policy that sees a future involving only native plant species and what members of the public believe and value. Far from expressing hostility to non-native species, in a UK context most people appear to welcome the use of non-invasive non-native planting in urban public spaces, whilst at the same time having some understanding of the risks as well as the benefits. If key long-term goals of sustainable urban planting are to increase human well-being and to maximise support value for native animal biodiversity at a time of climate change, there is a need to reflect convincing scientific evidence and the beliefs and values of the urban citizen in a more nuanced urban landscape policy and practice.

ACKNOWLEDGEMENTS

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Analysis of Solar Access and Daylight in Outdoor Sites for Planting Design

PECHA KUCHA PAPER

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Keywords:

Planting design; Research-based design;
Sun-shade analysis; Optimal plant
growth; Human comfort, Climate change;
Sustainability

ABSTRACT

The Dequindre Cut¹ is a below-grade pathway, located on the east side of Detroit, Michigan. Much of the cut has been converted to a greenway in Phase 1 development and progress is being made towards phase 2 of this project. It is extensively being referred as the “Low-line” project, comparing it to the High line project of New York. As a part of the phase two of the project, greenway is to be designed for landscape planting plan. This study aims to analyze sun and shade to address the selection of plants within the gradually increasing grade separation and also comment on strategies for human comfort and optimal plant growth. To study this, 3d models of the site were simulated to evaluate solar illuminance through different seasons and time of the day. It was observed that the different site within the larger site context had different shading conditions. The results of this study can be used by designers, architects and planners to conclude research based design decisions for planting plans. Further, the methodology can be implemented to various other landscape planning and designing projects to address climate change and sustainability in their designs.

INTRODUCTION

Site background

Dequindre Cut has served as a passageway for freight trains to bring raw materials into the city, supporting the stove industry, food at the Eastern

Market, pharmaceuticals and other industries on or near the Detroit River for over 150 years. To avoid conflict with those using the surface streets, it sat 25 feet (7.6 meter) below grade, passing under major thoroughfares as Jefferson and Gratiot Avenues (Figure 1). As the landscape of the city changed, and various industries faltered, the businesses began disappearing, and so did the freight shipments along the cut. The use of the cut for rail service ended in the late 1970s. And there it sat — a two-mile (3.2 km) “trench” within a mile of downtown, yet abandoned and threatening.

The Cut is among the most transformative pathway projects in the country and is part of the plan for a 26-mile (41.8 km) Inner Circle Greenway, which will encircle the city, connecting neighborhoods and their residents to the most treasured community assets (Figure 2). The Dequindre Cut is crucial for future developments, which rests on reclaiming and reanimating the past abandoned spaces for a beautiful tomorrow.

Solar and daylight

Plants are as much a part of the architectural design of today’s exterior design as are lighting and furniture². The types of plants and the lighting conditions of each space should be evaluated at an early stage of the design process. There is a huge amount of plant loss each year in many landscape projects due to factors such as the quality of soil, water, drainage, planters, lighting systems and available daylight. The dynamic nature of daylight, throughout the day and throughout the year, poses numerous challenges when designing for outdoor planting plan for efficient growth while maintaining a comfortable environment for people.

Climate Consultant 6.0

Climate Consultant³ is a simple to use, graphic-based computer

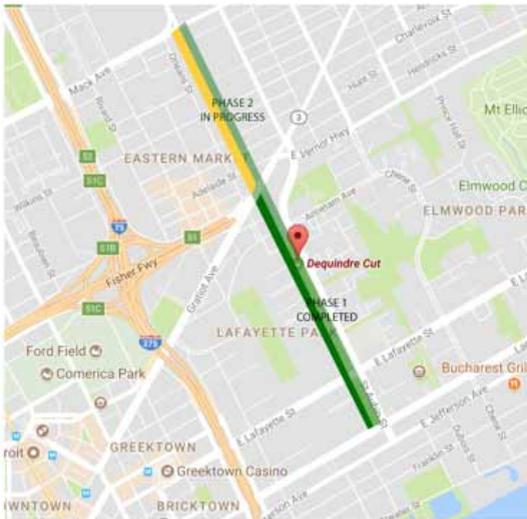


Figure 1. Site location of Dequindre Cut, Detroit. Source: Google maps



Figure 2. Site photograph of Dequindre Cut, Detroit looking South-east. Source: Google images

program that helps architects, builders, contractor, homeowners, and students understand their local climate. It uses annual 8760 hour EPW format climate data that is made available at no cost by the Department of Energy for thousands of weather stations around the world. Climate Consultant translates this raw climate data into dozens of meaningful graphic displays. The goal is to help users create more energy efficient, more sustainable buildings, each of which is uniquely designed for its particular spot on our planet⁴.

Solar Radiation

The average monthly solar radiation level in Detroit, MI is 4.26 kilowatt hours per square meter per day (kWh/m²/day)⁵. See Figure 3 for

monthly comparisons. The illumination⁶ range for Detroit was extracted from climate consultant. Further, overlaid with optimum plant growth band to indicate the amount of lux required for plants to grow.

On a clear summer day, the sun gives off something close to 32,000-100,000 lux in the direct sun. This is relative to where you are located on a longitudinal axis. The closer you are to the equator, the more direct sun the plants are getting. Full-sun plants usually need at least 25,000 to 50,000 lux to do well, with increased productivity occurring when light levels are near full sunlight⁷.

METHODS

Building 3d model of the site

The 3d model of the Dequindre cut site was build using photogrammetry modeling software. Aerial images were taken for 900 m section of the cut, extending from Mack Avenue to Gratiot Avenue using a drone (Figure 4 and 5). This method will ensure to pick up most recent shading objects of the site. Likewise a 3d model can be generating using architectural modeling softwares including AutoCAD, Infracworks and Rhinoceros.

Sun shade analysis

This model was imported into Ecotect analysis software⁸ and analyzed for hourly shadows range for Detroit weather file.

The simulations show that area 2 of the corridor is much more shaded than the area 1 (Figure 6 and 7). So, plants selection of the two areas has to comply with the sun and shade. To further quantify the number of sun and shade hours, sun shading charts were obtained from the Climate Consultant 6.0 for following 3 conditions for summer and fall months i.e. June 21 to December 21:

1. No obstruction
2. Small tree obstruction (Area 1) , height 6m



Figure 3. Illumination range for the site in lux, pink bar indicates the lux requirement for optimal plant growth. Source: Climate Consultant 6.0

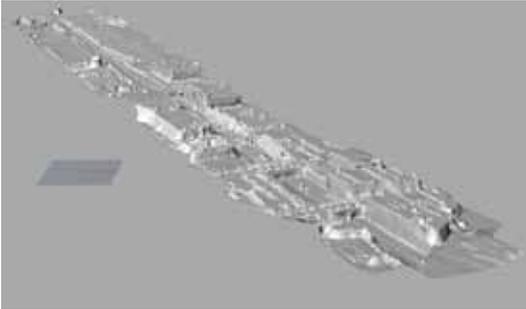


Figure 4. Simulated 3d model of the corridor using photogrammetry as seen in Rhinoceros. Source: Climate Consultant 6.0

3. Neighboring obstacle (Area 2), height 40m

The charts show the number of shaded hours in a day for that particular area Figure 8, 9 and 10. When there is no obstruction, the area is exposed to full sun. In Area 1, there are 4 small trees of height 6m in ENE, E, ESE and SE directions casting shadows for approximately 3 hours. In Area 2, there are neighboring obstructions which are 40m high on ENE, E, ESE, S, SSW, SW, and W directions. This leaves with only 1 hour of sun in this area.

Equipment required: Computer system, AutoCAD, Autodesk Infraworks, Lumion, Ecotect Analysis, Lightscape software, Climate Consultant 6.0, Printer
Strategies for comfort

Climate consultant also suggests the best set of design strategies for human comfort through Psychrometric chart. (Figure 11). This information can be used to come up with sustainable designs for buildings and environment conditions.

The Psychrometric Chart is an



Figure 5. Aerial Image of the cut
Source: Drone imagery

example of how different attributes of the climate can be displayed concurrently to show if humans will be comfortable in spaces with these characteristics. More importantly it can also be used to show how to design buildings envelopes that can modify or filter these external climate conditions to create comfortable indoor environments.

RESULTS

The result can be summarized as to classify the shading pattern to be⁹:

Full sun – 6 plus hours

Part sun – 4-5 hours of sun

Part shade – 2-3 hours of sun

Full shade – less than 1 hour of sun

Based on this, Area 1 falls under Full sun classification with more than 6 hours of sun. And Area 2 falls under Full shade classification with less than 1 hour of sun.

APPLICATIONS

The methodology can be implemented to various other landscape planning and

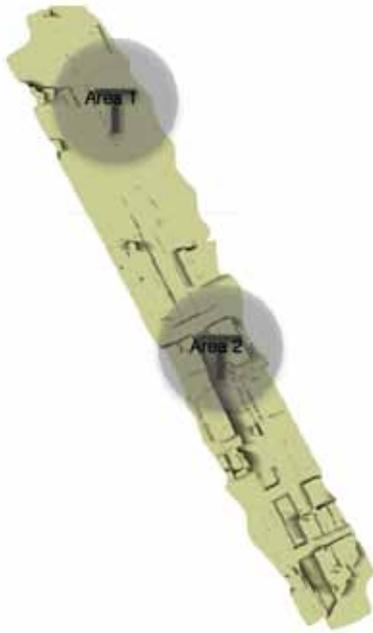


Figure 6. Shadow range as obtained for Ecotect analysis. Source: Ecotect analysis

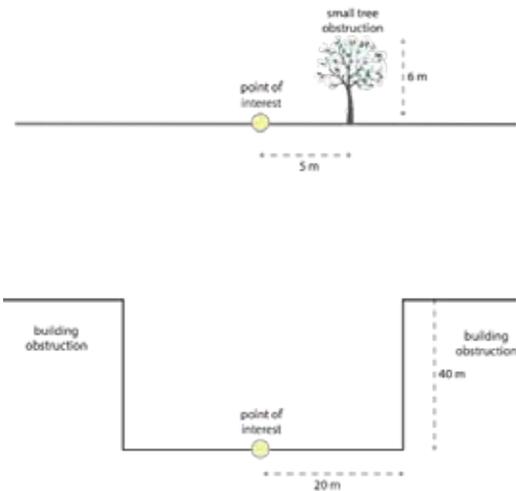


Figure 7. Section view of the Area 1 (top) and Area 2 (bottom). Source: Survey

designing projects to address climate change and sustainability in their designs.

This study will help to answer questions like, What is good daylighting design and what is bad daylighting design? What strategies and approaches can lead to good daylighting designs, and what issues should a designer be concerned about? When during an architectural design process should daylighting

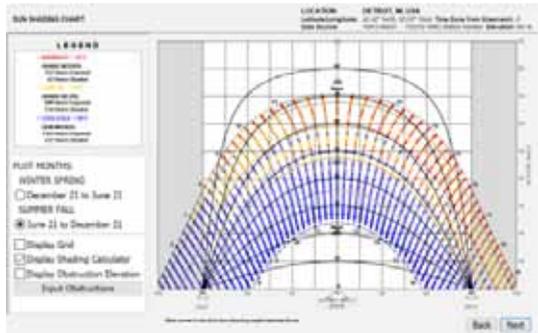


Figure 8. Sun shading chart when there is no obstruction. Climate file is of Detroit, MI, USA. Source: Climate Consultant 6.0

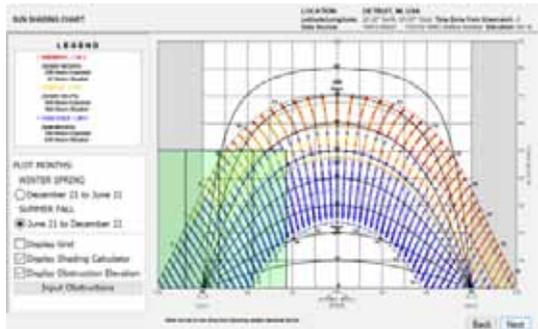


Figure 9. Sun shading chart of Area 1, with four small trees of height 6m as obstruction. Climate file is of Detroit, MI, USA. Source: Climate Consultant 6.0

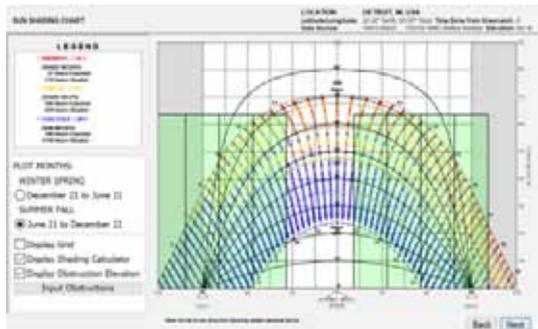


Figure 10. Sun shading chart of Area 2, with buildings of height 40m as obstruction. Climate file is of Detroit, MI, USA. Source: Climate Consultant 6.0

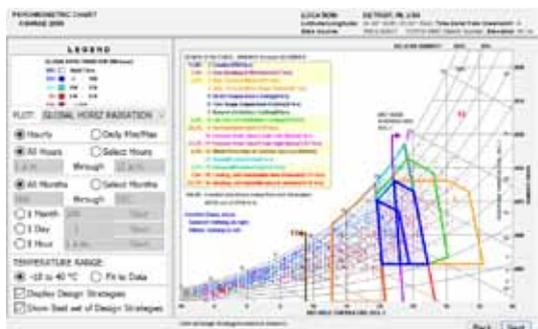


Figure 11. Psychrometric Chart for best design strategies. Climate file is of Detroit, MI, USA. Source: Climate Consultant 6.0

be considered? How can a designer best integrate daylighting design into the architectural design process? How can an architect design for good daylighting: that is, what design and analysis tools and “daylight” products are available and how are they best used/integrated to create an effective daylighting system?

DISCUSSION AND CONCLUSION

Climate consultant provides clear approach to quantify the number of hours of sun or shade at a particular location. It calculates this based on the site weather file and input of obstructions including size, height and horizontal distance.

In this case, obstructions in Area 1 are Honey Locust (*Gleditsia triacanthos*) trees which are native to North America and prefers full sun conditions. As through this study we classified Area 1 as “Full Sun” with more than 6 hrs of sunlight, Honey Locust fit perfectly well with the site sun conditions. For further plant installations, one must make sure that only full sun plants are accommodated in that area (Eg- Blue Oat Grass, Russian Sage, Prairie dropseed, etc). Whereas, Area 2 being classified as “Full Shade” because of the neighboring buildings, one needs to make sure that plants/trees which prefers shade are installed in that area (Lady Fern, Dutchman’s Breeches, Trillium, etc). Using this quantification method, will make it easier to select plants at a micro level block within the site. Similar process can be followed to assess and compare winter and summer shading conditions.

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5.2. PLANTING DESIGN AND ECOLOGY

GROUP J

Invasive Plant Species – Friends or Foes? Contributions of the Public Parks and Gardens of the City of Porto

Cláudia Oliveira Fernandes

The Olmsted Woods: A Hybrid Approach to Creating Sacred Groves at the Washington National Cathedral

Nathan Heavers

Planting Design Principles Through Urban Eco-Riverscape

Rezky Khrisrachmansyah

Native versus Exotic Species in the Vacant Land of Four Cities of Portugal: Urban Ecology and Landscape Architecture

Ana Luísa Soares & Sónia Talhé Azambuja

Historical Landscapes as Scenes of Legislative Conflict: Nature Protection vs. Cultural Heritage

Attila Tóth

For a Sustainable Aesthetic

Marc Treib

INTRODUCTION

Invasive Plant Species – Friends or Foes? Contributions of the Public Parks and Gardens of the City of Porto

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ABSTRACT

As a consequence of the relentless global change, new and unprecedented plant species combinations are emerging forming Novel Urban Ecosystems (NUE). These new assemblages are composed by both native and exotic plant species, raising awareness about biodiversity loss and biological invasions, but also for the unexplored opportunities they bring to face the Anthropocene.

The aim of this research was to study invasive plant species, plant species with invasive potential and plant species combinations in Public Parks and Gardens of the city of Porto, Portugal, as a starting point to a debate about NUE challenges and prospects, and to instruct future planting design and maintenance options. Porto's overall situation and a case study are here analyzed. Results revealed that a high percentage of exotic plant species in Public Parks and Gardens of the city of Porto do not necessarily represent a higher ecological risk. Nevertheless, most of these urban green spaces are still maintained following general protocols with no concern about future scenarios of global changes and disregarding the problems and opportunities that may arise with novelty. This way, a set of evidence-based guidelines for the design and maintenance of Public Parks and Gardens was proposed to assist practitioners and decisionmakers.

The impact of human activities on Earth's climate and ecosystems are now so measurable and pervasive that the planet has recently entered a new geological epoch in which mankind has a central role – the Anthropocene (Steffen, Crutzen and McNeill, 2007). The increasing human pressure is responsible for accelerated rates of change never seen before. These anthropogenic environmental changes are reshaping ecosystems processes and patterns (directly through land use change and species introduction and indirectly through climate change and pollution), threatening biodiversity and triggering uncertain consequences (Cantrell, Martin and Ellis, 2017).

In the urban context, the effects of the anthropogenic environmental changes can be more intense, as cities are artificial systems where human societies are (over)concentrated (Schmidt, 2014). Under these circumstances, nature in cities is being forced to find survival mechanisms which result in the emergence of Novel Urban Ecosystems (NUE). These emerging ecosystems: 1) are composed by new and unprecedented species combinations (assemblages of native and exotic species) that can change the ecosystem functioning, 2) are the product of deliberate or accidental human action, although their maintenance does not depend on constant human intervention and 3) are a biotic response to human-induced abiotic conditions and/or novel biotic introductions (Hobbs et al., 2006).

The deliberate or accidental biotic introduction in an ecosystem is considered one of the most significant drivers of change in biodiversity at the global scale (Sala et al., 2000). This way, NUE are challenging the perception of conservationists and raising awareness about biodiversity loss and biological invasions (Kowarik, 2011). Biological invasions are increasing worldwide



Figure 1: Public Parks and Gardens of the city of Porto.

and are enhanced by the effects of the Anthropocene. Climate change interferes with all the dimensions of biological life and alters the behavior of species, namely by favoring the invasion process. Besides, biological invasions are directly influenced by human migration and global trading, which has ruptured biogeographic boundaries and created, over the centuries, channels of dispersion allowing the introduction of species into regions that they would probably never have reached (Hobbs et al., 2006). This way, many exotic species arrived at our gardens and some of them have become invasive. However, it is important to understand the introduction, naturalization and invasion process (Richardson et al., 2000) because not all exotic species have harmful behavior, and, in fact, many are now cultural symbols of our cities.

NUE will prevail and increase in the future (Perring and Erle, 2013) and, for that reason, they must be deeply investigated. The consequences of novelty remain unknown, as well as the unexplored opportunities they can bring to face the Anthropocene. Some authors believe that NUE can potentially provide several benefits to people

(Standish, Hobbs and Miller, 2013) and that novel assemblages of species that emerge because of human-induced transformations are expected to be adapted to the new environmental circumstances, and in some cases better adapted than previous native assemblages (Kowarik, 2011). The study of species combinations in urban green spaces can be an important step to understand NUE and to control/monitor biological invasions, preventing future ecological and economic damages. In addition, we believe that it can instruct the design and maintenance of more resilient urban green spaces.

This way, the aim of this research was to study invasive plant species, plant species with invasive potential and plant species combinations in Public Parks and Gardens of the city of Porto, Portugal, as a starting point to a debate about NUE challenges and prospects in a Southern Europe context, and to instruct future planting design and maintenance options.

MATERIAL AND METHODS

The research resorted to a database

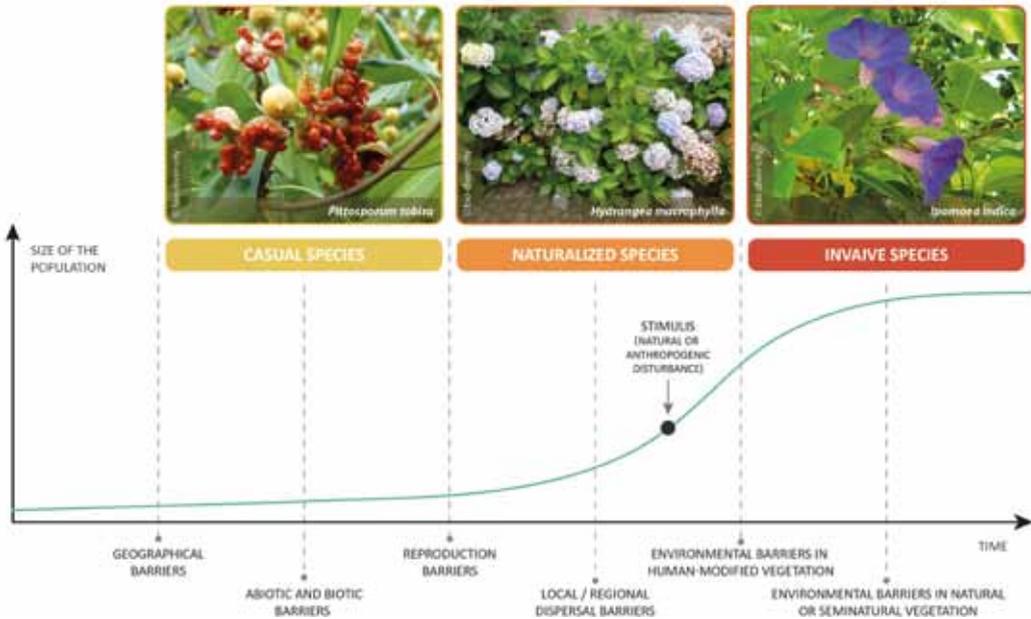


Figure 2: Introduction, naturalization and invasion process (adapted from Richardson et al. 2000 and Marchante et al. 2014)

from a previous research project about the morphology and biodiversity of the urban green spaces of the city of Porto. Floristic surveys were conducted using a methodology that classifies and maps urban habitats based on Raunkiaer's Life Forms – the Urban Habitats Biodiversity Assessment (UrHBA) (FarinhaMarques et al., 2017). This database collected information from 407 floristic surveys carried out in a sample of 29 Public Parks and Gardens of the city of Porto (Figure 1) that were selected using a methodology that grouped similar green spaces based on variables relevant for biodiversity such as dimension, vegetation cover, space character, etc. (FarinhaMarques et al., 2016). The floristic surveys resulted in the identification of a total of 41 UrHBA habitats (areas, lines and points patches) and approximately 600 plant species.

These plant species were first organized according to their origin (native or exotic) and then the exotic species were classified according to their status (casual, naturalized or invasive), using Richardson et al. (2000) proposed terminology for plant invasion ecology. Exotic species with casual,

naturalized or invasive statuses were considered “species with ecological risk” since they have the potential to become invasive or are already invasive. On the other hand, species with neither of these statuses were considered “species without ecological risk” (Figure 2).

The results of this classification allowed to comprehend Porto's overall situation regarding species origin and ecological risk. To examine more profoundly species combinations and to relate the ecological risk with different levels of presence of exotic species, one of the 29 Public Parks and Gardens of the city of Porto was selected as a case study. First, it was necessary to create “Assemblages Groups” to represent different percentages of native and exotic species in each UrHBA habitat of the case study (Figure 3). Group A represents a dominance of native species and group C represents a dominance of exotic species. Group B illustrates a balanced proportion of native and exotic species.

Then, it was necessary to classify within the exotic species the percentage of species with ecological risk in each UrHBA habitat of the case study. After

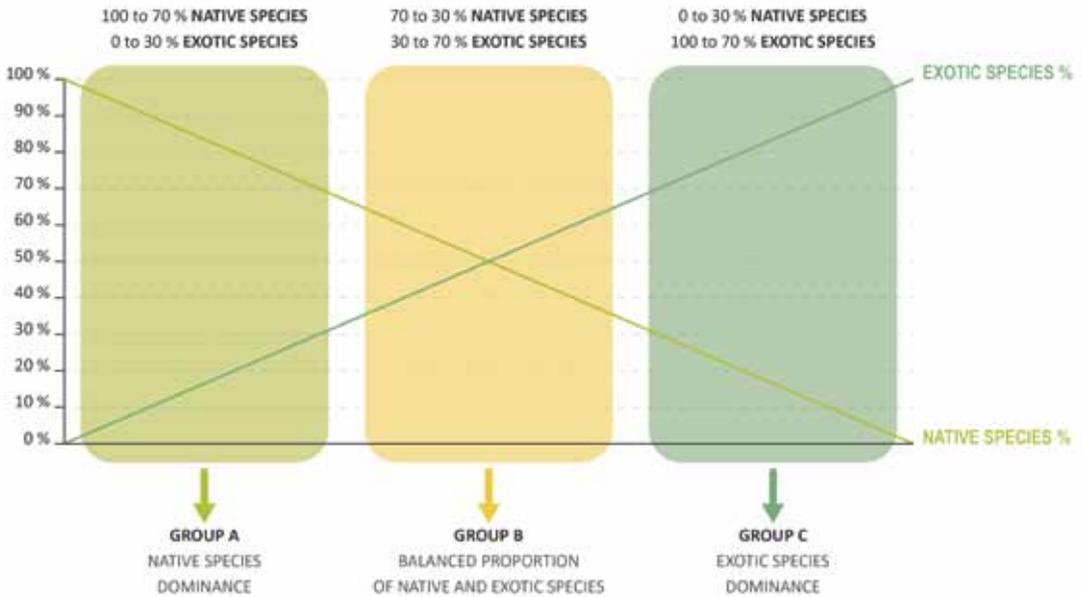


Figure 3: Assemblages Groups.

analysing several Public Parks and Gardens according to the presence of species with ecological risk, it was possible to determine three categories: low – habitats with less than 7,5% of species with ecological risk ($\leq 7,5\%$); medium – habitats with a percentage of species with ecological risk between 7,5% and 15% (7,5 – 15%); and high – habitats with more than 15% of species with ecological risk ($\geq 15\%$) (Table 1a). In addition, the Invasive Potential (for casual and naturalized species) and Invasive Gravity (for invasive species) was analyzed based on Marchante et al. (2014) assessment of Portugal's situation. Casual and naturalized species were scored according to their invasive potential: low invasive potential (1 point), medium invasive potential (2 points) and high invasive potential (3 points). Invasive species were scored according to their invasive gravity: low invasive gravity (4 points), medium invasive gravity (5 points) and high invasive gravity (6 points). The UrbHA habitats of the case study were scored and the average score determined if there was a low (≤ 2 points), medium (> 2 and ≤ 4 points) or high (> 4 and ≤ 6 points) invasive potential/gravity.

For instance, a UrbHA habitat that has a casual species with medium invasive potential (2 points) and an invasive species with high invasive gravity (6 points), has an average score of 4 points and, consequently, medium invasive potential/gravity (Table 1b). Finally, the overall ecological risk of each UrbHA habitat of the case study was defined according to the following figure (Table 1c).

RESULTS AND DISCUSSION

City of Porto

The percentage of exotic species (60%) is slightly higher than the percentage of native species (40%). Within the set of exotic species, 14% have ecological risk and 50% of the species with ecological risk are invasive species. Invasive species are distributed between the herbaceous layer (40%) (e.g. *Tradescantia fluminensis*) and tree layer (40%) (e.g. *Acacia melanoxylum*) and the most representative physiognomic type is phanerophytes (37,5%), particularly with evergreen foliage (e.g. *Pittosporum undulatum*). Naturalized species belong mainly to the herbaceous layer (70%)



Figure 4: Percentages of plant species with ecological risk in Public Parks and Gardens of the city of Porto.

(e.g. *Stenotaphrum secundatum*) and the most representative physiognomic type is geophytes (36,4%) (e.g. *Oxalis latifolia*). Casual species belong mainly to the shrub layer (50%) (e.g. *Pittosporum tobira*) and the most representative physiognomic type is phanerophytes (64,3%), particularly with evergreen foliage (e.g. *Chamaecyparis lawsoniana*).

The Public Parks and Gardens with a higher percentage of species with ecological risk are Tait House Garden (17,2%) and Avenida Brasil Garden (17,1%). This result could be related with a less intensive maintenance regime. Maintenance, especially in Public Parks and Gardens, is a variable with an important effect on species behavior and needs to be further studied in the context of this research. Avenida Brasil Garden is located near the beach and, for that reason, the high percentage of species with ecological risk could be related with the presence of sand dunes invasive species such as *Carpobrotus edulis* and *Arctotheca calendula*. Dunes system are one of the most endangered ecosystems in Portugal and these results, even though are related to a garden, also

reinforce this problem. Public Parks and Gardens with higher richness of species with ecological risk (S. Roque Park, Serralves Park, Passeio Alegre, City Park and Cristal Palace Gardens) are not the spaces with higher percentage of species with ecological risk. This result could be related with other variables to explore further in the future such as the dimension of the spaces and their maintenance regimes, as already stated before (Figure 4). Rubbish with vegetation (RUB/VGT) and habitats dominated by forest phanerophytes (FPH/DEC, FPH/CON, FPH/DEC/EVR, etc.) have a higher percentage of species with ecological risk. Serralves has the UrBHA habitat (RUB/VGT) with the highest percentage of species with ecological risk (53%).

Case Study – Tait House Garden

The Tait House Garden was selected as a case study since previous results indicated that it has the highest percentage of species with ecological risk. This historic garden from the 19th century has approximately 1,1 ha and a total of 17 different UrBHA habitats (Figure 5), although floristic surveys were only carried out in the vegetated



Figure 5: Tait House Garden UrbHA Habitats.

habitats (11 habitats). Results revealed that 40% of the species in the Tait House Garden are exotic. Within the set of exotic species, 26,1% have ecological risk and 50% of the species with ecological risk are invasive. Species with ecological risk belong mostly to the herbaceous layer (80%) (e.g. *Tradescantia fluminensis*) and the most representative physiognomic type is geophytes (40%) (e.g. *Oxalis pes-caprae*).

The described methodology for the analysis of species with ecological risk was applied to the vegetated UrbHA habitats of the Tait House Garden (Table 2).

The majority of the UrbHA habitats of the case study have a balanced proportion of native and exotic species (Group B). Group A (dominance of native species) is slightly represented but there are no habitats of Group C (dominance of exotic species). Habitats from the group B reveal null to high ecological risk, which indicates that, *per se*, the presence of exotic species do not necessarily represent ecological risk. However, habitats from the Group A reveal low to medium ecological risk, which seems to indicate that a higher

percentage of native species can reduce the ecological risk.

Habitats with low percentage of species with ecological risk revealed high Invasive Potential/Gravity (FPH/EVR and MPH/DEC), which means that a habitat can have a small number of species with ecological risk, but these species can represent a greater threat. Habitats with high percentage of ecological risk reveal high or medium Invasive Potential/Gravity (RUB/VGT, STR/VGT and LHE), which means that a larger number of species with ecological risk can represent a greater threat.

No relationship was found between the percentage of species with ecological risk and the Invasive Potential/Gravity, since habitats with low percentage of species with ecological risk (e.g. FPH/EVR and MPH/DEC) and habitats with high percentage of species with ecological risk (e.g. LHE, STR/VGT and RUB/VGT) revealed a high Invasive Potential/Gravity.

In general, the analyzed habitats revealed a medium to high ecological risk. This result is essentially related to the Invasive Potential/Gravity rather than to the percentage of species with ecological risk.

Habitats with higher percentage of species with ecological risk are ruderal and characterized by herbaceous layers (RUB/VGT, STR/VGT and LHE). Habitats with lower percentage of species with ecological risk are dominated by winter deciduous and evergreen phanerophytes (MPH/DEC and FPH/EVR). Habitats with higher invasive potential/gravity are ruderal (STR/VGT) and characterized by tree and shrub layers (FPH/EVR, TPH/EVR and MPH/DEC). Habitats with lower Invasive Potential/Gravity are covered with impervious materials (PAV/VGT) and characterized by winter deciduous and evergreen forest phanerophytes (FPH/DEC/EVR).

EVIDENCE-BASED GUIDELINES FOR PLANTING DESIGN AND MAINTENANCE

The combination of native and exotic species is one of the distinctive qualities of Parks and Gardens. The assemblage of species must be guaranteed once this research demonstrated that the presence of exotic species does not necessarily represent an ecological risk.

The use of invasive species is strongly discouraged and the use of species with ecological risk should be carefully considered. Some casual and naturalized species are very much appreciated and perform functions of great utility in Parks and Gardens. Once their behavior is already known and as long as the evolution of their status is monitored, we find no reasons to eliminate these species from the gardens, although their presence in plantation schemes should always be cautiously considered. Examples of these species in Portugal are: *Cercis siliquastrum*, *Chamaecyparis lawsoniana*, *Helichrysum petiolare*, *Lantana camara*, *hydrangea macrophylla* and *Acanthus mollis*.

Exotic species with unknown behaviors can continue to take place in planting designs. Otherwise, creativity

and experimentation in the design process would be compromised. What we recommend is that its representativeness should be reduced. Although it is not a tested recipe yet, we suggest that the proportion of exotic species with unknown behavior in the proposed plant list do not exceed 5% to 10%.

Another recommendation is that the planting plans include the registration of the status of the species (native, exotic with unknown behavior, exotic with ecological risk: casual, naturalized, invasive). Likewise, management and maintenance plans should contain detailed information regarding the cultivation and monitoring of these species in Parks and Gardens.

According to the results of this research, we propose special care in the planting proposals for ruderal habitats (STR/VGT, RUB/VGT, THE), such as flowering meadows. Seed mixtures should consist of native species, carefully selected and avoiding commercial mixtures.

Geophytes (including rhizomatous) have a great dispersibility and are widely used as ornamentals especially in mixed borders, raised beds and in filling boxwood beds. These species should also be carefully selected since in this study they were the most representative physiognomic type that had invasive potential and invasive status.

Since it was shown that the ecological risk depends essentially on the Invasive Potential/Gravity rather than on the percentage of species with ecological risk we advise that maintenance tasks in Parks and Gardens' must be done by trained people and closely supervise by experts, as they are well aware of the species and their behavior.

Although biodiversity in parks and gardens also includes the diversity of fauna, in this work only the data about plant diversity was analyzed. Nevertheless, the fauna data for amphibians, butterflies, birds and reptiles, was also recorded in the

research project (see methodology). So, in the future, the dynamics established between flora and fauna will be examined.

Future research will also address the proportion of spontaneous vs introduced exotic and native plant species, as well as endemic, rare, specialist vs generalists plant species, etc. Likewise, the database should be consolidated, and the indicators and ranges proposed here should be refined, stabilized and applied to more case studies.

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TABLES

Table 1

- a) Percentage of species with Ecological Risk;
 b) Invasive Potential/Gravity;
 c) Final Ecological Risk assessment.

% OF SPECIES WITH ER	
≤ 7,5 %	LOW
7,5 – 15 %	MEDIUM
≥ 15 %	HIGH

INVASIVE POTENTIAL/GRAVITY				
CASUAL & NATURALIZED SPECIES	Low Invasive Potential	1 point	≤ 2 points	LOW
	Medium Invasive Potential	2 points		
	High Invasive Potential	3 points	> 2 and ≤ 4 points	MEDIUM
INVASIVE SPECIES	Low Invasive Gravity	4 points		
	Medium Invasive Gravity	5 points		
	High Invasive Gravity	6 points		

a)

b)

% OF SPECIES WITH ER	INVASIVE POTENTIAL/ GRAVITY	ER
LOW	LOW	LOW
MEDIUM	LOW	LOW
LOW	MEDIUM	MEDIUM
LOW	HIGH	MEDIUM
HIGH	LOW	MEDIUM
MEDIUM	MEDIUM	MEDIUM
HIGH	MEDIUM	MEDIUM
MEDIUM	HIGH	HIGH
HIGH	HIGH	HIGH

c)

Table 2
Tait House Garden UrBHA Habitats
analysis.

UrBHA HABITATS	% OF NA- TIVE SPECIES	% OF EX- OTIC SPECIES	ASSEM- BLAGES GROUPS	% OF SPECIES WITH ER		INVASIVE PO- TENTIAL/GRAV- ITY		ER
FPH/EVR	64,7	35,3	B	5,9	LOW	5	HIGH	MEDIUM
FPH/DEC/EVR	40,0	60,0	B	10,0	MEDIUM	1	LOW	LOW
TPH/EVR	57,1	42,9	B	14,3	MEDIUM	6	HIGH	HIGH
MPH/DEC	80,0	20,0	A	8,0	MEDIUM	3,5	MEDIUM	MEDIUM
MPH/DEC	61,9	38,1	B	4,7	LOW	5	HIGH	MEDIUM
LHE/CHE	73,7	26,3	A	10,5	MEDIUM	4	MEDIUM	MEDIUM
LHE	61,5	38,5	B	23,1	HIGH	4,3	HIGH	HIGH
THE	66,7	33,3	B	0,0	-	-	-	-
STR/VGT	33,3	66,7	B	33,3	HIGH	5,5	HIGH	HIGH
PAV/VGT	78,9	21,1	A	10,5	MEDIUM	2	LOW	LOW
RUB/VGT	57,1	42,9	B	28,6	HIGH	4	MEDIUM	MEDIUM

The Olmsted Woods: A Hybrid Approach to Creating Sacred Groves at the Washington National Cathedral

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ABSTRACT

Across many cultures, we hold groves in high esteem, often as sacred places. Whether products of nature, such as Yosemite's Mariposa Grove, or deliberately constructed, as in the orange grove extending from the Mezquita de Cordoba's field of columns, groves form significant spaces, especially when grown in conjunction with religious buildings. In the ancient Europe many people believed that spirits inhabited sacred sites and groves long before buildings consecrated them, while in America, people created sacred space out of ordinary forest claims J.B. Jackson (1980), making a space sacred through action. An exception to this American pattern is Frederick Law Olmsted Jr.'s design for the Washington National Cathedral grounds. It hybridizes the two approaches for understanding and making sacred groves. Recognizing the remarkable white oak (*Quercus alba*) woodland as having spiritual value, he preserved a grove as the heart of the Cathedral landscape, ensuring that it was understood as a sacred space in its own right. However, once recognized as significant, it has been a continuous challenge to maintain the existing grove as an integral part of the landscape design as new projects and plantings gradually replace and infringe upon the native grove.

INTRODUCTION

J.B. Jackson (1980) noted that groves played a significant religious role through the middle of the 19th century

in America. He claimed that people had made groves sacred through use, transforming ordinary patches of woodland into places of worship. The idea of sanctifying ordinary forests for religious purposes contrasts with the ancient Greek and Roman notion that places are inherently sacred by virtue of the gods and nymphs that reside in the earth, stones, water, and trees. Only in places where the spirits dwelled did people then build altars and temples, explains Martin P. Nilsson (1948). In the New World, J.B. Jackson's assessment of the American notion of sacred space rings true for Christians before the mid-19th century. There are, however, American landscapes deemed sacred that were not, at least to begin with, cultural products, for instance, the giant Sequoias of Yosemite's Mariposa Grove described by Frederick Law Olmsted (1865) and protected by an Act of Congress signed by President Lincoln in 1864. The idea that some particular natural groves are sacred aligns with the philosophy of the Transcendentalists, who promoted the idea that nature itself could transform one's spirit, a persistent thought, especially about groves. Since the mid-19th-century, at least, Americans have compared particular groves of sequoias, coast redwoods, American elms, and white pines to cathedrals. In this sense, groves in America are not as "overlooked" as Jan Woudstra (2018) argues is the case in contemporary Europe. We have made natural groves into significant and long-lived cultural products in the United States through structures like the National Park System, but also through private enterprise, as in the case of the Washington National Cathedral.

In 1907, Frederick Law Olmsted Jr. began work on the landscape of the Washington National Cathedral (DC), the same year that masons laid its cornerstone. His designs for the Cathedral grounds responded to the wooded condition of the site, which he strove to maintain as the heart of the



Figure 1: View of the US Capitol dome from Mt. Alban through woods (author's photo)

Cathedral Close (close is the English term for the enclosed precinct of a cathedral). In the way that many mid to late-19th-century writers described the great groves of the west as cathedral-like, Frederick Law Olmsted Jr. characterized the natural grove of the cathedral as a “sylvan narthex (Olmsted Jr., 1907).” He made the point that the woods itself was a sacred space, created by the trees.

In this paper, I argue that the characteristics of the site of the Cathedral, especially its groves, gave it a degree of sacredness before people consecrated it with built structures and services. Bishop Henry Yates Satterlee recognized that it was no ordinary site and woods and Olmsted Jr.'s design heightened its qualities. The century-long development of the close, beginning with outdoor services in a natural amphitheatre in the woods, further organized it as a sacred space. Therefore, the Cathedral project hybridized two notions of creating sacred space. It took the inherent qualities of the site (perhaps protected by the *genius loci*)—its native groves and hilltop position—and brought European architectural ideas to them, merging the neo-Gothic design of a cathedral based on 14th century precedents with a mixture of medieval and English landscape garden concepts for the grounds. Of course, building the sixth largest gothic cathedral in

the world within a native white oak grove has not been without conflicts. Maintaining the grove at the core of the Cathedral Close is a continuous struggle between the existing qualities of the grove and what landscapes architects have made of it.

SECURING A SITE, A SACRED GROVE TO BEGIN WITH

As Jan Woudstra (2018) points out, the term grove is of English origin, but it has evolved in what it signifies over the centuries. It seems that grove derived from *graf*, the word for thicket or copse—productive woods. Today (and in Omsted Jr.'s era) groves are typically understood as treed open spaces with a clear ground plane and either irregular or regular groupings, often but not always composed of one or just a few species. A key aspect of groves as I use the term is that they have an emotional impact on visitors, perhaps spiritual in nature. The main measure of this quality presented as evidence here is what people have said and written about groves. Of course, we can easily equate religious activity and the construction of paths, crosses, sanctuaries, and churches, as sacred space however, these are no more important than the sacredness of a site itself.

When Bishop Satterlee arrived in Washington in 1896, he was greatly disappointed with the proposed site for the cathedral. Within two years, he had negotiated the purchase a different site on a hill about 400 feet above sea level, called Mt. Alban, along the ridge of hills overlooking the city. It had all the natural features he thought important, a high-position, a beautiful view of the city, and a native forest. Once the property of Joseph Nourse, registrar of the Treasury under George Washington, it was Nourse's dream that it one day support a church. Satterlee described him, as “like some of the old Hebrew patriarchs, he was wont to find a sanctuary of God in the hill overlooking the city, and to



Figure 2: Outdoor service in the natural amphitheatre, 1929
(Library of Congress, Prints & Photographs Division)

retire for seclusion and communion with God under the gothic arches of the wood on Mount Alban, where he lived (Satterlee, 1901:21).” Nourse found sanctuary in this place; Satterlee writes as though the pious Nourse pre-ordained the site for a cathedral. Saint Albans Church, built in 1851, after Nourse’s death, did prepare the site—its owners held off developers, who wanted the land for house lots. The church is still very active in the shadow Cathedral. However, it was the natural features of Mt. Alban, which were the main quality guiding the placement of the cathedral. One reporter, quoted in Satterlee’s *The Peace Cross Book* (1899), states: “The site of the proposed cathedral is one of great beauty. It overlooks the city of Washington, Alexandria and a long stretch of the Potomac. The Capitol and the Washington Monument stand conspicuously out, almost in the foreground, of the picture, while immediately to the rear and sides of the spot upon which the cathedral will stand are groves of beautiful oaks (p. 50).” Satterlee knew immediately that Mt. Alban should be the site. “I went to St. Alban’s Church, saw its magnificent view (Fig. 1) and felt at once that this land...was the site for the Cathedral (Satterlee, 1896).” To initiate the project, he held outdoor services in a natural amphitheatre in an opening among the oaks, a practice he likened to early Christian gatherings (Clagett, 2010)

(Fig. 2). He raised the Peace Cross with great ceremony to celebrate the end of the Spanish-American War in 1898, but also to call attention to the site and the project. Satterlee hired architect Robert W. Gibson and Beatrix Jones (Farrand), a founding member of the American Society of Landscape Architects, and designer of the gardens at Dumbarton Oaks. They were the first to suggest quads of school and clergy buildings to the north of the cathedral, leaving the wooded south, east, and west sides open. In 1909, a couple of years after Satterlee commissioned Frederick Law Olmsted Jr. to create a general plan for the close; he advised placing all the buildings along the perimeter (Satterlee, 1909), ensuring that the Cathedral’s groves continued to grow at the heart of the close.

OLMSTED JR.’S PLANS, SACREDNESS THROUGH PRESERVATION AND BUILDING

Frederick Law Olmsted Jr. embraced the task of envisioning a Gothic cathedral in an American woodland, a task to which he came well prepared. As the landscape architect of the McMillan Commission design team for Washington, DC, he had travelled widely in Europe, and of course had worked across the United States with his father. He recognized in the Cathedral site qualities to preserve and aspects to enhance through design, especially its woods. While Satterlee and Beatrix Jones (Farrand) recognized what to preserve, Olmsted Jr. applied himself to the question of how to lay out the site to maintain and enhance its natural qualities. By understanding the forest as a “narthex”, he showed that the landscape and the cathedral were an indivisible entity. He designed so that people would experience them as one. In his words, “the great sweeping branches of the trees seem to brush off, as it were, the dust of the city, so



Figure 3: Frederick Law Olmsted Jr.'s plan for the Cathedral Close, 1910. (St. Albans School Archives)

that one at last reaches the cathedral cleansed in mind and spirit (Olmsted Jr., 1919).” The role of the forest was much more than a backdrop to the building; it was part of the architecture, like the groves of Cordoba’s Mesquita, but in an irregular configuration, laid out by nature.

Examining Olmsted Jr.’s general plan for the Cathedral Close of 1910 (Fig. 3), it is apparent that wherever possible, he placed the clergy and school buildings toward the streets creating an extensive grove at the centre of the superblock. Particularly important to Olmsted Jr. was how one arrived at the Cathedral, either by carriage, car, streetcar, or on foot. He desired a dignified entry and determined that passing through the woods at the core was the optimal experience. As he characterized the approach, “carriages coming from the direction of the city might leave Massachusetts Avenue without completing the long climb, and after plunging into the beautiful woods that cover the easterly part of the grounds, wind their way up to the Cathedral through the shade and quiet of this sylvan narthex (Olmsted Jr., 1907.)” This road winding through the

white oaks was to Olmsted a critical aspect of the design of this sacred precinct. It needed little change; visitors simply needed to experience the grove.

Three decades later, in 1939 when Dean Powell, asked Olmsted Jr. to consult again on the grounds, one of the questions at hand was where to place a major gift of medieval architecture and sculpture collected by George Barnard, who amassed The Cloisters collection in New York. Olmsted Jr. wrote:

“It would be most unfortunate to introduce this, or any other, important and considerable artificial feature into this portion of the Close if it can possibly be avoided...In the entire Cathedral Close there is only one considerable body of approximately natural woods which is, and can possibly remain, uninterrupted by buildings and other sophistications (Olmsted Jr., 1939).”

It is clear that Olmsted Jr. felt that the woods contributed immeasurably to the Cathedral Close. He also took great care to work around large individual trees as he sited buildings, roads, and pathways. Of course, there were conflicts, as the much-admired view from Bishop’s lawn. He advised: “carefully thought-out steps should be taken to control the excessive growth in height of existing trees on the lower slopes (Olmsted Jr., 1939).” As throughout his plans, Olmsted Jr. prioritized the qualities to enhance, usually in favour of the trees, but not always. The groves were a dominant and essential feature throughout the site, and he honoured them. However, not at the expense of connecting the site to the city through the view.

“The setting of the Washington National Cathedral is most rare in picturesqueness and beauty, whether we consider its aspect as viewed from the city or that of the city as viewed from the cathedral site. Seen from the city, the cathedral will crown a densely wooded hill, standing tree-embowered at the summit of easy graceful slopes.



Figure 4: Cathedral rising above the Olmsted Woods, as viewed from the city, 2005 (author's photo)



Figure 6: Contemplative Circle in the Olmsted Woods, diminishing the character of spaces created by the trees, 2010 (author's photo)



Figure 5: Highly maintained oak grove at the West Front of the Cathedral with mature and young trees (author's photo)



Figure 7: Amphitheatre with existing oak integrated into the terraces by landscape architect Michael Vergason, 2006 (author's photo, 2011)

It will rise heavenward out of and above Nature's strength and beauty, in towers and buttresses and pinnacles as a sublime, God-inspired anthem in stone (Olmsted Jr., 1937) (Fig. 4)."

CHALLENGES, CONFLICTS, AND SUCCESSES IN THE OLMSTED WOODS

The legacy of Satterlee, Jones (Farrand), and Olmsted Jr. on the Cathedral grounds is significant because of how they recognized the inherent quality of the existing white oak groves and treated them as a sacred precinct, much like the natural groves in National Parks across America, but contrasting the given nature with a young cathedral. Envisioning how a

cathedral close could combine native groves, a substantial gothic structure, and three schools on 23 urban hectares, while maintaining the feeling of being in a grove, was a substantial task, which goes on today. On the one hand, it is a significant achievement that a manicured oak grove exists on the West Front (main entrance) of the Cathedral (Fig. 5), and that the more natural Olmsted Woods remain at the core of the site. On the other hand, the gradual and at times piecemeal development of the close has diminished the size of the Olmsted Woods and changed its character through the addition of structures.

Sometimes there is simply a lack of understanding of the guiding ideas of Olmsted Jr.'s design. For

instance, the carefully graded Pilgrim Road approach is a one-way exit road from the Cathedral with sports fields and facilities on one side. In the early 2000s, the Olmsted Woods was greatly in need of restoration, especially its ravine, which captures rainwater from the roads and the Cathedral's roof. The network of paths through the woods lacked order, leading to compaction from many people choosing their own trails. Andropogon Associates of Philadelphia introduced a new path and water infrastructure to guide and control the flows of water and people. The Pilgrim Way resulted, a graceful substitute for the experience of Pilgrim Road, albeit on foot. Most of the way up the Pilgrim Way, winding the slopes between 150-year-old white oak, beech, tulip trees, and hickories, is the "Contemplative Circle (Fig. 6)"—a freestanding seat wall in a circular form with a paved central space built in 2001. This is precisely the type of structure Olmsted Jr. eschewed. Rather than allowing the trees of the grove to do the work of creating a sacred space, it undermines the grove. Such moves seem all the more egregious in relation to medieval gothic architecture, which many argue took its cues from forests—the many slender columns reaching lofty heights and allowing shafts of light between. The Olmsted Woods themselves are an appropriate prelude to the architectural forest of the cathedral.

An intermediary between these two expressions of sacred groves is the outdoor amphitheatre. Olmsted proposed several versions of an amphitheatre, from seating set on the existing slopes to symmetrical layouts. In 1939, he questioned an amphitheatre design proposed by Florence Bratenahl, head of the All Hallows Guild, an organization charged with the care of the Cathedral grounds. He wondered about aligning the amphitheatre to the cathedral. It was not until 2006, that the All Hallows Guild constructed an

amphitheatre following the design of Michael Vergason (Fig. 7). Its position is much like Bratenahl's, oriented toward the two front towers, but its terraces follow the topography of the natural bowl, merging two important sources of sacredness for the grove where it dwells. Some have said that Olmsted Jr.'s proposals did not follow the topography, but I gather that building construction at the St. Alban's School changed the topography to the present conditions. In any case, while the addition of the amphitheatre adds more structure to the grove, trees grow on its terraces. Though it orients to the Cathedral on the one hand, it follows the lay of the land on the other, responding to the genius loci and recognizing the sacredness of the grove it occupies.

CONCLUSION

Whether or not we believe nature is sacred, there will always be some tension between the things we create and the natural forces of a place. Many landscape architects have now had a hand in the evolution of the Cathedral landscape, and each has had to decide how much to allow the site to speak for itself and how much to reconfigure the space. When construction on the cathedral finally ended in 1990, the masons dismantled the stone yard among the white oaks of the West Front. Roger Courtenay (1990) of the landscape architecture firm EDAW created the design. He recognized that the oaks are "what makes it unique as a cathedral setting, compared to the traditional setting of cathedrals in Europe and elsewhere in North America. It was this meshing of natural conditions (Courtenay, 1990)" with the built that is significant. Today, just one of the white oaks from Olmsted Jr.'s era remains on the West Front and many have died recently in the Olmsted Woods, but the grounds staff plant new trees each year. Despite good intentions to maintain the native groves on the close, the planted

oaks lack the density and uniformity of the original white oak stands, naturally seeded. Someday soon, the natural groves hailed by early visitors to the site will be composed entirely of a new generation of planted trees, recalling the initial sacred grove that inspired the construction of the Washington National Cathedral, but like the cathedral itself, a replica of things past in the hope of achieving sacredness.

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Planting Design Principles Through Urban Eco-Riverscape

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ABSTRACT

A river is an essential natural landscape component in an urban living environment. For developing country context, it has less meaning to its city and people. Deteriorating condition of the river, mainly in South East Asian (SEA), is inevitable. However, this paper focuses on Ciliwung River that is located in Bogor, Indonesia. Its existence in the past until now is giving valuable influence to the surrounding of Bogor. Unfortunately, anthropogenic pressure switched Ciliwung's riverbank today. The stream function slowly turned into a waste drainage instead of natural drainage with degraded ecological value. To restore the liveability and ecology of riverbank, identification of urban green system characteristic and its ecological value is done by using Geographic Information System. On the other hand, this study analyzed how much ecological services and benefits. The case study was divided into several segments to simplify the sampling area. Furthermore, the ecological design principles determined a new design of Urban Eco-Riverscape. Then, calculation of ecological services and its benefits were forecasted. Later, the result was compared all segments to find the best combination of planting principles to upgrade the ecological quality of Ciliwung River. Consequently, a new urban planting design principles was generated to improve ecological function of the river.

INTRODUCTION

Nowadays, the quality of living landscape becomes disrupted, uncertain, and degraded. These conditions occur in many countries with various impact. Complexities in environmental problems emerge with immediate land use change, growing density, and intricated urban-rural setting. In the developing countries, obvious differentiation between superblocks, blocks and Persil's are generated. It is obvious that some areas in the city in developing country have a high disparity. For example, some areas have high facilities because it belongs to private sector, but the others are lack of facilities, because the areas is undeveloped, traditional, and unformal. Moreover, complicatedness in SEA countries' governance (except Singapore) had turned the policy generation into an uneasy way to develop landscape. Indonesia is one of developing country that has some problems, especially in public-private space arrangements. Bogor is the upper area of greater Jakarta the capital city of Indonesia. In there, heritage building still can be found with a huge greeneries exposures known as Bogor Botanical Garden (BBG). This BBG is also passed by the main river-Ciliwung River- in the city which makes the landscape dynamics inside it even more varies. The existence of BBG increases the biodiversity and landscape quality, but unfortunately, massive settlements and buildings in the city had been blocked by the biodiversity movement in the city. In addition, the unstructured development of the building in Bogor haven't yet consider the biodiversity system as a whole, and didn't connected between urban setting and natural features.

The living landscape quality nowadays is becoming uncertain, disrupted, and degraded where it occurs in many countries with various impact. Specifically in the city, emerging



Figure 1: Site location

complexities grow and drive this area to a greater environmental problems. Land use changes, growing density, and intricate urban-rural system had turned the city system into several strata which are superblocks, blocks, and persil. Superblock is a very large commercial or residential block barred to through traffic, crossed by pedestrian walks and sometimes access roads, and often spotted with grassed malls. Block is an area bounded by four streets in a town or suburb, while persil is a piece of land for which there is one legal order, for example the same owner and the same property right.

Land ownership, public-private system, had been transformed urban surrounding into a highly disparate urban quality which less consider the landscape quality itself. Therefore, this paper is trying to explore what kind of principles that are able to be increase the ecological quality of urban area with this complexities as the context.

To understand the real urban complexities, I chose one piece of Ciliwung River as a case study. This river length is 97 km and lays from Puncak to Jakarta. To focus more in the context of urban complexities, I picked middle stream where it located in Bogor. The obvious complexities here is the river exposes one of the biggest biodiversity source in the city called Bogor Botanical Garden (BBG), but those ecological quality are somehow disconnected with its surroundings because the enclaved of urban system in Bogor. A definite face of the river stream inside and outside BBG is completely divergent. The condition of Ciliwung Riparian along the Botanical Garden is having many plantations and is exposing tropical nature inside it. On the other hand, the condition outer the Bogor botanical garden has a high density traditional settlement. This condition will lead to a degradation of the environment for instance erosion,

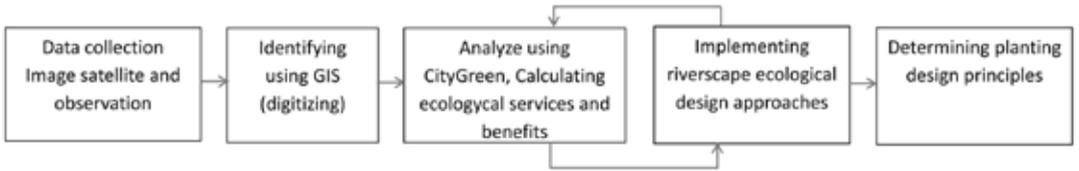


Figure 2: Phase of the study

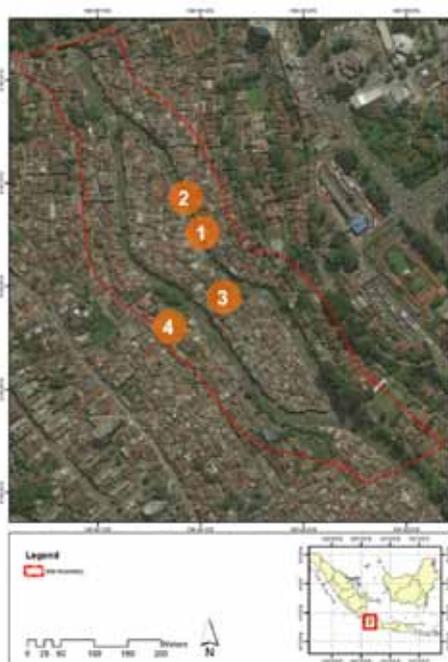
landslide, pollutions (water and soil) in the future. Moreover, it may impact the quality of life such as health and physical conditions.

There are many kinds of green open space in City, one of them is Botanical Garden. Green open space is very important to landscape quality to improve the quality of local climate, biophysics, promote mental and physical health and reduce morbidity and mortality in urban residents by providing psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity, and reducing exposure to air pollutants, noise and excessive heat (Braubach, 2017). This study conducted in the Centre of Bogor City, along the Ciliwung River that through the Bogor Botanical Garden and its surroundings. This

study aimed to identify the ecological services and benefits in an urban river, to implement the ecological principles in landscape planning, and to determine the planting design principles through eco-riverscape.

METHODS

This study was conducted last year and it is located in the Centre of Bogor City. This study divided the river into three segments of The Ciliwung Riparian which consisted Geulis Island, Bogor Botanical Garden, and Lebak Kantin. The site location for those segments has 2,7 km length and the ranges was around 40- 50 m wide of the riparian. Riparian area is the interface between land and a river or stream. The site location of the study can be seen in figure 1.



Landslide in Geulis Island, 2007

Landslide in Geulis Island, 2007



Private open space in Geulis Island, 2017



Potential public open space Geulis Island, 2017

Figure 3. Conditions of Segment 1



Figure 4. Conditions of Segment 2

The phase of this study included collecting data, GIS analysis, ecological services and benefits calculation, ecological principles implementation, and resulting in planting design principles based on all analysis and references (figure 2). Satellite imageries were used to identify the existing situation. Then, the specific calculation for the sinuosity rate of the river was conducted. Afterwards, ecological services and benefits were analysed through CITYgreen. CITYgreen is a GIS extension by American Forests (2002) that remotely sensed images are used to analyze the ecological and economic benefits of trees and vegetation in an area of interest (Hagevik 2008).

This study combined both quantitative and qualitative analysis. Several indicators had shown land cover composition, ecological services such as carbon removal benefits, and air pollution removal benefits (such as O₃, SO₂, NO₂, CO). Then, this study also implemented the ecological design approaches. Next, it is calculated again with CityGreen until it can be compared before and after using the ecological

approach.

After calculating the ecological services and benefits with ecological design approach, this study had determined some planting design principles in urban riverscape. Some simulation also conducted to see the most appropriate to the case study.

RESULTS AND DISCUSSIONS

Defining the characteristics

The three segments had different characteristics. Segment 1, where it focuses on Geulis Island, has a dense settlements and various steep contour. This segment has unique character because it has an island in the middle of the river stream. There are many private garden (home garden or backyard garden) and some other abundant building or land that is not maintained well by the owner. furthermore, there are several kinds of plantations, for instance fruit trees (*Carica papaya*, *Musa sp.*, *Muntingia calabura*), ornamental plants such as *Codiaeum variegatum*, *Bromelia sp.*, *Euphorbia sp.*, *Jasminum*, and many more, and also trees such

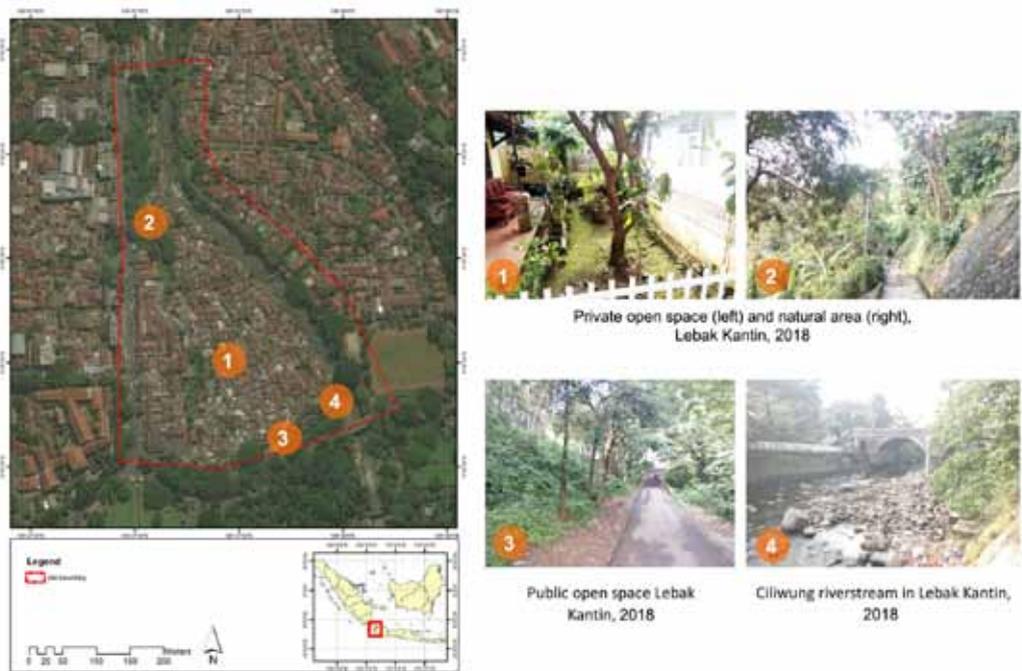


Figure 5. Conditions of Segment 3

as *Adenanthera pavonina* (Fabaceae family) that can attract birds. There is also historical building such as the first Chinese temple in Bogor at the middle of the Island. The conditions of the segment 1 can be seen as follows (Figure 3).

Segment 2 is very different than segment 1 and 3. It is part of Bogor Botanical Garden (BBG). Even though the current situation of BBG looks manicured, this segments showing a natural resemblance of tropical lowland forest. Many collection plants planted in segment 2. Some of the vegetations on the west side are *Flacourtia* spp, *Furcraea* spp, *Dillenia* spp, *Gigantochloa* spp, *Arenga pinnata* (2), *Elaeis guineensis*, *Metroxylon* spp (*Arecaceae* family), *Mangiferra* spp, *Terminalia*, *Ficus* (*Moraceae* family), *Garcinia* spp. On the other hand, on the east side are *Tabernaemontana* (*Apocynaceae* family), *Malvaceae* family, *Albertisia papuana* (*Manispermaceae* family), *Salacia* sp., *Vitaceae* family, *Sapotaceae* family, *Caesalpinaceae*, *Papilionaceae* family,

Albizia sp., and many more. The condition of segment two can be seen as follows (Figure 4).

Segment 3 shows similar surrounding to the segment 1. This segment is divided into two, there are Lebak Kantin village that located in the western part of the river and Sempur Park where it is located at the eastern part of the river. The conditions of Lebak kantin (segment 3) has a high density of organic settlement. The land has a steadily steep from west to the east side down to the river. Some area has a home garden and a big open space adjacent to the main road. On the other hand, opposite Lebak Kantin there is a Sempur Park and some middle-class settlement. The condition is quite structured, and it has a flat contour. The kind of vegetation that could be seen in this area is the same with segment 1 such as *Musa* sp., *Codiaeum variegatum*, *Bromelia* sp., *Euphorbia* sp., *Jasminum*, also local trees that also can be found in Bogor Botanical garden such as *Dillenia* sp., and *Ceiba pentandra*. Another interesting views

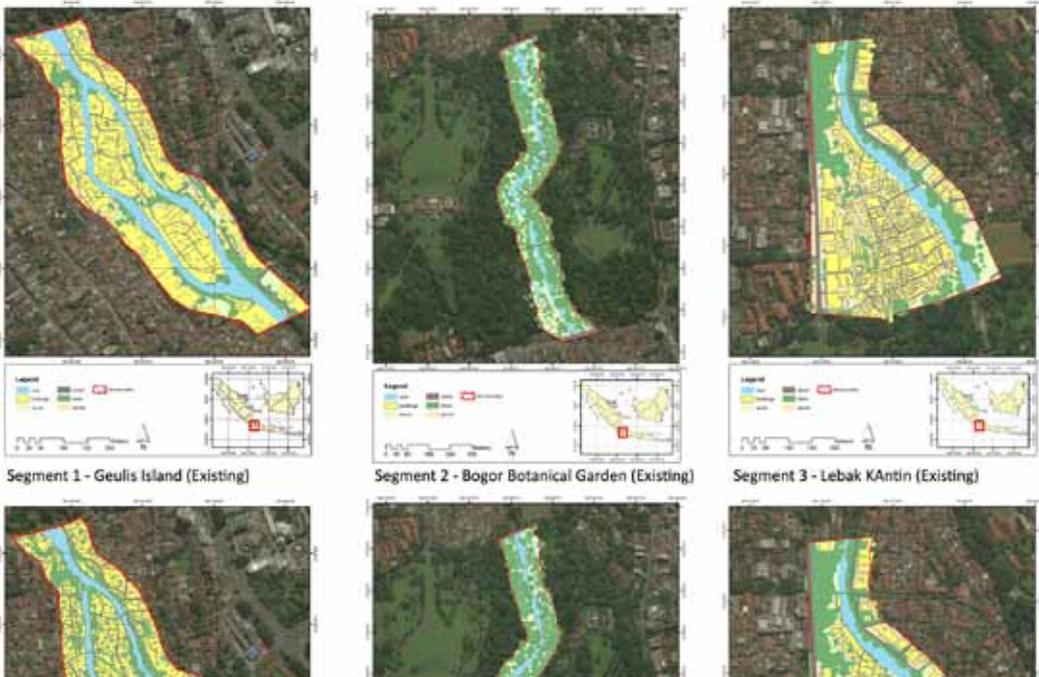


Figure 6. the improvement of each segment

that can be seen is a historic bridge which is able to enjoy from the other side of the river too. The conditions of segment 3 can be seen as follows (figure 5).

Ecological Design Principles

This study is want to see the improvement of the three sites that can give ecological service impact. The strategy is to improve the ecological values by adopting ecological design principles. The principles are includes:

A. Vegetation Management

Native vegetation helps filter runoff, controls flooding, and reduces or eliminates erosion. It provides shelter and food for urban wildlife. Canopy trees helps to lower down water temperature and create more favorable conditions for native fish (Otto 2004). In this study, the canopy of trees placed scatterly in all area, especially in the residential area. This strategy is crucial because it will generate positive effect of ecological service improvement. There are three particular strategies to

distribute the vegetation.

1. Optimizing a home garden
Some houses in Geulis Island and Lebak Kantin has a backyard, front yard or side yard. Thus, it is good if one house has a tree. This strategy can improve the ecological services.
2. Create a Grid Landscape
This strategy is to make a collective rooftop or roof garden because land ownership public-private polarization) had turned this area to be more difficult to relocate its people. So, it is possible to make a small communal garden in the top of their houses.
3. Strengthening the communal space

Some area, both in Geulis Island and Lebak Kantin have abandoned building, land, and communal space. From those spaces, it is possible to create a new place for the green area and public park area.

This strategy was implemented in this study through CityGreen. The target of the improvement was 30% of the green area added, which refers to the government policy.

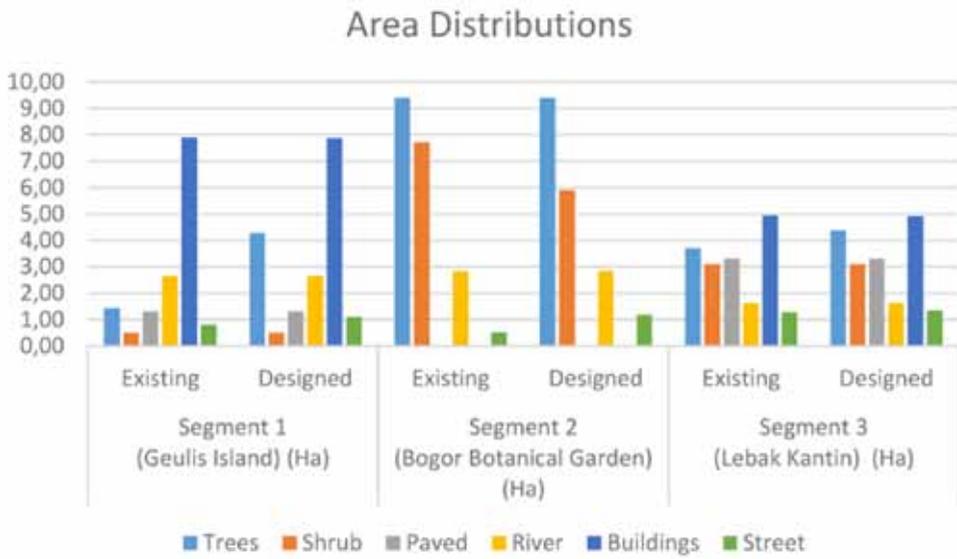


Figure 7. Graph of landcover distribution

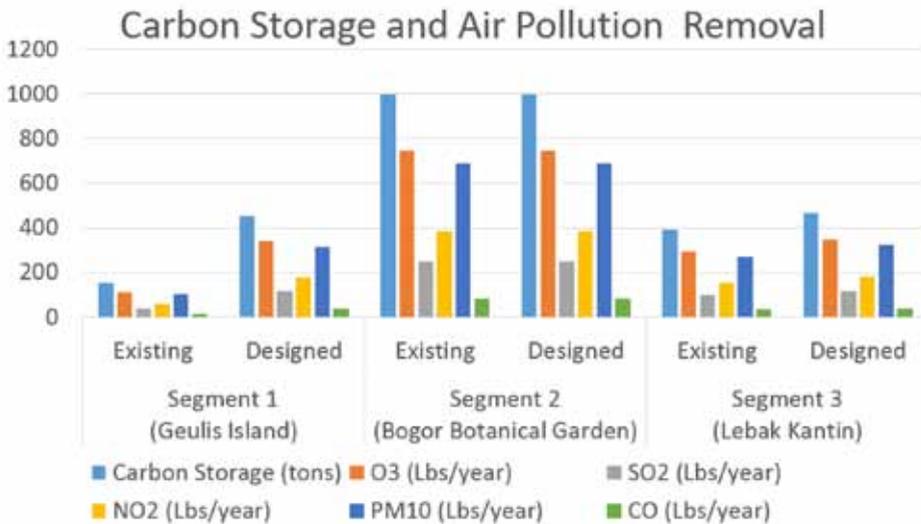


Figure 8. Graph of Ecological services (carbon storage and air pollution removal)

B. Structure Plan

Another strategy to create a new urban eco-river is to make a structured plan. This strategy is important to emerge

community and space development in the future.

1. Public access goals with river protection
While providing access, properly

Landcover	Segment 1 (Geulis Island) (Ha)		Segment 2 (Bogor Botanical Garden) (Ha)		Segment 3 (Lebak Kantin) (Ha)	
	Existing	Designed	Existing	Designed	Existing	Designed
Trees	1,43	4,28	9,40	9,40	3,70	4,37
Shrub	0,50	0,50	7,73	5,90	3,08	3,08
Paved	1,31	1,31	0,00	0,00	3,30	3,30
River	2,64	2,64	2,84	2,84	1,62	1,62
Buildings	7,90	7,88	0,00	0,00	4,94	4,91
Street	0,81	1,09	0,52	1,19	1,27	1,35

Table 1. Distribution of landcover area

designed greenways also protect the floodplain and provide wildlife migration corridors between otherwise isolated “patches” of native habitat (Smith 1993). Greenways and river trails combine recreational access with environmental enhancements and can often be incorporated into other infrastructure projects (Otto 2004). In this study, new access provided to connect all the riparian. In the dense settlement such as Geulis Island and Lebak Kantin some houses should be relocated, and the other should be moved back 1-2 meters. This strategy can trigger people to make their house reorientation to the river, make a small public space, and possible to plan some plantations in front of their house.

2. Balance recreational Activities Riverfront communities should provide facilities for as many recreational uses as possible while balancing some conflicting uses (for example, between power boats and bird watching platforms) and managing possible overuse of the river corridor (Otto 2004). In these areas several activities can be conducted such as bird watching, art performance, Other improvements are some building that has a dangerous condition must be relocated. For instance, there is a building located on the tip of the island, and there is also a building that located in the meander of the river, which has very high sinuosity. Lastly, all riverside is connected with a pathway continuously from segment

1, segment 2, and segment 3. In figure 6 there are some improvements. In segment 1 and segment 3 there was obvious difference between existing and designed, which the greenery open space much more spread than before. In contrast, seems like there are no significant improvement, but there are new accessibility under the canopy trees which has 1,5-2 meters wide.

Redefining Urban Eco River Scape Principles in Bogor City

After analysed the existing situation and designing the ecological strategy these are some results (table 1, and table 2). Table 1 and figure 7 illustrate a distribution of landcover area, from existing until designed one. Generally, all segments have reached approximately 30% of the trees in their area. In segment 1, there is an improvement from 1,43 Ha to 4,28 Ha, which is reached 30% of total area (segment 1) 14,79 Ha. Furthermore, there is also an improvement of pathways from 0,81 Ha to 1,09 Ha and some building are relocated which decreased the total area of building from 7,90 Ha to 7,88 Ha. In additions, other landcover are the same.

Segment 2 there only has one improvement by adding some pavements from 0,52 ha to 1,19 Ha. So, it decreases the number of shrub from 7,73 ha to 5,90 ha. On the other hand, segment 3 has three improvements. First, the canopy of trees increased

Carbon and Air Pollution	Segment 1 (Geulis Island)		Segment 2 (Bogor Botanical Garden)		Segment 3 (Lebak Kantin)	
	Existing	Designed	Existing	Designed	Existing	Designed
Carbon Storage (tons)	152,1	454,7	999,27	999,27	392,78	464,57
O3 (Lbs/year)	113,36	338,89	744,75	744,75	292,73	346,24
SO2 (Lbs/year)	38,03	113,7	249,88	249,88	98,22	116,17
NO2 (Lbs/year)	58,71	175,52	385,73	385,73	151,62	179,33
PM10 (Lbs/year)	105,16	314,37	690,87	690,87	271,56	321,2
CO (Lbs/year)	12,55	37,51	82,44	82,44	32,4	38,33

Table 2. Ecological services (carbon storage and air pollution removal)

from 3,70 ha to 4,37 ha. Second, the buildings decreased from 4,94 ha until 4,91 ha, which is two building relocated. Third, the pathways increased from 1,27 ha to 1,35 ha, which is some inspection route built near the river.

Table 2 and figure 8 show ecological services (carbon storage and air pollution) in three segments, between existing and designed. In general, most of the carbon storage and air pollution removal increased from existing until designed in segment 1 and segment 3, whereas in segment 2 the carbon storage and air pollutant removal are the same. In segment 1, carbon storage increased from 152,1 tons to 454,7 (3 times higher) tons, followed by air pollution removal in O3, SO2, NO2, PM10, and CO which most of the capacity removal by design increased third time higher than existing. On the other hand, in segment 2 the number of carbon storage and all of the air pollutant removal are the same. It was stable. Although some improvements already determined (in table 1) such as there are some pathways designed in segment 2. However, in segment 3 carbon storage increased from 392,78 tons to 464,57 tons (1,2 times higher), followed by air pollution removal from O3, SO2, NO2, PM10, until CO, which most of the capacity removal by design increased one point two times higher than existing.

It is clear that there is some correlation between land cover

distributions especially trees or greeneries improvement and ecological services that consist of carbon storage and air pollution removal. From table 1 and table 2, the conditions of segment 1 are very dense. The built area is more than 50%. After it designed by the ecological principles, the ecological services can reach 3 times higher than before. However, in segment 2, the intervention of making pathways does not give any impact to ecological services. At the same time, in segment 3, the conditions of the site have already had 20% of green open space; nevertheless, the buildings area are lower than segment 1 (30% building coverage), and the paved is higher than segment 1 (20%). Furthermore, the carbon storage and air pollution removal increased only 1,2 times higher than before, although the target of green coverage is the same between segment 1 and segment 3, which has 30% of trees coverage.

There are some planting design principles according to this result: first, the higher building coverage or, the denser of the settlement, the harder to distribute the trees. As a consequence, the collective rooftop is needed, and it can improve the number of green areas significantly. Second, the intervention of making pathways is not decreased the ecological services. The capability of removing pollutants are the same. Lastly, it is potentially important that in developing country, especially in

CONCLUSION

Indonesia home garden in the dense settlement are very crucial to improve the quality of the environment. Not only for ecologically but also for economically. Some local plantations are needed to give some beneficial values such as food including cooking spices plantation, fruits, vegetables, or even for psychological aspects such as flowers, and aromatherapy. When minimizing environmental impacts coincides with saving money, as in the case of many energy- and water-efficiency measures, the choice is clear. The Conservation Economy framework demonstrates that the principles of ecological design, applied systematically from the smallest to largest scales and supported by appropriate social institutions, can allow a resilient, enduring, and prosperous adaptation to place. (Van der Ryn 1996).

Carbon storage and air pollution removal are indicator of the quality of green urban space, thus those are correlate to the population of an area in this study. The more people live in dense area the more carbon storage and air pollution removal need in that area. It is because, people need healthy in their live. On the other hand, green open space in river ecosystem is needed to protect the river itself particularly, in riparian area. It is clear that river ecosystem in urban area is not only consider the existence of the green space but also consider about carbon storage and air pollution removal as a benefit for the people.

In conclusion, it is clear that there are significantly different from land ownership of three segments of Ciliwung River as urban riverscape. Segment 1 and segment 3 there are traditional conditions, which belongs to the local people. Segment 2 is the Botanical Garden that under the Indonesian Institute of Sciences, which has very natural conditions. From this study it clear that ecological continuity is needed and developing an access didn't make a significant difference to the ecological services. However, the conditions of traditional settlement in this case in Geulis Island (segment 1), and Lebak Kantin (segment 3) have needed a specific strategy to improve the green space, due to the land ownership. It is because not all local people can understand the benefit of ecological value. Thus, it is important to have a consolidation with some new strategy such as collective rooftops, optimizing home garden and abandoned land or building, or even make new access to the riverfront. These strategies solely to improve the quality of local people itself and the quality of urban riverscape. Another slightly different is the denser a settlement, the more effective the rooftop so that it can endorse the number of ecological services. On the other hand, the more paved and fewer buildings of the settlement, the more effective to improve ecological services by optimizing home garden and communal space. Moreover, it will lead to enhancing other eco-material that can substitute the paved.

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Native versus Exotic Plant Species in the Vacant Land of Four Portuguese Cities: Urban Ecology and Landscape Architecture

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ABSTRACT

The contemporary city has been growing discontinuously, leaving abandoned structures and vacant land in its wake. The current situation has been caused by economic uncertainty, real estate speculation, and continuous suburban development. The existence and relevance of this issue is well-established in the literature, and recent publications have shifted focus toward how to “reuse” vacant land and abandoned structures.

In the scope of the research NoVOID Project – “Ruins and vacant lands in the Portuguese cities: exploring hidden life in urban derelicts and alternative planning proposals for the perforated city”, funded by the FCT (PTDC/ATP-EUR/1180/2014) were identified and classified the main vacant and derelict urban spaces in four Portuguese cities: Lisbon, Barreiro, Guimarães, and Vizela.

The research starts from the idea that vegetation is a fundamental structuring element in landscapes. Not only does it dominate most land ecosystems through its biomass, but it also constitutes the habitat for animal populations

and is at the heart of the majority of human productive and cultural activities. It is also the element that best integrates a landscape’s biological response to environmental factors (physical, biological and anthropic). A botanical research was performed to a sample of twenty sites located in the four cities under study, to the different types selected (ruins, ruins, and yard and vacant lands), including the following phases: construct a floristic inventory with all the taxa found; establish the ratio of native and exotic species and identify the invasive species; identify the presence of RELAPPE species (in Portuguese: rare, endemic, localized, protected (e.g., species in the Habitats Directive), threatened or endangered). In total, 339 different species of plants were identified, 73% of which are native [32% represent synanthropic ruderals species, 1% (4 species) Iberian endemism, and only 1 specie is protected in Portugal] and 27% exotic (being 14% invasive or potentially invasive).

This study furthers the discussion on the ecological, functional, and aesthetic potential that vacant land and ruined spaces have in contemporary cities. Repurposing these spaces through innovative landscape architecture, for either temporary or permanent uses, represents a crucial step toward enriching urban life.

INTRODUCTION

The main aims of this paper are to identify, promote awareness of the importance of and the benefits to be gained from biodiversity and human/non-human interactions in existing ruins, urban hollows, and vacant lands, and developing new methods of working these urban landscapes. The study cases are four Portuguese cities (Lisbon, Barreiro, Guimarães, and Vizela) where in a sample of twenty spaces the botanical inventory was carried out, and a discussion about possible uses of these spaces is elaborated within the project NoVOID – “Ruins and vacant lands in Portuguese cities: exploring hidden life in urban derelicts and alternative planning proposals for the perforated city”, funded by the FCT.



Figure 1. The NoVOID's inventory map of ruins and vacant land in Lisbon, Portugal. Source: NoVOID Project.



Figure 2. The NoVOID's inventory map of ruins and vacant land in Barreiro, Portugal. Source: NoVOID Project.

MATERIAL AND METHOD OF THE APPROACH

The four cities studied are located in two urban areas of mainland Portugal (PT): Lisbon and Barreiro in Lisbon Metropolitan Area (AML), in west south central, and Guimarães and Vizela in Ave Intermunicipal Community (AVE), in northwest Portugal. To study these cities were defined in this research project three categories ruin, ruin yards and vacant land:

Ruins –structures produced by technology and intended for human use or for other purposes that have reached an advanced state of dilapidation, being therefore incapable of performing the function for which they were originally designed;

Ruin yards –non-built lands surrounding dilapidated buildings that visually can be considered as integral parts of the same property;

Vacant land – is defined in this study as unutilized, non-cultivated, non-landscaped, and non-built upland, with shrub and herbaceous covering showing signs of neglected and lack of maintenance, or presenting bare soil, rubble, and vestiges of razed buildings.

Project NoVOID will build on interdisciplinary work at the confluence of Human Geography,

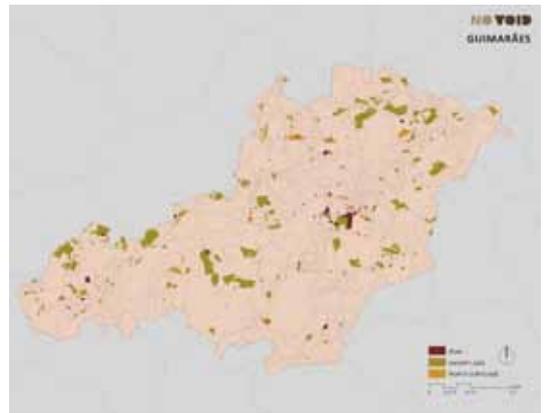


Figure 3. The NoVOID's inventory map of ruins and vacant land in Guimarães, Portugal. Source: NoVOID Project.

Ecology, Landscape Architecture, and Architecture. A multi-method approach was adopted: combining quantitative methods (statistical analysis of census data, remote sensing and vertical aerial photography interpretation, fauna and flora sampling, and inventories), with archival work and ethno-geographical qualitative methods (observation and interviews) in order to respond to the various components of the research. Fieldwork is very important since significant data was collected or confirmed with field surveys. The research of NoVOID project is focused on a sample of four cities representative of different shrinking urban contexts: Lisbon, Barreiro, Guimarães, and Vizela. The methodology developed in this

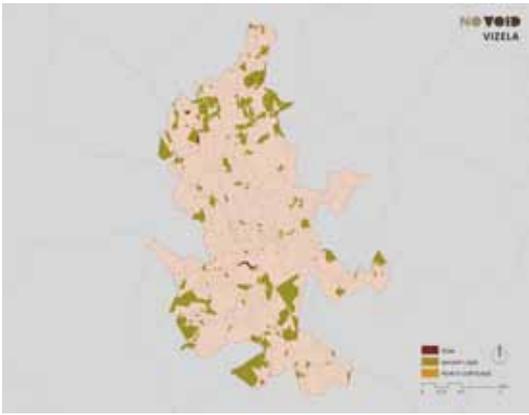


Figure 4. The NoVOID's inventory map of ruins and vacant land in Vizela, Portugal. Source: NoVOID Project.

research project could be applied in the future to other cities.

For the cities studied were identified and quantified by way of geographical information systems the areas corresponding to the typologies establish.

In the urban area of Lisbon (figure 1), were identified 2 173 buildings in ruins (91, 8ha, with ruined backyards), corresponding to 1.08% of the area of the city and 772 vacant lands (336.4 ha), which correspond to 3.98% of the area of the city. In the urban area of Barreiro (figure 2), there were identified 377 polygons in ruins (15 ha) corresponding to 2.2% of the area of the city and 169 vacant lands (194.8 ha), which occupy almost one third (29.2%) of the city's perimeter. In the urban area of Guimarães (figure 3) were identified 210 buildings in ruins (a total of 14 ha), which corresponds to 0.6% of the urban area and 218 land polygons (124.7 ha) that correspond to 5.31% of the area of the city. In the urban perimeter of Vizela (figure 4), a total of 70 polygons corresponding to ruins (2.1 ha) were identified, which covers 0.31% of the area of the city, and 139 vacant lands (91.2 ha) that correspond to 13.4% of the area of the city.

From a sample of twenty places identified a floristic inventory was done to characterize their biodiversity value (figure 5). This methodology followed

the main steps:

- 1) identification of all the taxa found in the target areas (plants);
- 1) construction of a floristic inventory;
- 1) establishing the ratio of native and exotic species and identify the invasive species;
- 1) identification of the presence of RELAPE species (rare, endemic, localized, threatened or endangered) and of species in the Natura 2000 network.

Thus, we can observe the coexistence of many species with a characteristic of strong invasiveness coexisting with some species of interest for protection and conservation. Species that occur habitually in the ruins and old walls of the studied cities which belong to the autochthonous flora and which are favored by the urban environment (specialists in urban ruins). In vacant areas, some grasslands could present other interesting species (like orchids). Despite the interest for the protection and conservation of some species associated to the urban ruins most of the flora is exotic, and much of it is invasive and is favored in its expansion by urban voids and urban ruins.

The range of ruins, vacant land, and abandoned ventures will be selected to propose meanwhile or permanent rehabilitation/reconversion programmes for those spaces as reference examples. The next stage aims is to create new urban areas that play a vital role as ecological, aesthetical and social in order to improve the urban comfort. Many of the proposals will involve the re-appropriation of public space or the occupation of terrains vague or abandoned land.

RESULTS AND DISCUSSION

The results show 339 different species identified, 73% are native [32% represent synanthropic ruderals species, 1% (4 species) Iberian



Figure 5. Examples of vacant land in four cities Lisbon (a), Barreiro (b), Guimarães (c) and Vizela (d), were the floristic inventory was done. Source: NoVOID Project, © Estevão Portela-Pereira.



Figure 6. Native species: *Antirrhinum linkianum* Boiss. & Reut. (a), *Ulex europaeus* subsp. *latebracteatus* (Mariz) Rothm. (b), *Sedum album* L. (c), and *Carex elata* subsp. *reuteriana* (Boiss.) Luceño & Aedo (b). Source: Flora-on.pt, © M Porto, A J Pereira.

endemism, and only 1 species is protected in Portugal] and 27% exotic (being 14% invasive or potentially invasive).

In the overall list, almost 3/4 of taxa are interpreted as natives versus 1/3 exotic species. Some species have value for protection and conservation, aesthetic or because they are Iberian endemism's: *Antirrhinum linkianum* Boiss. & Reut., *Ulex europaeus* subsp. *latebracteatus* (Mariz) Rothm., *Sedum album* L., and *Carex elata* subsp. *reuteriana* (Boiss.) Luceño & Aedo (figure 6).

None of these endemism's are, however, infrequent or rare, and are therefore not threatened species. However, some exotic species are invasive and are a risk for the balance of natural and urban ecosystems, for example, *Ipomoea acuminata* (Burm.) Merr., *Tropaeolum majus* L., *Ricinus communis* L., *Cortaderia selloana* (Schult. & Schult.f.) Asch. & Graebn. (figure 7).



Figure 7. Exotic species that are invasive: *Tropaeolum majus* L. (a), *Ipomoea acuminata* (Burm.) Merr. (b), *Ricinus communis* L. (c), *Cortaderia selloana* (Schult. & Schult.f.) Asch. & Graebn (d). Source: Flora-on.pt, Invasoras.pt © F Clamote, J D Almeida, Invasoras.pt.

Our research has shown that vacant land in the cities studied is full of native plants that are born spontaneously. The inventory of about 250 species of native flora, i.e., about 2/3 of the total of 335 plants, is relevant data for landscape architects to study their potential for use in green spaces without watering. Since irrigation of green areas is a significant cost, and water being scarce, it is essential to study solutions of native vegetation that is well adapted to the urban context.

The use of native's plants in urban green spaces contributes to sustainability and the increase of biodiversity. The use of native species with ornamental value should be increased in urban areas, because they are more resilient (requiring less watering and treatments for pests and diseases). Landscape architects can create interesting plans that combine native species with exotic species (not invasive species), respecting the

ecologic functionality, promoting the recreation potential and the increasing of the aesthetic value.

The vacant spaces with native flora may be the stage for the following temporary uses:

- The accomplishment of Environmental Education actions with schools for in situ observation of native vegetation;
- Temporary exhibitions with themes that cross the Art to Science;
- Workshops with the exploration of medicinal, aromatic and dye plants;
- Establishment of community gardens and gardens;
- Availability of the botanic inventory data of the 335 species in open databases so that they can be created an app for the discovery of the native and exotic flora of the vacant spaces of the city.

This research project, where the multidisciplinary team consists of geographers, architects, landscape architects, urban planners, botanists and other specialists, aims at looking into and discuss the value and potential of vacant and abandoned land in four cities and present solutions that enhance their value through meanwhile and permanent projects.

FINAL REMARKS

The dissemination of the results of this project NoVOID is intended to set criteria to the designers (landscapes architects, architects, urban planners) and authorities that act upon the environment and landscape, as well as the decision-makers and those who propose solutions and regulations. This methodology could be applied to other cities. Sustainable urban planning by valuing these vacant spaces and integrating them into the various types of green areas play a crucial role in the Ecology, biodiversity, urban resilience, aesthetic appreciation, and urban comfort.

The methodology and the proposals for temporary and permanent uses of this research can be applied to other cities.

The conflict between native versus exotic plant species in urban landscapes can be minimized by merging the knowledge of fields such as Landscape Architecture, Ecology, Botany, and Horticulture.

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Historical Landscapes as Scenes of Legislative Conflict: Nature Protection vs. Cultural Heritage

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cultural heritage, historical landscapes, landscape architecture, monument protection, nature and landscape protection

ABSTRACT

Historical gardens and parks are specific green spaces. Specific not only because of their historical value and significance related to a particular period or style, but also because of they are green spaces that are protected by two national legislative documents at the same time – Act No. 49/2002 on the Protection of the Monument Fund and Act No. 543/2002 on Nature and Landscape Protection. Moreover, the Slovak Republic is also internationally obliged to protect historical greenery sites based on two international agreements - The Venice Charter (ICOMOS, 1965) and The Florence Charter (ICOMOS, 1981). One might think that double or even manifold protection automatically means good protection; however this situation causes many conflicts in the everyday practice. This paper examines the general conflict situations and interfaces between the two laws and it shows and discusses particular examples where nature protection has complicated the protection of gardens as a historical landscape composition and a cultural monument.

INTRODUCTION

The rich history of architecture, garden design and landscape architecture has formed a series of varied valuable monuments and cultural heritage sites, designed in different styles and dating back to different periods of human

history. These cultural heritage sites include objects where plants were used as design elements, such as geometrical gardens of renaissance and baroque, romantic English landscape gardens and parks or designed open landscapes such as calvaries, historical alleys, churches and chapels and many other forms. In such situations, plants and building elements form a united couple of natural and cultural monuments. This situation creates valuable historical landscapes on the one hand, but also scenes of legislative conflict on the other side. Following The Venice Charter (ICOMOS, 1965) and The Florence Charter (ICOMOS, 1981), Slovakia is obliged to protect its historical green spaces as cultural heritage sites. At the national level, historical monuments of garden design and landscape architecture, including mainly gardens and parks, but also other forms of designed landscapes, are protected as cultural monuments under the Act No. 49/2002 on the Protection of the Monument Fund in the jurisdiction of the Monuments Board of the Slovak Republic established by the Ministry of Culture of the Slovak Republic. However, as trees belong to the main design elements of these hybrid monuments of nature and culture, these historical sites are also protected by Act No. 543/2002 on Nature and Landscape Protection in the jurisdiction of the Ministry of Environment of the Slovak Republic. These two legislations are in many cases conflicting or even counter-productive. The nature protection law protects all natural elements, while monument protection considers especially the overall design and cultural heritage, where trees are part of the composition as a specific category of design elements. This leads to problematic restoration or reconstruction of historical sites, which requires tree felling, clearance of spontaneous vegetation or removal of the shrub layer, as all trees and plants enjoy an equal nature protection status.

Objects of historical green spaces listed on the CLMF SR	Number of Monument Objects	Historical green spaces with a linkage to cultural monuments in the form of built constructions	Number of National Cultural Monuments
Park	276	Manor House and Park	125
Garden	34	Manor House with Compound	90
Alley	14	Manor House and Garden	8
Arboretum	2	Mansion and Park	8
Tree	3	Manor House and Arboretum	1
Pheasantry	1	Urban Palace and Park	4
Forest Park	1	Church and Garden	13
Urn Garden	1	Spa Resort with Park	12
Green Space	1	Observatory and Park	1
Rosarium (Rose Garden)	3	Memorial with Park	2
Cemetery	3	Cemetery with Green Spaces	9
Total	339	Calvary with Historical Green Spaces	2
Objects of historical green spaces registered as individual National Cultural Monuments (NCM)	14	Castle with Historical Green Spaces and Vegetation	9

Table 1. An overview of historical green spaces according to the register of the Central List of Monument Fund of the Slovak Republic (CLMF SR). Source: Monuments Board of the Slovak Republic, Division of the State Information System, 2017

The paper will examine particular situations in Slovakia, where nature protection and monument protection have caused conflicts and will take a closer look on problematic decision making procedures and solutions. The aim of the paper is to discuss improvement possibilities of Slovak legislative landscapes, which could increase the efficiency of future decision making.

Legislative protection of historical green spaces in Slovak Republic is ensured by two laws: Act No. 543/2002 on Nature and Landscape Protection (Nature Protection Law) and Act No. 49/2002 on Monument Fund Protection (Monument Protection Law). None of them considers protection of historical greenery as a particular category. Both consider historical green spaces as an integral part of a whole spectrum of cultural and natural heritage. It is possible to proclaim specific protection of historic green spaces. Slovak Republic is obligated in historic greenery protection also by international agreements - Venice Charter (1964) and Florence Charter (1981).

HISTORICAL GARDENS AND GREEN SPACES IN SLOVAKIA

The Slovak Act on Monument Fund Protection considers a historic garden as an architectural composition, which constitutes of primarily vegetation elements, which means that they are perishable, yet renewable. Thus, its appearance reflects the perpetual balance between the cycle of the seasons, the growth and decay of nature and the desire of the artist and craftsman to keep it permanently unchanged. This principle is a basic axiom for law protection of historic greenery as a kind of cultural monument in Slovakia.

The Central List of Monument Fund of the Slovak Republic in terms of Act No. 49/2002 registers 339 cultural monuments in the category of historical green spaces.

HISTORICAL GREENERY PROTECTION IN SLOVAKIA

Historical greenery is in legislative



Figure 1. The main view of the building is disturbed by an unoriginal planting of blue spruce. Archive of the Regional Monument Board in Prešov, 2017



Figure 2. Spontaneous woody vegetation disturbs the main axial view of the manor house in Krivany. Archive of the Regional Monument Board in Prešov, 2017



Figure 3. A historical landscape garden composition with mature and old trees at the manor house in Šarišské Bohdanovce. Archive of the Regional Monument Board in Prešov, 2017

understanding a green space registered in the Central List of Monument Fund of the Slovak Republic. It can have two forms – an individual cultural monument or part of a monument area or its protection zone according to the Monument Protection Law. All other parks are protected according to the Act No. 543/2002 on Nature and

Landscape Protection. This means that all greenery, including historical greenery, in Slovakia is protected. This protection however considers “only” the biological value of trees, as they were situated in an open landscape. Although the object of protection is in both laws the same, the protection principle is considerably different. In the case of historical greenery, the Monument Protection Fund considers a tree as the most important compositional element of a landscape composition. The decision making on felling trees is a competence of a respective Nature and Landscape Protection Authority. This authority however cannot decide in contradiction to decisions made by a Monument Fund Protection Authority. This seemingly doubled protection derives from a different assessment of historical greenery. While a Nature and Landscape Protection Authority assesses in most cases the biological and health condition of single trees, a Monument Protection Authority primarily considers the compositional and landscape architectural value of a tree in their decision making process. However, Monument Protection Authorities cannot make decisions on tree felling, but it specifies requirements on necessary interventions into the green space and vegetation cover structure of a landscape composition. This commonly leads to complications and disagreements. This duplicated protection is problematic in practice and therefore a reconsideration of the protection of some sites has been initiated. If a composition was created as a landscape architectural work and the author of this composition originally considered the necessity of maintenance, which aimed to keep an initial or a targeted state of the composition and if this kind of maintenance was practiced in the past, then in such situations the requirements and aims of the Monument Fund Authority should be prioritised. But if the original composition was meant to be a landscape project or if

EXAMPLES OF CONFLICTS BETWEEN NATURE PROTECTION AND MONUMENT PROTECTION



Figure 4. Wrongly selected species for replacement plantings in the historical spa park of Vyšné Ružbachy. Archive of the Regional Monument Board in Prešov, 2017



Figure 5. Trees in the historical park in Strážky cover the main axial view of the manor house. Archive of the Regional Monument Board in Prešov, 2017

the original composition of a garden or park was significantly changed or lost, in such cases a prioritisation of Nature and Landscape Protection Law could be more efficient and relevant. Contact areas or in many cases friction areas of both protection authorities is obvious in their approach to protection in specific assessment procedures on tree felling or on the impact of legislatively obligatory substitute plantings on a registered historical green space (Semanová, 2013).

In the historical park at the manor house in Ľubotice, an original inner view on a former service building was reconstructed through a replacement of the vanished building by a mass and volume copy. However a secondary planting of blue spruce from the last third of the 20th century could not be removed because the Nature and Landscape Protection Authority did not allow the felling of this tree. Although the Monument Protection Authority has decided that the tree should be left until reaching its final stage of life and then it will not be replaced by a new tree. This can be considered a negative example of restoration and an illustrative example of conflict (Figure 1).

Another negative example is the park at the manor house in Krivany. The main axial view from the manor house into the park and the reverse visual linkage from the park to the manor house have been disrupted. The manor house has not been used for a long time. In the 1980s, the manor house has been fenced in by a mesh fence and this was an ideal place for growing of spontaneous vegetation. This grew to adult trees. The mesh fence was subsequently removed but the spontaneous trees had to be preserved, despite the fact that they transversally disrupted the main axial view. This unpleasant situation has remained unchanged (Figure 2).

The park at the manor house in Šarišské Bohdanovce can be considered a relatively positive example. The composition of the park has been partially restored; however there are still some axial views that should be opened. An old original common spruce has been removed from the woody plant structure and it has been replaced by the same species (Figure 3).

Selection of unfeasible woody

CONCLUSION AND PERSPECTIVES

plants that are not original in the landscape composition can be another result of the conflict between Nature and Landscape Protection and Monument Protection. The traditional wooden houses in the historical spa park of Vyšné Ružbachy were originally lined by a freely growing and overgrown hedge of Tatarian honeysuckle (*Lonicera tatarica*) that was originally regularly pruned. This has been recently removed and replaced by a line planting of thuja and spruce, which cannot be considered an adequate replacement. The original overgrown and overaged hedge should have been removed and replaced by the same species, with the possibility of choosing a variety with a smaller growth so that pruning can be reduced or completely avoided (Figure 4).

An illustrative example of a conflict between Nature and Landscape Protection and Monument Protection is the Park of the Manor House in Strážky. The main axial view before reconstruction is partially covered and narrowed by trees from the original composition that dates back to the establishment of the park (Figure 5).

This is also combined with compositionally unsuitable additional plantings of blue spruce (*Picea pungens*). There were more of them, but they gradually started to vanish and disappear from the composition. This situation is also connected to the fact that the accompanying vegetation of a nearby river Poprad was not sufficiently maintained and the riverside vegetation started to cover one of the main views of the manor house. Here the Nature and Landscape Protection Authority did not allow removing the unsuitable trees and therefore this can be considered a negative approach and a complicated procedure. Currently, the main axial view is already partially opened by targeted monument protection interventions.

The existing approaches to preservation, maintenance and management of historical green space objects in Slovakia can neither be considered satisfactory nor exemplary. A paradox is that there is a very rich cultural heritage in the form of historical gardens and parks, with a relatively detailed and exhaustive evidence and documentation. However at the same time, there is a problematic coexistence of two equally important national laws. Another problem is caused by the fact that in many cases the competent bodies do neither have a sufficient interest in objects of historical green space, nor the money for an adequate maintenance and preservation. This problem is even further deepened by situations where conventional nature protection makes it impossible to undertake some necessary interventions to existing green spaces, in order to renew or preserve the cultural and historical value of the original spatial composition. On the other hand, it should also not happen that a valuable solitary tree which has achieved significant dendrometric parameters would now be massively pruned to open up an overgrown view. In the case of historical garden preservation, maintenance and renewal, a joint approach is needed where professionals from both perspectives could achieve a consensus and make decisions. It is important to highlight the fact that each particular situation might require different approaches. Extreme nature protection, along with no interest and lack of investment capital has caused degradation and in many cases even destruction of valuable garden heritage sites. In those Monument Boards where there are experts in landscape architecture working on garden heritage conservation, the positive difference is perceivable. Landscape Architects have

the necessary knowledge capacity and skills to negotiate with both, monument conservationists on side and nature conservationists on the other side. Moreover, they can bring 'landscape' as a heritage aspect and issue into the discussion. An optimistic perspective is represented by the field of study of Landscape Architecture. The Slovak University of Agriculture in Nitra, as the only higher education institution in Slovakia training future Landscape Architects, has the responsibility and ambition to prepare graduates for the uneasy position of garden heritage conservationists, especially in such situations where the historical value of the original spatial composition is still identifiable and reconstructable. Landscape Architects should be the experts to decide about the most appropriate approaches, ways and tools of garden heritage restoration. In Slovakia, this still requires a significant paradigmatic change, which means a 'long-distance run'. Positive inspirations are represented by a few professional restorations, which show that it is possible (some of them are presented in this paper). The future perspective of Slovak garden heritage conservation is thus to be seen in well-educated and competent young professionals in the field of Landscape Architecture that has been recently re-accredited by IFLA-Europe from 2018 to 2023.

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For a Sustainable Aesthetic

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Beauty, sustainable, Mario Schjetnan

Roberto Burle Marx, Georges Descombes

ABSTRACT

Much of the attention paid to landscape architecture in the last two decades has been restricted to discussions of sustainable practice, environmental resilience, and social justice. As a result, the regard for designing with plants as an art has languished. Of the possible approaches to planting design that address both sustainable and aesthetic parameters, this paper will discuss only two: using plants primarily for spatial definition; and regarding both native and suitable exotic species as ethical and viable choices.

In terms of landscape design at a broader scale, one could regard with equal merit Joan Nassauer's proposal for using an orderly framing of areas of more unkempt vegetation, and a wilder buffer framing an orderly interior. In either case sufficient area must be devoted to species and patterns needed for sustainability, but planted with some artistic intent.

Ultimately, landscape design should not be a question of either/or—either sustainable practice or an aesthetically pleasing landscape—but one of both/and: both beauty and responsibility—a creative approach that yields something better than either value system taken in isolation.

FULL PAPER

Much of the attention paid to landscape architecture in the last two decades has been restricted to discussions of sustainable practice, environmental resilience, and social justice. As a result, the regard for designing with plants as an art has languished, at various times hampered by local ordinances that restrict the species accepted as street trees, the paucity of varieties available in nurseries, and perhaps also the limited instruction in planting

design offered in university curricula. While garden designers have continued to actively explore the selection and combination of plants for harmonious or other aesthetic effects, this has been less true in the broader practice of landscape architecture, where surface areas are greater than the garden and constituencies are larger than the single client or family.¹ Exceptions to this rather broad generalization certainly exist: those landscape architects who have designed with plants responsibly and creatively, using form, color, and growth patterns to produce attractive and engaging landscapes.

This paper extends the argument first made in a paper presented at ECLAS last year. In that paper I tried to reestablish interest in an aesthetic planting design that surpasses the functional criteria that have occupied the center of discussions over the recent decades. Among these functional requirements are the restrictions on urban tree species, the polemic for the use of only native plants, and a stress on plant selection for animal habitat. I must stress that in no way am I dismissing the importance of plant use based on these criteria—I simply want more. I want landscapes that are both appropriate *and* aesthetically pleasing. Of course I agree that beauty is ultimately in the eyes and mind of the individual, but those personal opinions are usually informed and confined by social norms: we are individuals, but we are also social animals shaped by our culture. Until relatively recently, for example, Californians had no issues with the eucalyptus tree, a species imported from Australia into the state during the nineteenth century for use as windbreaks on farms and ranches, and as a source of wood for railroad ties. Today, however, long after the eucalyptus had become a dominant species—though susceptible to death by the climate's rare frosts, or causing injury by falling limbs—the tree is no longer popular, and is today threatened

by periodic movements to eradicate them.² Given the ubiquity of the eucalyptus, its complete eradication is clearly an impossibility, although new plantings of the tree have been curtailed. My point is that although originally brought to California only for practical reasons, the eucalyptus today displays an aesthetic that has become appreciated, and even regarded by some as an endemic Californian tree.³

Of the many possible considerations behind planting design that addresses *both* sustainable and aesthetic parameters, I will focus only on two: planting used primarily to define space; and an argument that both native and suitable exotic species are ethical and viable choices. My ultimate goal is to show that in each case the landscape architect achieved a level of aesthetic excellence and sensual provocation that surpassed functional requirements such as sustainability. Four case studies will demonstrate that planting design can achieve a status as art, while meeting all demands for sustainable practice: the 1947 Donnell garden in Sonoma, California by Thomas Church, the 2011 Bicentennial Park in Mexico City by Mario Schjetnan and the Grupo Diseño Urbano, and the 203–2017 renaturalization of the River Aire outside Geneva by SUPERPOSITIONS. Lastly, to illustrate the masterful use of plants both native and exotic, I will discuss the 1979–1991 Fazenda Vargem Grande project in Areias, Brazil, by Roberto Burle Marx.⁴ Although these landscapes applied different modes of thinking their design, each nonetheless led to a landscape botanically appropriate and aesthetically gratifying. Admittedly, as an anonymous reviewer of this paper noted, these are a subjective choice of methods and projects, and then cited approaches in Germany that support spontaneous growth, and in New Zealand that use native species in a manner that mimics natural processes.⁵ One cannot dismiss these tactics as invalid of course, but I would question whether or not

these approaches to planting design represent any notable degree of the creativity. Can we not do more than mimic?

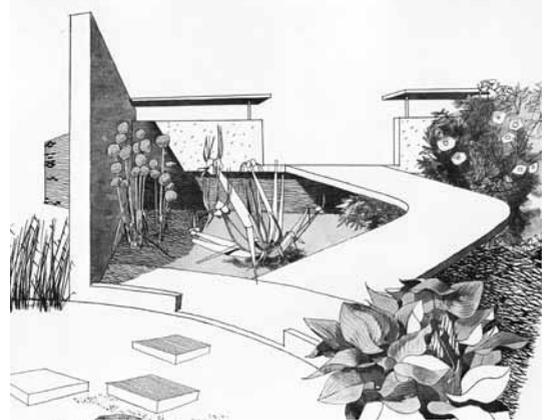


Figure 1 Christopher Tunnard (Gordon Cullen, Delineator), "Plants with Grey Foliage." [*Gardens in the Modern Landscape*, 1938]

The "structural" use of plants was one of the pillars of modernist landscape design, first advanced by Christopher Tunnard in his 1938 book *Gardens in the Modern Landscape*, and later revived and proselytized by Garrett Eckbo in *Landscape for Living*, published in 1950.⁶ To these landscape architects, the "structural" use of plants implied that in the designed landscape the primary purpose of trees, shrubs, and other vegetation was their ability to define space and not their color or beauty (figure 1). Of course, while this may have been a more focused statement of intention, the idea was hardly new. Throughout landscape



Figure 2 André le Nôtre, Parc de Sceaux, France, 1670–1690. Poplars lining the canal. [Author]



Figure 3 Thomas Church, Donnell Garden, Sonoma, California, 1947. Live oaks cover the lanai. [Author]

history trees and shrubs have been used architecturally, famously in gardens such as Versailles and Sceaux by André le Nôtre (figure 2). Although the poplars that today flank the canal are a twentieth-century addition, they represent how planes or masses of greenery can rival, or substitute for, planes or masses of masonry. Whether geometric or more naturalistic in their arrangement—as in the English landscape garden—trees alone can successfully define space. In the modern period, however, the prescription was somewhat different than in the past, with landscape theorists arguing that somehow one could distinguish pure form from all cultural and aesthetic associations with the plant.

A structural approach could plant anew or appropriate existing vegetation. Thomas Church incorporated stands of mature California Live Oak (*Quercus agrifolia*) growing on the site of his Donnell garden, thus truly consulting the *genius loci*. This appropriation might represent the most basic “sustainable” practice: using, through maintenance or rearrangement, the vegetation endemic to the site (figure 3). Although Church claimed that the Donnell design, particularly its swimming pool, derived from the natural meanders of the nearby Napa River, a certain degree of abstraction was necessarily involved.⁷ Despite its contemporary geometry, however, the primary structuring elements of the garden were the existing live

oaks.⁸ The planning of the garden, in fact, *derived* to large degree from the disposition of these trees, and for more than half a century they have continued to serve as the primary elements shaping the garden spaces. Here “sustainable planting design” did not involve a visit to the nursery for plants requiring little water or care, but instead understood the masses and qualities of the local vegetation, and incorporated them into the design. Planting design becomes integration rather than selection and insertion.

In complete contrast to the design method employed at the Donnell garden was the approach taken by Mario Schjetnan and the Grupo Diseño Urbano in the design of the Bicentennial Park in Mexico City. Here there was nothing, absolutely nothing, that could be used for the proposed park. Every aspect of the design had to find a new beginning. To be constructed on land polluted by decades-long occupation by an oil refinery, after remediation the design would begin with a clean slate. The site was so thoroughly polluted that removing all the tainted soil was impractical, in fact impossible. Instead a thick concrete slab would cap the most problematic areas of the site. In the planting of the wooded zone of the botanical garden, the design team determined how much soil was required for the health of each species of tree. The variance in the soil depth required defined the varying contours of the new land.⁹ A portion of the new park would be dedicated to the display of indigenous flora from the many regions of Mexico. While some plants could thrive in the atmospheric conditions of the Mexican capital, others would need support in glass houses. Following the sustainable directives that propelled the overall design, the glass houses were designed with inverted-pyramidal roofs configured to collect rainfall and store it in underground cisterns until needed for irrigation during the drier months of the year (figure 4). In the glass houses the tropical species have grown into a



Figure 4 Mario Schjetnan, Bicentennial Park, Mexico City, Mexico, 2011. Glass houses as chinampas (“floating gardens”). [Author]

jungle. A former oil pit was converted into use as a multi-level orchid house, while other areas now support the temperate plants native to the region. Here we see a sustainable approach whose basis lay in an aesthetic idea, an approach tempered by the curatorial program and sustainable needs. “Sustainability” is used as a means to an end and not an end in itself.

Some landscape architects argue that one must use only native plants in order to achieve an ethical and tenable landscape design. In instances this approach, although certainly worthy, has been attacked as “racist” by the counter argument: if a plant has grown in similar conditions and has no invasive or other negative attributes, there is no good reason to deny its use.¹⁰ From observations of nature and studies of botany, they suggest, we can determine what is appropriate and what will prosper under the local climatic and soil conditions. Plants need not be native. In addition, the conditions of a designed landscape in a city are far different than those of the forest or rural terrain. The Belgian landscape architect Bas Smets has told of his disputes with local authorities who required the use of native species.¹¹ Smets countered by arguing that the conditions of the city are not those of the countryside, and trees that do well in rural settings might not survive in urban situations.¹² In the United States we have seen a rapid rise in the use of

Metasequoia glyptostroboides and *Ginkgo biloba*, ancient trees of Chinese origin that do well in urban conditions—they are, after all, among the oldest species on Earth and must know something about how to survive. Can we not argue for the use of any species that will not deteriorate indigenous environments and yet will thrive in its new home?

Many landscape designs mix native and exotic species, projects that flourish with no undue burden on the local environment. In photos, the plants used in the renaturalization of the River Aire appear to be spontaneous and to be indigenous to the site; this is not the case, or true only in part. Implemented over a period of more than a decade, the project by SUPERPOSITIONS, with Georges Descombes as principal designer, transformed the existing Aire canal into a recreational riverine landscape reshaped to address the threat of potential flooding. While the dominant labor was addressed to configure the river bed and its adjacent terrain, earth movement was augmented by the importation of hundreds of thousands of plants. Some of these were indigenous to the site or region, but other were selected for their ability to stabilize the soil and prevent erosion. And yet, in the warmer months, the effect is quite beautiful, displaying a richness of textures and colors that even might rival those of the herbaceous borders by Gertrude Jekyll—but at a vastly larger scale (figure 5).¹³ And even an experienced landscape architect, botanist, and plant collector like Roberto Burle Marx mixed Brazilian and imported species in his landscape designs.

At the Fazenda Vargem Grande in Areias, Roberto Burle Marx did rely to large degree on native Brazilian plants such as bromeliads and palms to convert a former coffee plantation into a magnificent estate garden. In addition to being both artist and plant collector, Burle Marx has been known as a landscape architect who used primarily Brazilian plants to create gardens with strong patterns or spatial



Figure 5 Georges Descombes/SUPERPOSITIONS, Renaturalization of the L'Aire, Geneva, Switzerland, 2001+. [Author, August 2012]

structures that supported flowers and foliage rich in color and form.¹⁴ However, he *also* imported plants and trees from as far away as Madagascar, and one might add, at considerable expense. Yet despite any troubling issues of adaptation, the “immigrants” in this particular Paulista garden fully assimilated without problems [figure 6]. One must look at Burle Marx’s plant selection in regards to its forms and not only genealogy. In a lecture given in 1962, he stated: “Ideally, we should plant only species native to the area; but in some less-favored areas this might not produce a garden. Even for me, in Brazil,” he continued “where I have the choice of five thousand trees and shrubs, there are limitations. With the richest national flora in the world, I have to borrow to find plants that will give flowers in flowers beds.”¹⁵ In his designs Burle Marx consistently used areas planted with a single species to yield low shapes or shaped volumes. In the upper pool at Fazenda Vargem Grande, for example, the plants filling each of the vegetal blocks were chosen for their color, texture, and the height to which they naturally grew [figure 7]. In this way, without undue maintenance, Burle Marx invigorated the French tradition of the parterre by sculpting three-dimension reliefs rather than drawing flat patterns that remained rooted to the ground.



Figure 6 Roberto Burle Marx, Fazenda Vargem Grande, Arealis, Brazil, 1979–1990. Pools and planting on the upper terrace. [Author]

A question: How long is required for a plant to be regarded as native?¹⁶

To this point the discussion been focused on plant selection with only some suggestion of how their overall designs might be configured. Let me now briefly address aesthetically satisfying, sustainable approaches to planting design more broadly, at the level of the landscape design as a whole.

Two decades ago Joan Nassauer proposed an aesthetic for sustainable design based on using an orderly frame that contained interior plantings allowed to grow without undue control: in effect, allowing “messy” interior planting [figure 8].¹⁷ In her essay Nassauer addressed the social issue that links control and neatness with caring and sociability. If we must leave shrubs uncut to support bird habitat, or let grasses cover all surfaces left unmown, or let fallen trees rot before our eyes to support insect life, let us at least contain these zones within plantations that make clear our *intention* to create these messy areas. This is essentially the same strategy as putting the most hideous garbage in a handsome bin or nuclear waste in elegant impermeable containers. Well, perhaps not quite. While it is open to question whether social norms can be sheathed in respectability in this way, it avoids the larger issue of trying to change the aesthetic preferences of a nation or culture.

The Nassauer scheme is but one



Figure 7 Roberto Burle Marx, Fazenda Vargem Grande, Areias, Brazil, 1979–1990. Mixed planting as a relief. [Author]

of several possible approaches, of course. Conversely, we might propose a wild, unkempt buffer used to frame an orderly interior, much like someone with a wild haircut clad in a well-tailored suit. The Oehme van Sweden design for the 1979 Department of Commerce in Washington, DC used just this approach, surrounding a well-maintained lawn with borders richly planted with diverse species. The key factor is that whatever treatment is used must be clear and obvious; it must communicate that the landscape has been created intentionally in this way and is not just the result of neglect.¹⁸ And it should be planted with its aesthetic impact as a major consideration.

Both these two concepts could devote sufficient area to varied species and spatial patterns in order to achieve “sustainability”, but employing plants selected and composed with artistic intent. Both are most often and obviously are studied in plan, however. Instead, we must also explore the design in section, perhaps by creating an artistic relationship between an understory planted to meet aesthetic and ecological need that is in turn structured by the judicious selection and placement of trees. Burle Marx’s work provides a model here. Realizing landscapes both beautiful and sustainable will not be easy because social norms color



Figure 8 Orderly Frame, Messy Interior (left); Messy Frame, Orderly Interior (right).jpg

our readings and appreciation of any design. Perhaps the goal can be only achieved incrementally, in stages. Ultimately, landscape design should not be a question of *either/or*—either sustainable practice or an aesthetically pleasing landscape—but one of *both/and*: *both* beauty and responsibility—a creative approach that yields something better than either value system taken in isolation.

In the practice of *ikebana*, the Japanese art of floral arrangement, the artist composes a limited group of vegetal elements to reveal their individual and collective forms and life forces. Sofu Teshigahara, founder of the Sogetsu school of flower arrangement, believed that: “Ikebana must not only restore any beauty which is lost when the flower is detached from nature—something also must be added, You begin with an idea of beauty with which you are already familiar and keep studying and experimenting.”¹⁹ Through selection, isolation, and reconfiguration, there emerges a new entity, a composite form possessing an aesthetic presence greater than the sum of its individual constituents. Might the lessons provided by the practice of *ikebana* inform planting design at a larger scale? Or is a complete transformation of approach required when working with vegetation very much alive: ever growing, hopefully thriving, but ever tending to die?

NOTES

ⁱ As well represented by the Royal Horticultural Society’s annual Chelsea Flower Show in the United Kingdom.

ii Eucalyptus are so widespread in California, and have become an integral part of the landscape over almost two centuries, that most people consider them native. Emma Marris, "The Great Eucalyptus Debate," *The Atlantic*, 30 November 2016.

iii Of course, in Australia the eucalyptus, or "gum", has been long a symbol of the country, celebrated in paintings such as Tom Roberts's *A Queen of Gums* (1826), Private Collection.

iv Roberto Burle Marx is credited with discovering a number of plants collected on expeditions in the Amazon and other parts of Brazil, including the *Heliconia burle-marxii*. The numerous books about the landscape architect include P. M. Bardi, *The Tropical Gardens of Roberto Burle Marx*, New York: Reinhold, 1964; Giulio G. Rizzo, *Roberto Burle Marx: Il Giardino del Novecento*, Florence: Cantini, 1992; and Guilherme Mazza Dourado, *Modernidade verde: Jardins de Burle Marx*, São Paulo: Editora Senac 2009.

v Anonymous reviewer.

vi Although his definition of "structural" is somewhat vague, Tunnard's argument attempted to look beyond the selection of plants used primarily for aspects such as color or even rarity. Christopher Tunnard, *Gardens in the Modern Landscape*, London: Architectural Press, 1938; "The plants live in space and in the earth at once, and each and every plant is in itself an organization of space, containing within its three-dimensional silhouette a most complex and variable enclosure, a structure of marvelous articulation and delicacy, a piece of constructivist sculpture of the most tremendous richness in variety." Garrett Eckbo, *Landscape for Living*, New York: Duell Sloan, and Pearce, 1950, p. 93.

vii The pool, its shape inspired by the winding creeks of the salt marshes below, was designed to provide adequate space for all water activities." Thomas Church, *Gardens Are For People*, New York: Reinhold, 1955, p. 227. See also Marc Treib, *The Donnell and Eckbo Gardens: Two Californian Masterworks*, San Francisco: William Stout, 2005.

viii This was the principal reason that the garden could be photographed, and subsequently published, even before it was completed. For one photograph see Peter Shephard, *Modern Gardens*, London: Architectural Press, 1953, p. 45.

ix "The garden's topographic design was based around the needs of the plants from each biome: the desert section, for example, is practically at ground level, while the tropical forest biome required four meters of additional soil." Mario Schjetnan, *Reconciliar Ciudad y Naturaleza/Reconciling City and Nature: GDU 40 Years*, Mexico City: Universidad Nacional Autónoma de México, 2017, p. 140.

x The prescription for native species during the era of National Socialism in Germany has been extensively studied by Gert Gröning and Joachim Wolsche-Buhlmann. See their "Some Notes on the Mania for Native Plants in Germany," *Landscape Journal*, Fall 1992. For the counter argument see Kim Sorvig, "Natives and Nazis: An Imaginary Conspiracy in Ecological Design: Commentary on G. Groening and J. Wolschke-Bulmahn's 'Some Notes on the Mania for Native Plants in Germany,'" *Landscape Journal*, March 1994.

xi Bas Smets, in conversation with the author, 15 March 2015, San Francisco.

xii The Swedish landscape architect recently reiterated these points in his presentation about his use of beeches in an urban plaza. Thorbjörn Andersson, "Planting Strategies in the Northern Latitudes," University of California, Berkeley, 17 February 2018.

xiii Jekyll is celebrated for her mixed, herbaceous borders, with their rich mix of color and textures. Although in some ways appearing "natural", these were hardly "sustainable" in the manner we expect today. To truly display their complete beauty, the bed were often replanted three times a year.

xiv Burle Marx's own garden, called the *Sítio*, located outside Rio de Janeiro, is currently being nominated as a UNESCO World Heritage Site.

xv Roberto Burle Marx, *The Garden as a Form of Art*, 1962; in Gareth Doherty, *Roberto Burle Marx Lectures: Landscape as Art and Urbanism*, Zurich: Lars Müller, 2018, p. 115.

xvi Stephen Jay Gould argues that what is considered native is itself dynamic. In effect, a native is a species that arrived first and was sufficiently strong to outlive other species in the region. But at what date does one stop the clock and say that no more species shall be introduced? "An Evolutionary Perspective on Strengths, Fallacies, and Confusions in the

Concept of Native Plants, in *Nature and Ideology: Natural Garden Design in the Twentieth Century*, Washington DC; Dumbarton Oaks, 1997, pp. 11–20.

^{xvii} This argument wisely addressed the relation between societal norms of decency and the ecological need for plant diversity and habitat. Joan Nassauer, “Messy Ecosystems, Orderly Frames.” *Landscape Journal*, Fall 1995, pp. 161-170.

^{xviii} This modification of interpretation is reflected in the quip that a design attempts to match the “intended perception” with the “perceived intention.”

^{xix} Teshigahara Sofu, *Kadensō: The Book of Flowers*, Tokyo: Sogetsu School of Ikebana, 1979. Although the compositions on display often appear to be highly contrived, the intention behind ikebana is to create a sense of “living flowers.” See Alfred Koehn, *The Way of Japanese Flower Arrangement*, Tokyo: Kyo Bun Kwan, 1937; Patricia Massy, ed., *The Essential of Ikebana*, Tokyo: Shufunotomo, 1987; and Sofu Teshigahara, *The Fifty Principles of Sogetsu*, Tokyo: Sogetsu School of Ikebana, 2004.

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5.3. CONSERVATION AND DEVELOPMENT

GROUP C

Designing the Conflict Heritage of
Post-Military Landscapes

Verena Butt

Cold War Heritage in Northeastern Italy,
a Challenge for Landscape Design

Luca Maria Francesco Fabris

From Conflict to Commemoration:
Finnish Civil War in the Landscape of
Tampere

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PECHA KUCHA PAPER

From Iron Curtain to Cross-Border
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Attila Tóth

A Conflict of One Hundred Years Ago as a
Challenge for Spatial Development Today:
The Conservation of WWI-heritage

Hanne Van den Berghe

Designing the Conflict Heritage of Post-Military Landscapes

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ABSTRACT

Although the processes of militarising and de-militarising landscapes in Germany are directly related to changing political situations, the significance of post-military landscapes as political and historical heritage is widely underestimated. The paper contends that areas that are now divested of their military function nonetheless represent conflict and also give rise to conflicting interpretations of the heritage. Taking this as a starting point, the present paper focuses on three design case studies and relates them to a theoretical background. The examples represent approaches that range from revealing the largely unknown military perspective of the landscape, through the encouragement of social engagement on behalf of a site heavily burdened with history to an almost playful but sensitive approach towards a former airfield. The author aims to foster a discussion about the meaning of post-military landscapes by pointing to their potential as public spaces, nature zones and heritage sites through integrated design approaches.

INTRODUCTION

From the end of the 19th century onwards, the military required more and more land to prepare for conflicts and test new weapon technologies. Its spatial expansion peaked in Germany before and during World War II and even increased during the Cold War. This situation changed rapidly with the fall of the Iron Curtain in 1989, when the Soviet troops left the former GDR, most

of the troops stationed in West Germany were withdrawn and the number of German soldiers was also reduced. Of the almost 1.4 million soldiers stationed in 1989, less than 0.5 million remained in 1995 (Kalman, 1997: 10). Currently, after 70 years of being stationed there, the British Rhine Army is now withdrawing.

Thousand of square kilometres have become “post-military landscapes” that contain multiple traces of past political and historical periods. The motivation for this research derives from the observation that this dimension usually seems to be overseen or even neglected when deciding on the civilian future of these sites. Currently, the focus is primarily on their ecological value. As a result, abandoned buildings and relicts from former military grounds that are witness to a political heritage are vanishing from sight, are misinterpreted or even being removed.

This paper’s first thesis states that post-military landscapes are a heritage of and in conflict and are interpreted in conflicting ways. The second is that landscape design can reveal these conflicts and resolve conflicting views when re-designing the site.

Two research questions derive from this. First, which aspects contribute to conflicting views of post-military terrain? Second, how can landscape design reveal such conflicts and support a reflective discussion on the meaning of those landscapes for the current society and future generations?

To answer these questions, literature research has been carried out, students’ studios have been set up (research through design) and projects already realised have been investigated (research about design).

Conflicting views of heritage

While used as such, military sites were isolated for decades and swathes of countryside were subordinated to military needs. In contrast to modern civilian countryside, they lack major



Figure 1. Grassland on the Bergen military training grounds (Image: V. Butt)

traffic infrastructure, settlements and the impact of an industrialised agriculture. Their dense forests, extensive grass- and heathlands and relicts of traditional cultural landscapes, lend them a unique aesthetic appearance. (Figure 1).

Military activities led to the preservation and creation of habitats for rare species. Thanks to these ecological qualities, many still active military landscapes are protected Natura 2000 areas. Similarly, many sites were declared national parks or biosphere reserves after the military's withdrawal.

But post-military grounds allow further interpretations when focussing on their political history, thus rendering them a heritage with conflicting viewpoints.

One such aspect of political interest lies in how sites originally became militarised. To ensure the availability of large areas of land for setting up camps and for conducting training, civilian property was



Figure 2. Mock-up village on the still active Senne training grounds (Image: V. Butt)

expropriated on a large scale, mostly forcibly. In some cases, concentration camp inmates, forced labourers and war prisoners worked on the sites.

Another aspect is the purpose of military landscapes. Military training areas were adapted and equipped to practise for armed conflicts in regions of conflict (Figure 2). Consequently, the majority of these landscapes have been contaminated irreversibly by the large-scale use of ammunition.

On other sites, high embankments were constructed to store ammunition, secret facilities were built to test the destructive power of new weapon technology and whole airfields were erected. Post-military landscapes thus represent past and current world politics.

A third aspect of the conflict heritage occurs in the heritage management or the sites' re-design. In the following, these conflicts will be named as "dissonances", thereby referring to the authors John E. Tunbridge and Gregory J. Ashworth (1996), who coined the term of "dissonant heritage" (ibid.).

DESIGN APPROACHES TO A HERITAGE OF CONFLICTING INTERPRETATIONS

According to Tunbridge and Ashworth, dissonances occur inter alia through different interpretations of heritage (ibid.: 6 ff.). This is problematic if a dominant group defines which heritage interpretation is promoted (ibid.: 29 ff; 47 ff.). Also, dissonances may occur between the needs and expectations of a heritage site's different user groups (ibid: 69). Dissonances can be reduced by accepting multiple heritage interpretations (ibid.: 93). Concepts can be inclusive by accepting diversity via integration into a wider heritage or minimalistic by being reduced to common aspects of diverse interpretations (ibid.: 177 ff.). In the following, three examples show how a

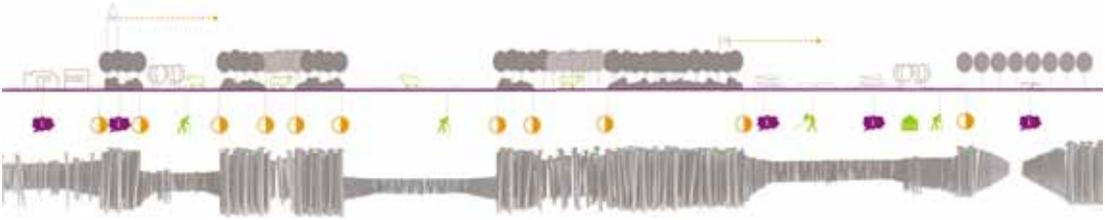


Figure 3. Landscape perception as a passage through different scenes (Image: M. Farhat and M. Hartmann)



Figure 4. Requisites, backdrops and curtains (Image: M. Farhat and M. Hartmann)

heritage's conflicts can be revealed and dissonances reduced through design.

Changing perspectives

Currently, the most common perception of former military training grounds is of an idealised pre-industrial landscape which owes its appearance to the military function. Its military use is thus perceived as a relevant factor in a particular landscape's quality and genesis but the military's use and interpretation of the terrain is surprisingly unknown.

Why did the military forces shape large areas of land in the way they did? How do soldiers use and see a landscape? In her book "Military Geographies" (2004), Rachel Woodward states that the military's landscape interpretation attributes new layers of meaning to places (Woodward, 2004: 106). As an example she cites a member of the British army (ibid.), who writes: "*We were also instructed in interpretation: countryside became terrain, rolling hills became gradients that slow down one's progress across country, wild hedgerows became areas of camouflage, mountain streams became obstacles and sources of water.*" (Ballinger, 1992: 129).

The first design approach reveals one aspect of this perspective. During a studio session at Leibniz Universität

Hannover, students worked on concepts for the Senne military training grounds in Northrhine-Westfalia. The training area is, although still actively used by the British Rhine Army, a Natura 2000 reserve. For decades there have been discussions about the site's possible civilian future.

Forests alternating with park-like grasslands, grazing sheep on heathland and cobbled streets characterise the training grounds. Within this idyll, ruins of depopulated villages, mock-up villages for practising urban warfare, rusty tanks, bunkers and shooting ranges are witness to military use. All these elements serve as scenarios for practising war. During an excursion, a member of the British Army explained that he interprets this landscape as a "theatre". A group of students picked this up and contrasted the common perception of the area as an idyll with a "change of scene" (Farhat and Hartmann in: Bohumila et al., 2011: 113 ff.). In Farhat's and Hartmann's proposal, the military's structural idea of the landscape is strengthened through design. Referring to the army member's descriptions as a "theatre", the students interpret the visitors' path through the terrain as a passage through different scenes or backdrops (ibid.) (Figure 3).

The students use theatre-related metaphors. The grass- and heathland

and semi-open forests serve as “stages”, maintained by sheep, robust cattle and horses. In the students’ interpretation, the animals play major roles as the new “actors” (ibid.) And indeed they are crucial for the proposed differentiated habitat management (ibid.). The most obvious reference to the site’s military history are some of the “stage requisites” such as concrete bunkers, ruins of farmhouses and tanks (ibid.). Staying with this main theme, the dense forests are defined as “backdrops”, in which spatial and ecological qualities are strengthened by the dynamic protection of natural processes (ibid.). Other forests are defined as “curtains”, which seem to open when the visitor moves along the path to the next scene (ibid.) (Figure 4).

By preserving characteristics of the traditional cultural landscape and the parallel underlining of the military’s structural approach, two conflicting heritage interpretations become visible and can co-exist.

Encouraging engagement

Some German military grounds relate to atrocities. On sites where people suffered or met their death, or where their suffering or death was prepared, careful documentation is needed and opportunities for remembrance and commemoration should be provided. In the culture of remembrance, places play an important role, as described by Pierre Nora in his idea of “*lieux de mémoire*” (sites of memory) (Nora, 1990: 7). Aleida Assmann also states that sites are a medium of memories that can preserve or authenticate memories even during periods of collective forgetting (Assmann, 1999: 21). The sites do not convey the memories themselves, but in combination with additional media or memories the experience of a place can reawaken memories while equally the site becomes “reanimated” (ibid.). If memories are lacking completely, an unwanted effect may unfold, as

ghostly places emerge, peopled by the imagination or haunted by suppressed memories (ibid.).

The importance of preventing “ghostly places” becomes obvious at the “Heeresversuchsstelle Kummersdorf-Gut/Airport Sperenberg”. From 1875 on, research and tests, for example on railway technology, guns, battle tanks, intermediate-range missiles and nuclear bombs were carried out here (Pöhlmann, Bauermeister, Sommerer, 2014). Kummersdorf is considered to be a cradle of rocket technology and thus of space travel (ibid.: 26). These technological findings had a devastating impact, as the weapons were used for bombarding European capitals in World War II (ibid.: 28). After World War II, the Soviet army occupied the site. New barracks and a military airport were built and remained in use until 1994.



Figure 5. Ruins of a test facility in Kummersdorf (Image: Denkmalamt Teltow-Fläming)

Today, although the site is a protected monument and partially a flora-fauna habitat and nature reserve, the approx. 4000 objects (Aumann, 2015: 120) are becoming derelict (Figure 5), and ecological succession is transforming the heathland.

When exploring this abandoned place and talking with people, the site seems to be unwanted, reminding people of a history no one wants to remember. Although located only 30km south of Berlin, the place is almost

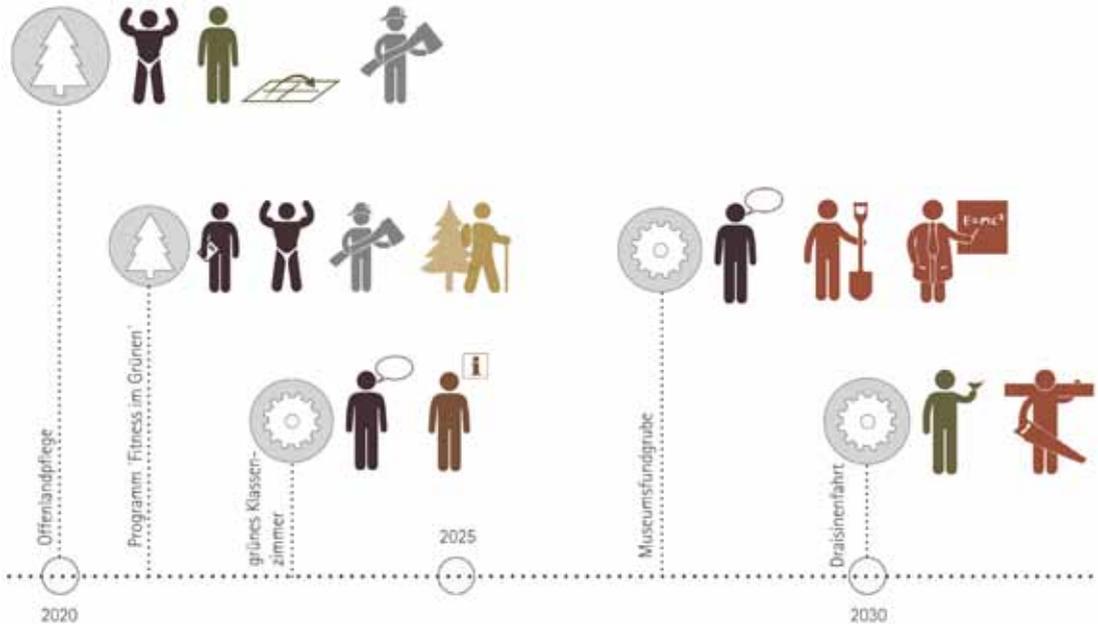


Figure 6. Voluntourist activities follow a timescale (Image: N. Schüler, detail)

unknown. During a students' design studio the key relevance of research, documentation and political education very soon became obvious. Another challenging question was how to preserve a site of this size, which would involve such an enormous amount of work.

The student Nicole Schüler found the starting point for an answer in a local group of volunteers who become engaged in the site's preservation (Schüler in: Holtkemper et al., 2013: 227). She used this structure as an anchor for her concept of "voluntourism", which is based on the idea of combining voluntary work with holidays (ibid.: 222 ff.). First, she designed a masterplan for the site, which focuses on habitat management, monument preservation and reconstruction and on recreation. To realise this masterplan, she has defined an organisational system for the voluntourism (ibid.). It combines professionals with working volunteers, e.g. in groups of "ecologists", "preservationists" and "historians" (ibid.). Their activities include felling trees on

heathland to support this habitat while reconstructing an overgrown 12km-long shooting range (ibid.). Other groups offer or join guided tours and organise events for tourists, students and pupils (ibid.).

Encouraging social engagement fosters an active discussion about, and reflections on, the site's history. By means of such joint efforts, memories can be handed down, while at the same time the place becomes filled with memories of current generations.

Integrating heritage into everyday life

If political history weighs less heavily, a design's focus can be defined more freely and can go along with re-defining a site. Nevertheless, conflicting aims for the site's future may occur, e.g. between those of developing nature and of use by the public. The next case study, "Alter Flugplatz Bonames", is located in Frankfurt and shows how to negotiate apparently contradictory needs through design.

During the Cold War, the American forces erected the "Maurice Rose

Airfield” on the grounds of a former airfield. A landing strip with a tower building, hangars and a manoeuvring area, a helicopter parking zone and a fuel depot were constructed. When the army withdrew in 1992, other users soon took over this site: skaters discovered the landing strip and a café opened in the former tower (Yorck, 2010: 226). From 2002 on, the GTL Landschaftsarchitekten designed a park of a new kind, relating to the site’s identity as former military grounds while integrating the aims of recreation, local activities and nature protection.



Figure 7. Crushed material at the former airfield (Image: © GTL Landschaftsarchitekten)

Two-thirds of the paved surfaces were unsealed (ibid.: 228). Most of the debris was crushed into different sizes, from square-metre blocks to fine gravel and re-used as park elements. These parts of the park have been given over to succession (Figure 6).

The site’s most iconic structure is the remains of the former landing strip. The asphalted surface has largely been kept, including its markings (Figure 7), creating a perfect location for skaters and cyclists.

The tower, today in use as a café, has been painted with huge red-and-white squares, strengthening its symbolic role and underlining the site’s origins.

Marketing activities enhance the concept by titling their brochures “Birds – the new aviators at the old airfield”

(Stadt Frankfurt, 2015) or “From airstrip to wilderness” (Stadt Frankfurt, 2013). Beyond this, the brochure gives insight into how diverse stakeholders were integrated into the project.

Besides the unique design, the stakeholders’ diversity defines the site’s new identity. This project shows that former military grounds can be integrated into everyday life, allowing both outdoor recreation and nature protection.

CONCLUSION

All former military properties are related to conflict. All sites are related to war, many to expropriations and sometimes atrocities, while being characterised equally by outstanding ecological qualities and their appearance as natural idylls. Since these tensions give post-military landscapes unique depths of meaning, at the same time providing potential for political education and heritage development, for nature development and recreation, it is important to address them in landscape design.

When defining the future of post-military landscape heritage, planners should be aware that different groups have different interpretations. Future generations see the site with different eyes from those of today, as do those who suffered here, spent their childhood there before the area’s conversion for military purposes or experienced the grounds as a soldier. The example of the Senne training grounds show how design interventions can open up one’s perception for other, conflicting landscape interpretations through design.

In the case of Kummersdorf-Gut/ Airport Sperenberg, it seems both necessary and difficult to find suitable approaches towards the site’s history. The example shows how heritage can be transformed into a site of political education. Guided and financed by public institutions, engagement should

REFERENCES

be encouraged, thereby opening up a debate amongst stakeholders, eye-witnesses and volunteers. The heritage interpretation is thus placed in many hands and helps to create a collective heritage for the future.

But even if a site is just regarded as infrastructure, the example of Bonames makes it clear that integrating historic sites into everyday life and creative approaches towards the relicts can create places with a unique identity, in which heritage management, ecological aims and usability are interwoven.

Design can help to reveal the immanent conflicts of a heritage site, negotiate conflicting interpretations and balance conflicting needs. Integrative design approaches are particular suitable for tackling this responsible challenge.



Figure 8. A landing strip as the perfect location for leisure activities (Image: © GTL Landschaftsarchitekten)

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Cold War Heritage in Northeast Italy, A Challenge for Landscape Design

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ABSTRACT

Throughout the twentieth century, Friuli Venezia Giulia, the north-eastern region of Italy that borders Austria and Slovenia, played a strategic wartime role. From the Great War to the Cold War, the installation of defensive works including barracks, fortifications and infrastructure distinguished the territory. A significant rationalization in the territory and modification in the organizational structure of the Armed Forces took place from the end of the Cold War, through the EU expansion to the countries located on the north-eastern border of Italy, and up to the Army's transformation from conscription to voluntary service. The town of Casarsa della Delizia represents a case of important significance due to the presence of the "Trieste" barracks, a settlement of extensive and significant environmental impact, a part of which has not been used for years, becoming over time a landscape-abandonment issue, on which action is needed. The paper focuses on the proposals to recover this former military area as a new integrated part of the city, merging the necessity of saving the past heritage and developing a new landscape vision, bringing together the historical and contemporary ways of living and promoting urban regeneration complex operations.

INTRODUCTION

Historically, the Friulian territory has borne the indelible signs of military defence. Artefacts of defence are a tangible expression of history,

highlighting the sense of landscape and assuming precise cultural connotations. In particular, the twentieth century brought three successive waves of militarization to the region, as Friuli-Venezia Giulia was one of the theatres in which the I and II WWs were fought (Pascoli and Vazzaz, 2008; Bernasconi and Muran, 2009). Later, the Cold War elicited a radical change in the territorial, social, and economic connotations of Friuli, evolving during the second half of the last century quite differently from the Italian context (Romero, 2009). This historical evolution transformed the territory into a fabric of barracks, powder kegs, and bunkers occupied in large part by the armed forces of Italy.

Forty years of Cold War dramatically affected the landscape morphology, with strong repercussions on the regional agricultural and industrial retrogression (Baccichet, 2015). After 1989, when European Union countries (joined by the Eastern European countries in 2007) started a slow and progressive defence-instruments restructuring process, the Italian Army also adapted itself to this changing context and strategic needs (Gastaldi and Camerin, 2017). The Italian Law 331/2000 established the gradual replacement of military personnel with volunteers. This contraction policy has led from a massive Armed Forces appropriation of the Friuli Venezia Giulia Region (considered as an essential and wick border to be protected against a possible Soviet invasion) to a gradual concentration in a few sustainable sites, abandoning most other sites (Santarossa and Scirè Risichella, 2016).

In this frame the Authors propose the analysis and transformation of the former "Trieste" barracks in Casarsa della Delizia (Pordenone) (Figure 1).

Now closed and fenced, this compound could be transformed into new open and public spaces. The project would encompass the

expectations and the participation of local communities and would strive for solutions which would enhance culture, enrich the economic value of the site, provide social inclusion and social entrepreneurship including a collaborative management of the common property, and promote a green economy and new ways of living. The paper introduces the results of an international design workshop and other didactic proposals developed in collaboration with the Town of Casarsa della Delizia administration.

THE “TRIESTE” BARRACKS IN CASARSA DELLA DELIZIA

The “Trieste” barracks and the “Francesco Baracca” airport were built after the end of the Second World War on the area of the ancient-airships hangar and station erected in Casarsa during WWI. Four decades of military use have deeply marked the territory of Casarsa: In the Seventies of the last century, the “Trieste” barracks alone quartered more than 4,000 soldiers and their families, a number larger than Casarsa’s residents. The barracks have been a significant presence – influencing over the years the social, economic and urban aspects of the local community, whose economy, up to thirty years ago, was strongly characterized by the presence of one of the greatest barracks in Italy. The under-utilization of the barracks (23,5 ha of area) began in April 1991, when the “Cavallegeri Guide Regiment” was transferred to Salerno (Campania Region). Subsequently, the “41° Cordenons Artillery Regiment” occupied the site. Even though the adjacent military airport was preserved, and the continued use of the military installation seemed confirmed by an important restoration work begun in 1994, the end of military mandatory service in 2001 signalled a progressive and inexorable abandonment of the military area. The “41° Cordenons Artillery Regiment”



Figure 1: The “Trieste” Barracks area in Casarsa della Delizia. The historic urban centre of the City of Wine has the same surface of the former military compound. Source: Table elaborated during the 2015 workshop.

transfer to Sora (Frosinone) took place in 2007 (Senato della Repubblica, 2003 and 2007).

A number of proposals have been formulated for the possible reuse of the former military site, but they have been promoted by the local or national administrators without a real discussion with the community. On the occasion of the EXPO Milano 2015, the Mayor of Casarsa asked the Department of Architecture and Urban Studies of Politecnico di Milano to devise a way to promote Casarsa during that international event as the ‘Town of Wine’. Casarsa della Delizia, in fact, is part of the ‘Towns of Wine’ Italian Association, established in 1987, that joins all the principal locations where fine wines are produced in Italy.

The Politecnico di Milano proposal, instead of focusing solely on the concept of Casarsa as a place dedicated to the wine and its mere productive activity, also focused on the connections between the Friulian territory, which over centuries transformed into a flat landscape covered by vineyards; the cultural legacy of Pier Paolo Pasolini, the internationally known poet and director with Casarsese ancestors who lived in Casarsa during his youth and first maturity and wrote some of the best

artistic descriptions of the Friulian landscape; and the military heritage that during the last century transformed the rural landscape that is still present in Casarsa's territory with a constellation of former barracks, the most extensive being the "Trieste" one. The proposal has set the former "Trieste" barracks as the centre for a total transformation for both the town and its community.



Figure 2: Internal view of the former "Trieste" Barracks in Casarsa, workshop field-visit August 2015. Source: picture by Luca MF Fabris.

A DESIGN WORKSHOP FOR THE "TRIESTE" BARRACKS

In September 2015, the Authors ran the international workshop "Restarting from Bacchus and Dionysus, with the help of Oyamatsumi", bringing to Casarsa students from Europe, China, and Japan. The two-week workshop included a tour of the Friuli Region (Figure 2).

This initiative awakened in the local community a wide interest regarding a recovery action for the disused area. The workshop had been set around some of the EXPO 2015 themes ("Science and Technology for Agriculture and Biodiversity" and "Food and Lifestyles") combining different disciplines to highlight the values of Casarsa's unique and complex makeup. Merging landscape architecture, architectural design, and environmental

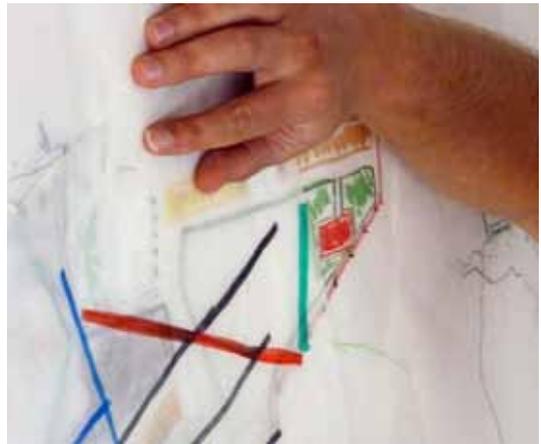


Figure 3. A 2015 Workshop Students' sketch about the renewal of the "Trieste2 Barracks. Source: picture by Luca MF Fabris.

design in a multi-scale approach, the workshop's brief identified the barracks as an urban void – a space that would have to be reactivated in order to bring new opportunities to increase economic recovery and to improve the social fabric of the town. The student's designs proposed three new enterprises to integrate sustainability into a program including a Cold-War Museum, a wine museum, and a pilot vineyard which would recreate a typical Friulian country-side landscape and promote organic farming and the history of the local cooperative social winery (a winery reality on a European scale) (Figure 3). The requests to the students to provide a design including a Cold War museum, a wine museum, a pilot vineyard were based on a previous analysis carried out before the workshop activities. In fact, there are no similar facilities in all the Friuli Venezia Giulia Region.

During some public town-hall (Figure 4) meetings and forums held before the study and after the presentation of workshop results, students had the opportunity to interact with the local citizens and the administration, collecting suggestions and desiderata from the local stakeholders. It was clear that the administration considered this great unused void as a real wound inside the town. However, local administration



Figure 4. Presentation of the International Workshop in the City Hall of Casarsa della Delizia. Source: picture by Luca MF Fabris.



Figure 5. A lecture moment during the 2015 International Workshop in Casarsa. Source: picture by Luca MF Fabris.

lacked (and needed) a set of ideas and concepts showing how to re-integrate this space in the city taking into account that there would be no real requirement to build new real-estate blocks or industrial areas in the Casarsa's territory.

Meanwhile, Casarsa's citizens stressed that the renewal of the "Trieste" Barracks had to maintain the memory of the place and its historic value, while creating a new attraction to bring into Casarsa tourists interested both in wine tasting and buying, and cultural events. Locals wanted to include most of the former military area in a public park designed to show tourists what goes on in wine growing process, also

in its historical aspects. To sum up, the proposed workshop brief and the stakeholders' desiderata were very similar, and made the workshop results stronger.

The students' project proposals were presented in Casarsa and then at the "Wine - A taste of Italy" Pavilion during the Milan EXPO 2015. All the proposals were influenced by the lectures held by a trans-disciplinary team of experts (Fabris and Camerin, 2017) (Figure 5). In fact, the proposals re-invented the enclosure of the former barracks to define a new rural future based on the production of excellent food for a post-industrial society hurt by the global crisis, but able at the same time to remember and preserve its past.

GOING DEEPER

In 2017 the Casarsa Administration asked the Authors to deepen the 2015 workshop results with an elaboration of some more detailed concepts starting from those preliminary ideas. The workshop scenarios (Figure 6) were the basis for a semester-long studio project involving students from the Master of Science in Architecture of the School AUIC of the Politecnico di Milano. In this case, the goals of the project were to define in more depth the architectural structures required to maintain some of the former military buildings and any new structures including – as required by the workshop brief – the Wine Museum and the Cold War Museum.

In addition, as asked by the town administrators, students had to design a sustainable hotel for tourists, and a low-impact structure hosting a hub for start-ups to improve local young entrepreneurship. The principal landscape architecture task (the maintenance of most part of the former military area as a public park committed to the dissemination and learning from the wine culture) was retained even in this new didactical stage. At the end of the design studio, the results (Figure



Figure 6. Proposal for the renewal of the walls closing the “Trieste” Barracks area. Source: rendering elaborated during the 2015 Workshop.



Figure 7: Proposal for the new park in the former “Trieste” Barracks area. Source: render elaborated in the 2015 workshop.

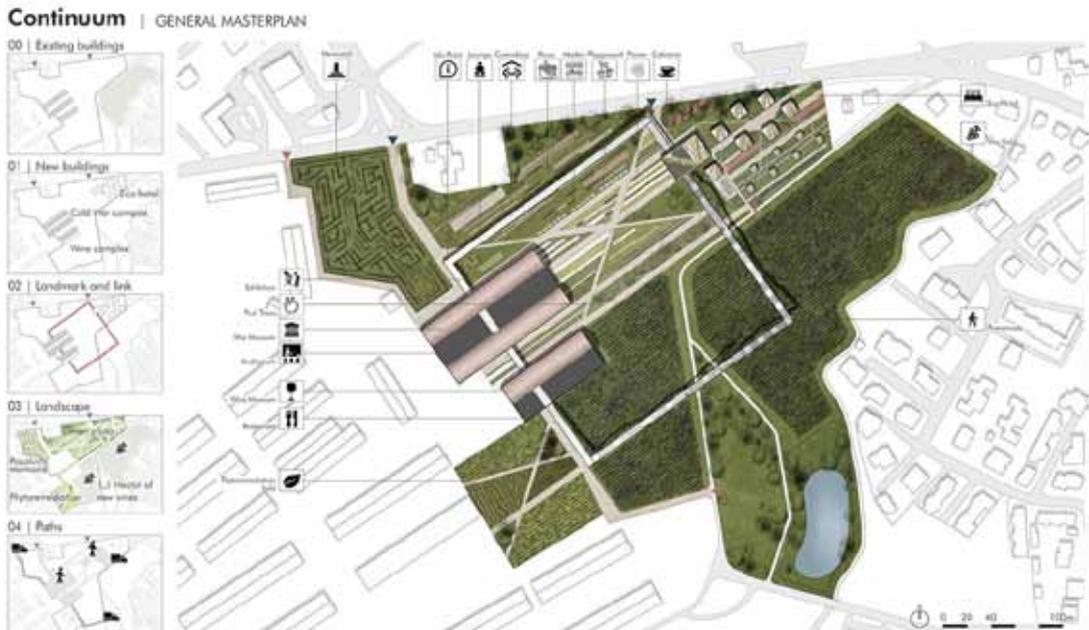


Figure 8: Proposal for the renewal of the “Trieste” Barracks. Source: drawing elaborated during the 2018 Design Studio.

7) along with several new example scenarios were given to the Casarsa Administration to support the request for the State counterparts to return to the community the former “Trieste” barracks area.

In 2018 the situation is still on stand-by. The Casarsa della Delizia City Council has just started a bureaucratic process through the State-Region Joint Commission to obtain the transfer of the former “Trieste” barracks from the Ministry of Defence to the Italian Public Property Agency (Agenzia del Demanio). Meanwhile, the Local Administration is also continuing to promote other teaching and research

activities with the Politecnico di Milano. The idea is to define more and more in detail, through functional and inclusive projects, the possible sustainable scenarios (Figure 8) for the future of this disused military area, taking into account the lack of public resources and the current crisis in the real estate sector.

CONCLUSION

Nowadays the context of the economic crisis is creating significant budgetary deficits, scarcity of public resources and difficulties in the real estate market: consequently, landscape architec-

ture-based projects that may ensure the territorial reintegration of former military areas should be supported. At the same time, procedures for returning the Ministry of Defence properties to the local communities appear to fit harmoniously into the existing territorial and urban design. It would seem opportune for the Ministry of Defence, the State Property Agency and the local authorities to collaborate in order to identify and implement reuse solutions needed to manage such a territorial complexity. The Authors' research and the didactic projects elaborated underline how the reinterpretation of interdicted military spaces should focus attention on the concept of space-identity, counting these spaces as a heritage of the collective memory, and as part of the sense of belonging of a community. Moreover, the Authors underline two needs: firstly, a close collaboration with the stakeholders to define the new functions and the new uses to be implemented in these derelict areas; and, secondly, public and private investments to fund this enterprise of mutual convenience and coexistence.

In Friuli Venezia Giulia there have been some cases of recovery, but these renewals did not take advantage of opportunities provided by the approach described in this paper. The Politecnico di Milano research unit's design brief proposed to Casarsa City Council a new scenario for the future of the former "Trieste" barracks. It has been postulated as reasonable approach – its methodology, to be adapted case by case. Specifically, the porous-walled enclosure of the former barracks, has been defined as a new landscaped public park, surrounded by a functional mix of infrastructures based on the local touristic potential (such as the museums of military history and vineyard-winery culture), combined with various types of hotel accommodation and the potentials associated with new local entrepreneurship (last generation

of start-up incubator). The former military compounds reuse in Casarsa, due to their size and historical characteristics, could become a model of public environmental regeneration and landscape design integrated with a neo-industrial business model activated by private participation – an important experiment that may stimulate the reuse of the several former military areas waiting for a new life in Italy.

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From Conflict to Commemoration: Finnish Civil War in the Landscape of Tampere

PECHA KUCHA PAPER

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ABSTRACT

The paper addresses the landscape of conflict in the Finnish civil war in 1918. Based on a case study of the city of Tampere, we reflect on how the interpretations of the civil war are intertwined in public space – simultaneously aggravating and maintaining the political post-war conflict and reinforcing shared commemoration.

Two phases are examined: 1) the political landscape of the 1920s-1950s, epitomized in the erection of monuments after the war, and 2) the commemorative landscape of the 2010s, evidenced by reconciliatory events and symbolic gestures. With the close reading of the planning and decision-making documents, we aim to identify the frame-shaping elements of the landscape of conflict – revealing both the narrative of disintegration and integration.

INTRODUCTION

The heritage of conflict landscapes is always political, dynamic and contested (Saunders 2004: 7). The meanings of the past are continuously rewritten, reinterpreted and reused for different purposes. The interpretations are not collectively shared; instead, individuals and social groups make different choices in regard to remembering and forgetting (Misztal 2003: 11, 79; Schriek 2018: 2; Smith 2006: 58). Monuments and commemorative places are the most visible manifestations of these choices. These places do not simply

witness historical events; they also reproduce historical narratives – often representing conflicting agendas (Dwyer 2004: 425; Rodrigo 2015: 36). The tangible traces of the past and the discordant expressions of the ideas and values related to it constitute the heritage of conflict landscapes. In this scene, landscape is not only a neutral backdrop but an actor in the heritage process, both shaped by human actions and shaping the community it exists in. Therefore, landscape is the object and subject of both conflict and consensual commemoration.

RESEARCH DESIGN

Our paper focuses on the landscape of conflict in the Finnish civil war in 1918. The centenary commemoration of the civil war invited us to reflect on the interpretations of the conflict in regard to landscape architecture. We chose to examine the City of Tampere because it presented the scene for the decisive and tragic events of the civil war in the spring of 1918. In this battle of Tampere, the non-socialist Whites, conducted by the Senate and Commander Mannerheim, defeated the socialist Reds, led by the Social Democratic Party. The civil war divided the nation politically and regionally. The White Guards were composed of farmers, along with the middle and upper class social strata from rural, central and northern Finland. The Red Guards consisted of industrial and agrarian workers from the southern industrial cities, including Tampere as the capital of the labour movement. The defeated Red Tampere and the victory of the Whites established the post-war conflict, embedded in the urban space and debate even today. Tampere evidenced a traumatic oblivion when the divided city returned to normal life after the war, and the painful experiences of particularly the defeated side were dismissed and not addressed. The official line portrayed an interpretation



Figure 1: The unveiling ceremony of the Statue of Liberty (1921), Vapriikin kuva-arkisto, Tampere Museum Centre.



Figure 2. The unveiling ceremony of the Statue of Mannerheim (1956), photographer Pekka Kosonen, Vapriikin kuva-arkisto, Tampere Museum Centre.

of the war based on the narrative of the winning side failing to account for recent history.

Even though the war itself has been thoroughly studied by historians, only limited research has been conducted on the landscape of the conflict. Our paper reflects on how the interpretations of the civil war are intertwined in the public space – simultaneously aggravating and maintaining the political post-war conflict and supporting and reinforcing shared commemoration. We examine two phases: 1) the political landscape of the 1920s-1950s, epitomized in the erection of monuments after the war, and 2) the commemorative landscape of the 2010s, evidenced by reconciliatory events and symbolic gestures. The research is based on the planning and decision-making documents and discussions related to them. With the close reading of the documents, we aim to identify the frame-shaping elements of the landscape of conflict – revealing both the narrative of disintegration and integration.

FINDINGS AND CONCLUSIONS

Landscape is the most important witness to tragedies (Heyde 2015: 194), and it may serve as a medium for both political conflict and shared commemoration. The landscape of Tampere is a manifestation of these two dimensions. The political post-war landscape is examined through two case studies: the Statue of Liberty erected to commemorate the White Guards killed in the battle of Tampere and the Marshal Mannerheim Statue, which was implemented in memory of the siege. Both projects represented the winners' interpretation of the events and, thus, faced fierce opposition among the strong working-class population of Tampere. The Statue of Liberty depicted a nude soldier with a sword, facing the Workers' Hall. The statue was erected in the centre of Tampere in 1921, but already the following year, a decision was made to remove it (Report on municipal administration 1918, 1921, 1922). Underlying the decision was the shift in the political balance of power in the council in favour of the social democrats. The defenders perceived the statue as a symbol of the country's liberation from Russia, whilst the ruling working class regarded the "statue



Figure 3. The vandalized Statue of Liberty with the text 'rebellion' (kapina) in 2015, photographer Antti Palomaa. *Yle Uutiset* 30.4.2015.

of hate” as a reminder of White terror. The ban on the defeated to publicly mourn their casualties reinforced the opposition for the statue (Peltonen 2000). Due to a dispute, an appeal regarding the decision to remove the statue was lodged with the governor, who annulled the decision. The governor’s decision was verified by the Supreme Administrative Court, which founded its conclusion on the decree issued on the protection of monuments (Aamulehti 8.11.1923).

Although the dispute was resolved, it did not erase the smouldering tensions. The conflict deepened again in connection to a plan to erect a statue for Marshal Mannerheim. The statue and its pedestal were completed in 1939, but the Winter War, which broke out soon after, prevented the erection of the statue. In 1951, another attempt with the statue was made, but the city council cancelled the project (City Council 11.4.1951). The reason behind the decision was the 1918 military uniform Mannerheim was depicted in, which clearly referred to his role as the commander-in-chief of the White Guards and the invader of Tampere (Tammerkoski 4/1956). The controversial statue was transferred outside the city centre to



Figure 4. The photography exhibition in the city centre in spring 2018, photographer Ranja Hautamäki.

a forest where the marshal was said to have observed the progress of the battle. The empty pedestal was left in its place in a central park square until 1964, when it was removed.

100 years after the battle of Tampere, it continues to remain topical to ask when the war will actually come to an end as a process that constructs and modifies impressions. Disputes connected to the culture of commemoration are persistent, as the case of Tampere demonstrates. The Mannerheim Statue has repeatedly been vandalised and the Statue of Liberty and its location have been raised as a topic again. The political divide lives on beyond the generation that lived through the war as transgenerational memories and experiences which emphasise the sentiment of oppression and injustice.

Even though the discord between the Reds and the Whites still exists in Tampere, a passive reconciliation has been accomplished. Particularly in the 2010s, a new interpretation of the war has gained hold: a nonaligned and humanely motivated outlook.

The shared commemoration was evident, for example, in the decision in 2015 to name the central battlefield of Kalevankangas as the park of reconciliation (Street Name Committee 2.9.2015). In the spring of 2018, the city centre formed the backdrop for a photography exhibition in which historical events and characters in uniform were depicted in the modern context of the battlefields. The differing interpretations by the Reds and the Whites have been effaced and the war has been presented as a shared tragedy that permanently changed the city. This approach also had a strong presence in many of the city's events, theatre performances, public lectures and a major exhibition in the museum centre Vapriikki.

The case study of Tampere evinces that the path to shared commemoration is lengthy and difficult, but public spaces and interventions offer an important framework for mutual interpretations. In these explications, it is essential to recognise the historical layers of the landscape and the contradictory narratives they contain. The landscape of commemoration may serve as a medium to shape a consensual view of the past whilst acknowledging its multi-faceted meanings.

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From Iron Curtain to Cross-Border Landscapes along the European Green Belt: Case Study Austria-Slovakia

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ABSTRACT

The Iron Curtain was one of the most dividing and well known boundaries in human history. It divided Europe to West and East throughout four decades. Today, the Iron Curtain is history, but it left behind a unique cultural and natural heritage. It has been replaced by the European Green Belt. From Iron to Green, from Curtain to Belt, still it means so much more than a mere play on words. It is about cross-border landscapes of our shared present and future. This article aims to grasp the change from a significant linear landscape of conflict, to diverse and valuable cross-border landscapes by the example of the Austrian-Slovak border. The paper characterizes the meandering cross-border riverine landscapes and the potential of their bridging. Furthermore, two very special places are discovered, where borders of three countries meet and intersect. The article highlights the importance of monuments as eye witnesses and memorials of the past. It suggests that the way to a sustainable cross-border region is built on a shared natural and cultural heritage and paved by the recognition of its strong historical legacy.

INTRODUCTION

The Iron Curtain used to be a global landscape of conflict in the real sense of the word. It was stretching from north to south of Europe, through the middle of the continent, while dividing the whole world to West and East. It was the physical manifestation of the Cold War, built after World War II in 1945 and lasting until the end of the Cold War in 1991 as a consequence of the fall of Communism in 1989. However, the separation and isolation throughout almost four decades encouraged the formation of the European Green Belt, an extraordinary ecological network and a pan-European living memorial landscape stretching from the Barents Sea to the Black Sea. Today, the Green Belt is the backbone of the European Green Infrastructure and a great example that biological diversity goes hand in hand with cultural diversity. It has become a shared natural and cultural heritage and a symbol for transboundary cooperation.

This paper takes a closer look at the 106.7 km long Austrian-Slovak state border, which is part of the European Green Belt. It identifies the landscape character and heritage values of these unique cross-border cultural landscapes, based on field studies. Hundred years ago, landscapes along both sides of the border were part of one monarchy and one cultural landscape. There was only a natural border – River Morava (March). After almost nine decades of separation, including four decades of Cold War, the borders seem to have gone as Slovakia joined the Schengen Area in 2007. This has opened up a huge regional challenge for Austria and Slovakia to reunite the cultural landscapes on both sides of the Morava River and to create a shared cross-border cultural landscape of the 21st century. Therefore, the paper discusses current landscape challenges and future development scenarios, which could

balance shared natural and cultural values with new societal claims and cross-border development, where landscape architecture should play a key role.

SHARED CROSS-BORDER LANDSCAPES ALONG THE RIVER

Landscapes along both sides of the Morava River have always belonged to the same cultural landscape. There are similar monuments from the Middle Ages, such as the Devín Castle on the Slovak side and the Hainburg Castle on the Austrian side, which have been significant landmarks of the region for centuries. The Habsburg period is manifested for instance by the baroque palace Schloss Hof in Austria and its Slovak 'sibling', Stupava Palace. The common culture and past are not only visible on monuments, but especially on the landscape character. Most of the Austrian-Slovak borderline is drawn on the map by the River Morava (March). Four decades of Cold War in the second half of the 20th century have caused that the land use along both sides of the river was not very intensive and was limited almost exclusively to border protection. This has left a significant stamp on lives and fates of many people, however nature has benefited from this forced protection by the Iron Curtain as valuable meandering riverine landscapes where unique wetlands and floodplain forests could develop undisturbed (Figure 1).

The immense potential of shared cross-border riverine landscapes has been used only partially so far. However, the March-Thaya-Auen Region makes already references to tourism potentials on the Slovak side of the river (March-Thaya-Auen, 2018). Currently, the connections between the Slovak and the Austrian side are limited. Until 2012, there were only two bridges crossing the river Morava - a railway bridge between Marchegg (A)



Figure 1. A view from the medieval Devín Castle (Slovakia) on River Morava (March) as a natural border between Austria (on the left) and Slovakia (on the right).

and Devínska Nová Ves (SK) and a road bridge between Hohenau (A) and Moravský Svätý Ján (SK). Besides these, there is also a ferryboat connection between Angern an der March (A) and Záhorská Ves (SK). The construction of the 'Bicycle Bridge of Freedom (Fahrradbrücke der Freiheit / Cyklomost slobody)' in 2011/2012, which created a new link between Austria and Slovakia for pedestrians and cyclists, can be therefore considered an important step forward - towards a more interesting cross-border cooperation and regional development. The bridge has significantly contributed to local and micro-regional tourism and it made easier for visitors coming from Bratislava to visit the Schloss Hof baroque castle



Figure 2. The dynamically shaped 'Bicycle Bridge of Freedom' has connected Schloss Hof (Austria) and Devínska Nová Ves, Bratislava (Slovakia) since 2012. Freedom' has connected Schloss Hof (Austria) and Devínska Nová Ves, Bratislava (Slovakia) since 2012.

and garden, which dates back to the Habsburg period (Figure 2).

According to SME Bratislava Portal, the number of visitors and users of the bridge has been continuously growing since its creation. During a single weekend in April 2018, the bridge was crossed by a record-breaking number of visitors (more than 5,000), out of which more than 2,200 were pedestrians and almost 2,800 cyclists (Brezák, 2018). These numbers clearly show that there is a real need for cross-border cooperation in sustainable regional development, tourism and recreation. The bridge was built on the site of a former bridge over the Morava River, which existed between 1771 and 1880 (APA-OTS, 2012). The bicycle bridge is an important link between a regional network of Austrian and Slovak cycle routes. Its construction was co-financed by the European Union within the Cross-Border Cooperation Program Slovakia-Austria (2007-2013). Cyclists and pedestrians using this recent connection over the Morava River have the opportunity to enjoy views of unique riverine landscapes and wetlands. A contemporary depiction of St. John of Nepomuk at the beginning of the bridge on the Austrian side makes a nice symbolic and spiritual connection between past traditions and contemporary developments.

A PLACE WHERE THREE COUNTRIES MEET

The specific atmosphere of cross-border landscapes gets even more powerful at places, where not only two, but even more countries share their borderlines. Within this study, two such places have been visited and observed. One of them is the Austrian-Slovak-Hungarian (A-SK-H) border at the very south of the Austrian-Slovak borderline and the other one is the Austrian-Czech-Slovak (A-CZ-SK) border at the northern vertex of the studied border. Both places have a very different landscape character.

The *A-SK-H border point* is located in the middle of a vast open agricultural plain. There are no geographical or landscape limits that would indicate that the landscape here is divided among three different countries. The horizon is marked by signs of urban development, especially by the skyline of the Slovak capital, Bratislava with its clearly recognizable landmarks - the Bratislava Castle or the Kamzík Hill with a television tower from the 1970s. The only sign that the landscape here is shared by three countries is a small 'meadow island' in the middle of an 'arable-land sea'. This was designed as the *Sculpture Park of Three Countries* in 1992 with twelve sculptures from twelve different sculptors. The stone monuments are placed around the border point and they stylize symbols like the number three, the form of a triangle, trinity, eternity, friendship, togetherness, attachment and others. These monuments are to be considered as a clear NO to dividing borders and a distinct YES to a Europe without borders. They symbolize the end of isolation and division between the three countries (Figure 3).



Figure 3. The Sculpture Park of Three Countries established in 1992 marks the intersection of Austrian, Slovak and Hungarian borders.

One of the spatially most distinctive sculptures is Juraj Cutek's creation, which turns the triangular symbol into a gate house made of three linked arcs. The gate sculpture represents the trinity of time (past –



Figure 4. A sculpture by Juraj Cutek in the Sculpture Park of Three Countries forms a three-arched gate that aims to symbolize the trinity of time and space, as well as the friendship and connection between the three countries.

present – future) with an anchor in the middle that stands for the static character of a friendship between the three countries (Figure 4). All the sculptural works represent three decades of peace and reunification, while an alone standing pale with barbed wire stays here as a raised warning finger and a reminder that this peaceful environment has replaced four decades of division and conflict embodied in the Iron Curtain.

Besides a strong historical legacy and a significant cultural heritage, this site is important also in terms of biodiversity protection, as the entire area is located at the interface of three Bird Directive Sites (SPA – Special Protection Areas) within the NATURA 2000 Network – Sys'lovské polia (SK / 1,775.69 ha), Parndorfer Platte – Heideboden (A / 7,273.30 ha) and Mosoni-sík (H / 13,095.88 ha) where besides other rare species the Great Bustard (*Otis tarda* L.), Europe's largest land bird, occurs. Last year a record number of bustards (up to 500) spent the winter in this area (TASR, 2017) and this year it was more than 500 (Filová, 2018). This shows that the borders have vanished not only for us, but also for some wildlife species. However, scientists have found that not all animals have forgotten the Iron Curtain. It is interesting that Central European deer still balk at crossing areas where



Figure 5. The confluence of River Morava (March) and River Dyje (Thaya) surrounded by beautiful and peaceful riparian woodlands marks the intersection of Austrian, Czech and Slovak national borders.

there used to be electrified fences (The Guardian, 2014). Since the physical borders were removed, the *A-SK-H border point* has become attractive also in terms of tourism and recreation. It especially attracts hikers and cyclists. This shows, how a place full of conflicts can develop into an inspiring multi-functional landscape with manifold dimensions – cultural heritage, ecology and biodiversity, agriculture, tourism and recreation, as well as education. The *A-CZ-SK border point* is located in a totally different landscape setting. The border is represented by two rivers - Morava (March) and Dyje (Thaya), while the intersection point is created by their confluence (Figure 5).

The riparian woodland offers a completely different landscape quality as it was in the case of the *A-SK-H border point*. Woodlands enclose the space and create a much more intimate natural-like character with only a couple of small wooden fishing houses reminding the visitors of the human presence. Here, this peaceful landscape setting with woodlands and water lets us forget the conflictful past of this site. Only an information board reminds us of the fact that this is a place where borders of three different countries meet. The conflict between West and East was also here favorable for nature and wildlife. The border point of three states is surrounded by



Figure 6. Bunkers from the second world war are significant landmarks spread throughout the Austrian-Slovak borderline.

Bird Directive Sites (SPA) – Záhorské Pomoravie (SK / 32,175.67 ha), March-Thaya-Auen (A / 14,832.00 ha) and Soutok-Tvrdonicko (CZ / 9,576.91 ha). Moreover, the area is also protected as part of three national Habitats Directive Sites – Kačienky (SK / 281.44 ha), Soutok – Podluží (CZ / 9,715.01 ha) and March-Thaya-Auen (A / 8,879.47 ha) thanks to the occurrence of important floodplain species. The March-Thaya-Auen is promoted as a 'Melange of unique Nature, great history and wine-growing lifestyle of the Weinviertel Region' (March-Thaya-Auen, 2018). It has transformed into an attractive tourist destination and offers nature experience in borderless floodplain landscapes, bird observation points, wine-tasting experience in traditional vineyards, time travel that reaches all the way back to Stone Age, while tracking important periods like the Bronze Age, the Iron Age, the Great Migrations, the Middle Ages, the Habsburg Period and the turbulent 20th century. The March-Thaya-Auen Region makes also use of the interesting cross-border landscapes along both sides of the Morava River and encourages its visitors to enjoy borderless natural and cultural values of the region (March-Thaya-Auen, 2018). This can be seen as a good practice example and an inspiration for further development.



Figure 7. Two monuments of the Iron Curtain and its victims located at the medieval Devín castle (SK).

EYE WITNESSES OF THE PAST, MONUMENTS OF THE PRESENT

The 20th century has left a sad and distinctive layer in Austrian and Slovak cross-border landscapes. The World War II, which caused deaths of millions of people is still readable in the landscape. There are several bunkers spread throughout the region. These have become part of the landscape character and regional identity, while serving also as a sad memento of war tragedies and conflicts (Figure 6).

Another conflictful milestone of these cultural landscapes was the above discussed Iron Curtain. It was indeed a strongly negative landscape element that destroyed many human lives in one or another way. As a remembrance of this sad historical period of Europe and its victims, there are several monuments along both sides of the border. Two distinctive monuments are located at the medieval castle Devín (Figure 7) near Bratislava. One of them is made of iron, which is a stylized reference to the Curtain. It was created by sculptor Milan Lukáč and it states a truly moving quote from Winston Churchill: 'The farther backward you can look, the farther forward you can see'. So peculiar for this site! The monument was unveiled by Her Majesty Queen Elizabeth II on an official State Visit to the Slovak

Republic in 2008. The other monument was designed by Peter Mészáros and it honors the memory of all victims of the regime.

Just on the way from Bratislava - Petržalka (SK) to Kittsee (A) a recent monument from 2016 aims to remind current and future generations of the personal tragedy of Hartmut Tautz, a young man who was killed when he was trying to cross the Iron Curtain. And this is only one of the 400 life stories that ended similarly at the Czechoslovak part of the Iron Curtain. Not far from here, there is a Memorial of the Iron Curtain with a preserved Cold-War bunker. All these landscape features aim to remind us that instead of walls and Iron Curtains, we should build bridges and instead of landscapes of conflict, we should value our shared natural and cultural heritage and aim for a more intensive cross-border cooperation. A positive example of such approach is the pan-European project of the European Green Belt, an ecological network that has a unique natural and cultural heritage and an emotional human and political history. Moreover, it symbolizes that something bad can turn into something good (Marschall, Müller, Gather, 2012). But are all fences and walls bad or have they always naturally belonged to the human society as constant structures protecting defined entities and claiming sovereignty? According to Vallet (2014) the 'wall' is more than just a historical relict for managing borders, quite the opposite, in recent years it has been given renewed vigour, e.g. along the U.S.-Mexico border or more recently in Hungary due to migration crisis. Thus, in specific situations walls can still be a necessary element that makes people feel safe on both sides of the borderline.

There is a clear need for joint research, in order to discover all possible development scenarios of this cross-border landscape with a unique natural capital and a strong historical legacy. In the last two decades, new

technical landmarks of renewable energy have occurred along the Austrian side of the border. These energy monuments stand for a visual manifestation of novelty, renewability and sustainability. A sustainable future development scenario should utilise the potential of cross-border landscape transition also through renewable energy, which could create a novel multilayer quality in the landscape. A joint approach in sensitive implementation of renewable energy, in line with nature and landscape protection along the European Green Belt landscapes, would create synergies in creating high quality landscapes generating green and renewable energy.

ACKNOWLEDGMENTS

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A Conflict of One Hundred Years Ago as a Challenge for Spatial Development Today: The Conservation of WWI-heritage

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Keywords:

World War One conflict landscape, landscape changes, aerial photography, landscape visualization, WWI-heritage

ABSTRACT

During the period 2014-2018, the commemoration of the First World War is taking place. This conflict destroyed besides the societies and their mode of life, also directly landscapes. This paper studies the conflict landscape in Flanders, an area located on the former Western Front in Belgium, which was the theatre of warfare for four long years. The area was intensively disturbed and reshaped into a lunar like landscape full of shell holes, mud and military features. The reconstruction after the war took a lot of effort. Nevertheless, the war left visible footprints in the landscape as the last remains of this conflict (e.g. bunkers, cemeteries). Additionally, also invisible remains are still abundantly present, making it increasingly clear that the landscape is connected with this war. Within an interdisciplinary research context, the study of the micro-topography characterized many shell holes in the landscape. The reasons for the conservation were studied by analysing the historical land use on aerial photos and by analysing policy discourses towards heritage and land use. The results, indicate that remains of the First World War are more abundantly present than

thought. This encourages the discussion in Flanders between modern developments and the conservation of WWI-heritage.

INTRODUCTION

The First World War (1914-1918) can be considered as a worldwide cultural calamity in both rural and urban areas. Approximately, 1.45 billion shells were fired by the German, French and British army on all the fronts (Miles, 2016). Although many regions around the globe had to cope with losses, destruction and pain caused by this war, this paper focuses on the conflict landscape located on the former Western Front in Flanders (Belgium) going from the North Sea to the French border in a north-south direction. This region was one of the most desolated areas during the war (Pearson et al., 2010). Indeed, many severe battles occurred in this corner of Flanders (e.g. the first, second and third Battle of Ypres and the Battle of Messines). Already in the beginning of the war, after the Battle of the Marne (5-11 September 1914), the war changed from a dynamic war to a stalemate in the trenches (Stichelbaut, 2011). As a result, the same area was shelled for four years long and changed sustain in a landscape full of craters, demolishing completely the fauna and flora (Wearn et al., 2017) and consequently the cultural landscape. Aerial and terrestrial photographs taken during the conflict give a clear visual impression of the destruction and confirm this desolated landscape, which surpasses without any doubt human living conditions, or better-combatting conditions, for all the different nations involved in the conflict (Barton, 2008). The valuable historic photos expose that the landscape was completely wiped out and almost nothing - except ruins, improvised graves, tree stumps, old roads and mud among others - were recognisable on the front line. In contrast, new military elements such as infrastructure needed



Figure 1. Historical aerial photograph taken from the city Ypres in 1918 (Copyright In Flanders Fields Museum)

for the combat (e.g. roads, trenches, railroads) and traces from exploded artillery and mines (e.g. shell-holes) were added to the landscape and steadily replacing the pre-war landscape, creating a characteristic WWI-landscape (Van den Berghe et al., 2018).

Because of the ‘tabula rasa’ created during the conflict, the returning refugees to Flanders had inevitably to rebuild, or remobilize, their properties and belongings. Local and national initiatives, organizations and institutions expedited the recovery of the landscape and resettlement of inhabitants (Claeys, 2017). The area was cleaned at a fast pace by gathering war remains and by even the ground level (Dendooven, 2009; Hupy & Schaetzl, 2008). Also, international actors, such as the promotion of the well-known modernist garden cities by the Belgium Town Planning Committee (established in 1915 in London), were influencing the plans of the reconstructions. Despite the consecutive lectures, congresses, developed plans and exhibitions, the advertisement of this type of city had only a minuscule impact on the planning in Belgium (Uyttenhove, 1990). However, the operations of all the actors together, with each a different degree of influence, realized a spectacular

reconstruction which took a lot of effort, labour and money. Consequently, the landscape today looks ‘healthy’ again with many panoramic views and a blooming nature. On the contrary, obvious remains of the conflict (e.g. bunkers, mine craters, cemeteries) are still scattered in the landscape, making it the last witnesses of the conflict (Chielens, 2009). This specific cultural landscape, with an associated WWI memory and identity, can be seen as an intangible ‘heritage-scape’ that induced already before the end of the war ‘battlefield tourism’. Today, it is generally accepted that the war, is still comprehensively interwoven with the landscape (Miles, 2016).

However, despite the clearly visible remains in the landscape and the related heritage sites, war memorials, museums and cemeteries for both Allied and German forces, the physical impact of the war (e.g. shelling, military infrastructure) on the landscape is still not fully understood. Apart from the obvious scars, ‘hidden’ remains or footprints are still present in the landscape. These need to be thoroughly investigated before they disappear due to modern and fast-changing developments and agricultural intensifications. Recent excavations nearby the village centre of Wytschaete, which represent only a small piece of the puzzle in the overall landscape, already proved that the soil of the former front line in Flanders is still full with WWI-remains and relics (e.g. site Hill 80) (www.hill80.com, 22/05/2018). These unknown relics, by which the society is not completely aware of and which can sometimes be dangerous due to exploding munition while cultivating (e.g. hearing damage) (www.nieuwsblad.be, 18/05/2018), have an impact upon spatial planning by challenging Flanders to balance between the opportunities for modern developments and intensifications on the one hand and the conservation of WWI-heritage on the other hand.

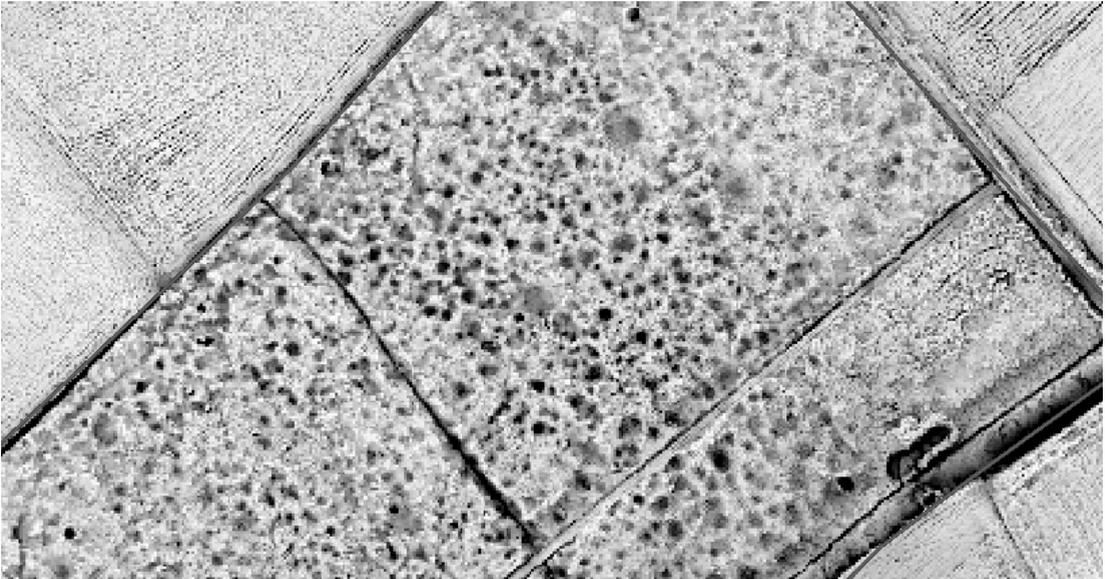


Figure 2. LiDAR image with clear traces of bombturbation (Flemish DHMVI 1 m raster)

This research firstly (i) investigates ‘hidden’ WWI-heritage on a landscape scale in a non-invasive manner by using interdisciplinary methodologies combining landscape research from a geographical point of view, landscape archaeology and physical soil prospections. Above and underground footprints and remains of the First World War in the present-day landscape are both discussed and characterized by the use of a range of different sources and methodologies. Secondly (ii), we try to understand why some remains are still preserved and others are not by use of in-depth landscape-change analysis that relies on land use changes (patterns) and policy changes (processes) in the last century.

MATERIAL AND METHOD

Great War heritage today

The Great War can be seen as a ‘3D-warscape’ that was fought in three different spaces: the air, underground and above ground (Derui et al., 2016). In each space, all parties executed adapted strategies, which makes this conflict a complex event to study. Therefore, in this research, we divided the Great War remains into two groups:

above ground (e.g. craters, trenches) and underground preserved heritage (e.g. dugouts, tunnels or post-war covered military infrastructure) (Gheyle et al., 2018), which both can be considered as heritage. The study of each type of heritage requires a different methodology and appropriate sources. This research that embraces three different disciplines, tries to reveal the as far as unknown or unconfirmed remains of the First World War in the present-day landscape firstly based on land use visible on historical aerial photographs in several time periods. Secondly, LiDAR (Light Detection and Ranging of Laser Imaging Detection and Ranging) images are used for the detection of above ground heritage (Gheyle et al., 2018; Meylemans & Petermans, 2017). These images reveal WWI-footprints in the micro-topography of the landscape such as imprints of WWI-‘bombturbation’ that generated scattered craters (Hupy & Schaetzl, 2006). Based on the degree of visibility of the footprints, the conditions of preservation can be recorded (Gheyle et al., 2018). Thirdly, geophysical soil prospection is used for the study of the buried WWI-heritage (Saey et al., 2015) conventional soil sampling procedures face restrictions

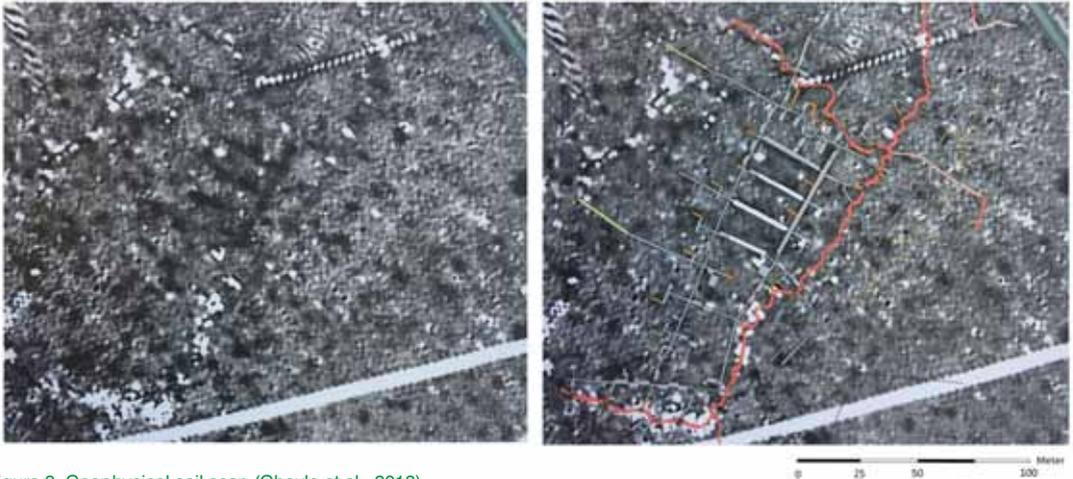


Figure 3. Geophysical soil scan (Gheyle et al., 2018)

because of their destructive character. Hence there is a growing interest in non-invasive techniques, on which proximal soil sensors are based. There is great interest in applying proximal soil sensing to improve the characterization of the buried heritage embedded in the soil landscape at sites such as the Stonehenge World Heritage Site, UK. Because calibration and validation procedures based on invasive practices are unconventional, we turned to the investigation of a well-documented practice trench dug during the First World War (WW1).

Where and why are WWI-footprints preserved and why not?

After revealing the preserved WWI-heritage today in the landscape, the question arises why some fields have WWI-remains and others not as the complete front line and its closely connected hinterland in Flanders were one hundred years ago completely filled with WWI-infrastructure and destruction imprints (Van den Berghe et al., 2018). To answer this question, driving forces or incentives of the whether or not preserved WWI-heritage in the last century and their related actors need to be investigated.

On the one hand, a landscape change study will be performed since

the understanding of the patterns of landscape changes form an important factor towards the conservation of archaeological sites and landscapes (Parcak, 2009). 'Change' in this context is defined as a different perceivable form of the landscape between two different time stages (Antrop, 2003). This approach analyses the changing land use (e.g. woodland, pasture) in the last century based on the perceivable information on thousands historical aerial photos taken during WWI by several combatting nations (Stichelbaut, 2011), and also photos from after the WWI upon today. The history of the changes indicates a particular either or no maintenance of WWI remains (Van den Berghe et al., 2018).

On the other hand, these patterns of change in the last century will be explored for several time phases (1915, 1918, 1940 and 2012) as an aid to understand the preservation. These will be spatially investigated by use of different GIS procedures on large-scale maps of the landscape (37 km²), whereby land use and linear structures (e.g. roads, waterways, green borders) are represented. Each map embodies a particular year in history by which the combination of these maps shows the changing spatial patterns in history. To interpret the possible discovered patterns, actors of importance such

as policy discourses, heritage policy, local initiatives, the influence of other events (e.g. WWII) and the international interests in the remembrance and commemoration of the WWI are investigated and linked with the patterns on the maps. It is noteworthy that the main aim of this paper is not to give a historiographical essay on historical sources, but will only consult these as a way of support.

PRELIMINARY RESULTS

Results show that WWI-heritage – even after 100 years - is still abundantly present in the landscape, both above and underground. Based on the interpretation of the aerial photographs (Van den Berghe et al., 2018) and the LiDAR images, it is clear that the landscape in Flanders is still a conflict landscape with scattered traces of the war in the entire area. The 3D information reveals a diversity of war heritage in the micro-topography of Flanders such as trenches, training sites, shelters, bunkers and entrances to dugouts, tunnels and many subtle shell-holes that are not visible to the normal eye (Gheyle et al., 2018).

Geophysical soil scans in several fields on the former front line indicate that the ground is still saturated with irregularities. Buried remains can be traced with these scans making it possible, with the comparison of features visible on WWI aerial photos, to identify the different irregularities (e.g. dug out Tor Top) (Gheyle et al., 2018; Note et al., 2018).

The preservation of WWI heritage today has an un-ignorable relationship with the type of land use in the past history, which is reflected in its landscape change trajectory. The more a parcel was changed from one type of land use into another, the less the preservation condition of above ground relics. Additionally, the kind of change is also important (e.g. from woodland to arable land, or from arable land to

woodland). The biggest percentage of aboveground relics can be found in fields that are not that severe cultivated such as woodland or pasture. On the contrary, exceptions can be found on arable land (Van den Berghe et al., 2018). The study of different spatial patterns of change between the time phases (pre-war situation, 1940 and 2012) shows that most hot spots of change represented by land use, are visible in the years after the war upon 1940 in the urban landscape (villages, cities). Later, from 1940, the focus of change was noticeable in the rural landscape. These can be linked with the different actors at the local and regional scale that are inducing different local and regional initiatives as well as different policy discourses, such as the policy of conservation and heritage (Himpe, 2018).

CONCLUSION AND DISCUSSION

This study tried to understand the preserved above ground WWI-heritage of today. Results indicated that the micro-topography traces of shell holes are more abundant than previously thought, even sometimes in arable land. To reveal the reasons behind the preservation of WWI-relics, land use changes and patterns, were studied.

This research tried to understand the reasons of disappearance or maintenance of WWI-heritage by practising two driving forces of influence: the study of land use changes and historical/temporal human actors. However, other factors that are not included have also an influence on the preservation. Therefore, it is interesting for further research to identify also these.

The study of the conflict on a landscape scale in this research supports sustainable heritage management by making it understandable and accessible for planners (Fairclough, 2003). A balance

between the remembrance of the conflict and the modern fast-changing society can be reached in future development by including the outcomes of the condition of the visible and the invisible remains today.

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5.3. CONSERVATION AND DEVELOPMENT

GROUP K

An Everyday Park Overwrites a Painful Past

Suvarna Apte
PECHA KUCHA PAPER

Conflict, Incarceration, and Decay: The American Concentration Camps of WWII
Shelley Cannady

The Design History of the City Parks from Romania in a European and Regional context
Albert Fekete

The Future of Planty Park in Cracow Compared to Other Examples of City Walls Being Transformed into Urban Parks
Katarzyna Hodor
PECHA KUCHA PAPER

Sites and Gardens with Historic-Cultural and Tourist Value. Contribution to an Identification Methodology with Public Visitation Objectives
Daniela Santos

The Future of the Maksimir Park: Historical Urban Parks in a New Local and Global Context
Martin van den Toorn & Iva Rechner Dika

An Everyday Park Overwrites a Painful Past

PECHA KUCHA PAPER

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Keywords:

independence, inner city, urban development, collective memory, open space strategy

ABSTRACT

This paper demonstrates that strategic open space planning may offer the way forward to resolve conflicting uses of Jallianwala Bagh, a historic park that witnessed a massacre in April of 1919. Located adjacent (500m) to the holiest shrine of the Sikh religion, the Golden temple, this park that memorializes a tragedy and was an important inflection point in India's independence movement, is presently used for recreational purposes and provides respite to tourists in a densely built walled city of Amritsar in India. The collective memory of a nation is in conflict with everyday social needs of the inner city of Amritsar.

INTRODUCTION

A cold blood ambush that killed 579 men, women and children stunned the Indians, catapulted an unassuming park called Jallianwala Bagh to embody the birth of a national consciousness against colonial oppression. It is believed to have sparked the coalescence of a fragmented independence movement in what was then an undivided India and a British colony, galvanizing Indians to push ever harder for independence that was finally achieved 28 years later in August of 1947.

Through a century of political upheavals, both planned and informal urban development in the historic core, its painful history is being erased

through a programmatic shift associated with religious tourism driven by the Golden Temple. Our paper investigates the particular predicament of this historic open space hemmed in by a bursting inner city (631persons/ha as opposed to London core at 223persons/ha) that has very few open spaces given the density. We believe that while the national narrative of our collective history is losing its meaning in part due to the design and management of the park, the solution lies beyond the redesign of the park in strategic open space planning. We ask how we can balance respite and recreational needs with a heritage of national significance in the dense walled city which hosts millions of tourists every year. First, we trace the evolution of old Amritsar's (cultural) landscape to unpack layers of history. We then propose an open space strategy that balances interpretation of heritage value of a site of conflict with the genuine need for community open space.

Jallianwala Bagh in Context

The holy city of Amritsar has occupied a unique place in the historical annals of India since its conception and establishment in 1577. It emerged as a religious centre for Sikhs when their religious leader, Guru Ramdas chose the location for development of a body of holy water (Amrit Sarovar) and temple Hari Mandir, now called Harmandir Sahib or the Golden Temple. The city around was eventually renamed Amritsar. With over 150,000 pilgrims/tourists every day and reaching 600,000 during special festivals, the Golden Temple is one of the emblems of religious tourism in India today. At the height of its glory, the city was 3.4 square kilometers of which two thirds were densely populated katras, the rest were dhabs (ponds) and baghs (gardens). Gardens closest to the temple were part of private estates called bungas, which belonged to chieftains visiting from Lahore (50

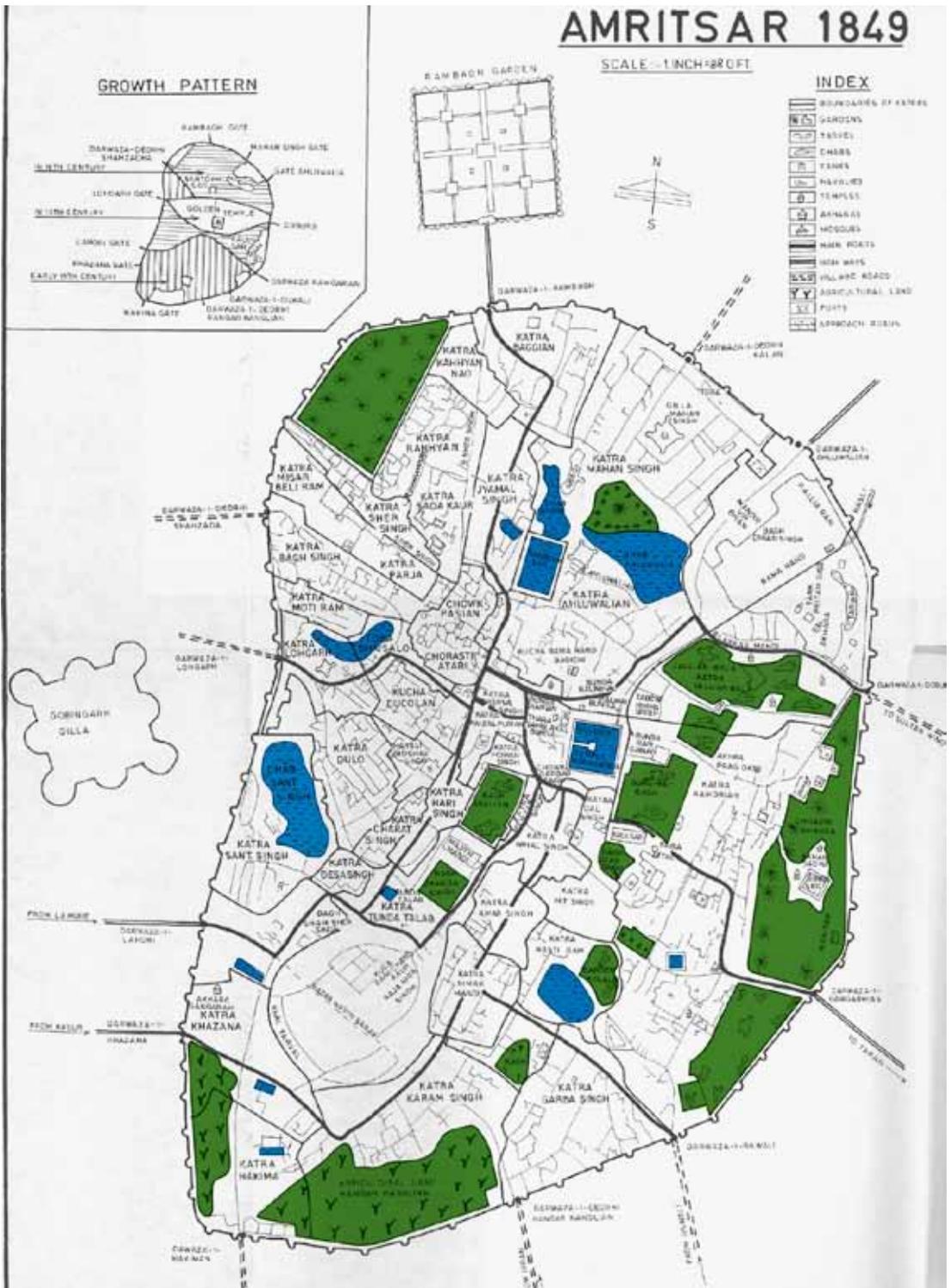


Figure1: Amritsar 1849 (showing extent of ponds, lakes and gardens), Fig1_Amritsar1849.jpg. Source: Base map by Gauba A.; Illustration by Suvarna Apte

kms. west of Amritsar in undivided India but now is across the border located in present day Pakistan). Bunga

Jallianwala and its garden belonged to a General Himmat Singh Jallianwala. Although, some were attached to

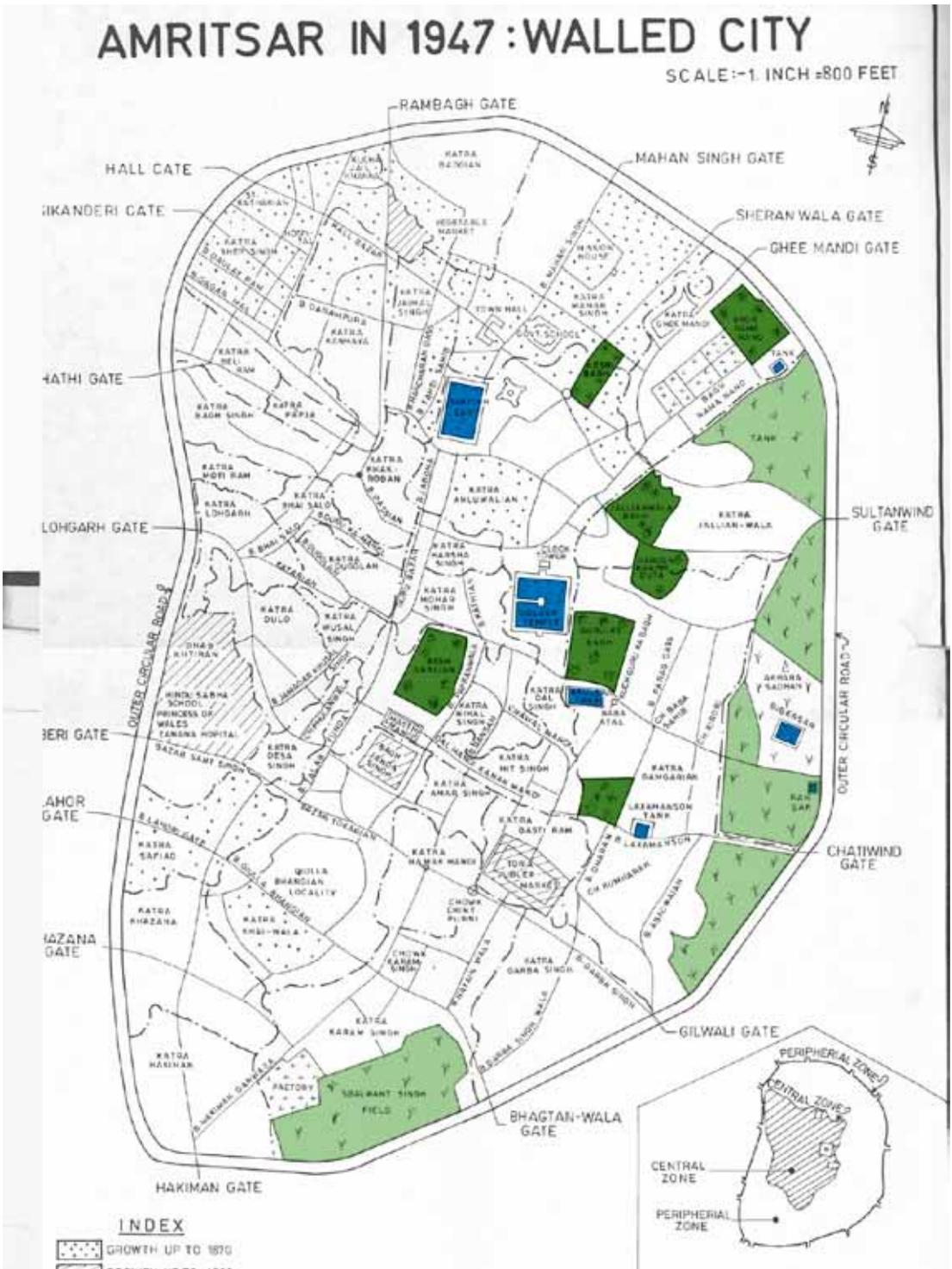


Figure 2: Amritsar 1947 (showing extent of ponds, lakes and gardens), Fig2_Amritsar1947.jpg, Source: Base map by Gauba A.; Illustration by Suvarna Apte

religious institutions, some belonged to rich merchants and several to the landed gentry. Smaller gardens could

be portioned off from the larger open spaces for personal use if one could obtain such an endowment (Gauba



Figure3: Amritsar 2017 (showing walled city with tremendously reduced open spaces), Fig3_Amritsar2017.jpg, 2017 Google map showing.

1998, Sahni 2003).

Collective Memory, Design and Urban Development

While many of the other parks and gardens have been lost in the name of urbanization but particularly to cater to the influx of migrants during the partition of India in 1947, we can attribute the massacre of 1919 to the survival of this open space in the centre of the historic city. (Purewal 2000) Today this 6-acre area within the walls looks like a quintessential neighborhood park with hedge lined walkways, trees that give shelter for midday lunches or naps. Two covered walkways give relief from the sun and the space functions as a temporary campsite for several groups of people visiting the Golden Temple and the city. The bulky central stone memorial is a 45-foot shikhara (literally a temple peak) set within a park like setting. It has been peacefully absorbed in the scenery as children jump in and out of empty reflection ponds and visitors take we-were-here selfies leaning against the memorial. Ubiquitous lawn and ornamental planting in soil or in pots makes light of the sheer callous savagery experienced in the enclosure by making the park a



Image 1: Memorial ground used for midday break, Img1_Memorial Foreground.jpg, Source: Authors

pleasant place. Even the well in which people jumped to their deaths trying to avoid bullets, fails to convey a sense of horror, having been enclosed by an oddly decorated pink building. The carefully preserved bullet-ridden walls are the only scars that truly give visitors a sense of its gory history.

The design and state of the park brings up questions of balancing public leisure space with the gravitas needed to memorialize the tragedy and marking a turning point within the quest for self rule among Indians for future generations. The overlap of use by pilgrims due to the proximity of the Golden Temple and use by locals as a neighborhood park has left Jallianwala Bagh unsure of what it really should be. Together, they present us with a dilemma of how to maintain the message and significance of historical events that have been so transformative for the nation while addressing need for open public spaces in the city today.

THEORETICAL FRAMEWORK

We deploy Lefebvre's triadic approach of perceived, conceived and lived spaces to create a framework and develop a strategy of open spaces for the walled city of Amritsar since it engages with not only social diversity but also with symbolic nature of space and the built environment. We open our investigation into the negotiated dialectic between the three as it unfolds



Image 2: Bullet ridden walls provide solemnity, [Img2_Preserved Bullet-marked Walls.jpg](#), Source: Authors

everyday. As we face the commodification of urban spaces along Dharam Singh Market, Jallianwala Bagh confronts immense pressure to not only participate in bite-sized nationalist tourism but also as an everyday space. The representation of space- conceived, by architect Benjamin Polk is a concoction of empty Indian symbolism that unfortunately does not capture the collective identity that emerged as an outcome of this tragedy. This approach guides us to delve into the social practices (perceived, the way a space is used) and both, historical and current symbolic value (lived) for the production of space around the Golden Temple. Similar to UNESCO's Historic Urban Landscape (HUL) approach, we ask how a city defines its heritage values and assesses the vulnerability of its past to the imminent pressures of urbanization.

Open space strategy

We believe that the inappropriate use of the Jallianwala Bagh can be addressed if we put in place a holistic vision and an open space strategy for acknowledging, reassessing and (re) connecting the assortment of gardens, courtyards, tanks, street junctions, setbacks etc. to address the needs of the visitors, residents and other communities of interest within the walled city. The values of freedom, justice and patriotism through which emerged the idea of an Indian nation,

are still relevant in the aspiration for a democratic nation which can be addressed in the repositioning of the inner city landscape. We are suggesting use of a simple four stage process of first prepare (the brief, scope of strategy, select partners, secure funding), then review the context, understand the supply, understand demand and need, analyse and identify objectives, prepare the strategy and action plan.

We have found that there are open spaces available close to the Golden Temple- these are also historic parks and need sensitive treatment but are not sites in conflict with everyday use. However, they are not as visible, well known or directly accessible as Jallianwala Bagh. The exercise of preparing a strategy begins with identification of open spaces in the old city such as Galiara and south of Langer hall, Chowk Karori, Bagh Ramanand, all have the potential to absorb tourists and are underused currently. We propose a study of their historic value as well their social, economic and environmental value from the perspective of connectivity to known popular points of origin and destinations of users. It would help the city to develop a connectivity strategy (example an interpretive directions and signage) to negotiate the inner city landscape to travel to and from the Golden Temple.

Way forward

What we are proposing cannot be accomplished without explicit involvement of the city stakeholders such as the SGPC, the Golden Temple management, the Jallianwala Bagh Memorial Trust, state and local officials and most importantly city's residents who undoubtedly have a conflicted relationship with massive volumes of tourists. To ensure future pride and stewardship of the historical spaces, city of Amritsar needs a dialogue of what values are being projected through its open space to create a balance between underused and overused open spaces.

Any proposed use would need to safeguard the multi use and multi-cultural nature of spaces in historic cities while suggesting concrete measures to streamline their kind, time and nature of use (CABE space document, 2009). The city needs its stakeholders to look beyond its narrowly defined agendas to remember why we are together as a nation in the first place. In an effort to retain its value for the entire nation, it cannot afford to let Jallianwala Bagh, a park of national importance be diminished to become a neighbourhood park.

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Conflict, Incarceration, and Decay: The American Concentration Camps of WWII

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Japanese American Confinement Sites, concentration camps, site interpretation, historic preservation

ABSTRACT

Following the bombing of Pearl Harbor by Japan during WWII, Americans of Japanese descent were confined in ten concentration camps in California, Arizona, Utah, Idaho, Wyoming, Colorado and Arkansas. These camps were largely dismantled at war's end and to the untrained eye little remains in the landscape to preserve their memory. As sites of remembrance and pilgrimage, the meager physical acknowledgement of most of them is incommensurate with their historical importance. This research compares differences in the current physical presence and on-site acknowledgement of these concentration camps by examining visual cues to their former existence, existing interpretative infrastructure, ease of access and wayfinding, and existing artifacts. Methods include photographic documentation of all ten sites and their surrounding contexts; communication with U.S. National Park Service personnel and others involved in site administration, access, or interpretation; communication with local residents; and the author's extensive involvement with the site of the largest of these camps. Findings expose a wide range in the number of historical assets remaining and in levels of historical interpretation, memorialization, access, wayfinding cues, and even in local awareness of their existence.

INTRODUCTION

Important historical landscapes of conflict in the United States are decaying into obscurity. Following the bombing of Pearl Harbor by Japan during WWII, innocent Americans of

Japanese descent were confined in ten concentration camps; these camps were decommissioned in 1945 and to the untrained eye little remains in the landscape to preserve their memory. As sites of remembrance and pilgrimage, the meager physical acknowledgement of most of them is incommensurate with their historical importance and renewed relevance in a time where xenophobia and nationalism are on the rise. As the field of landscape architecture increasingly embraces matters of social justice, it is critical to preserve landscapes that express broad tendencies to oppress.



Figure 1: WW II Japanese American relocation sites (the concentration camps are called WRA Relocation Centers). Image: National Park Service.

The ten camps are Tule Lake and Manzanar in California; Poston and Gila River in Arizona; Topaz in Utah; Minidoka in Idaho; Heart Mountain in Wyoming; Amache (a.k.a. Granada) in Colorado; and Jerome and Rohwer in Arkansas (Figure 1). All were remote; all were located in deserts or semi-deserts with the exception of the camps in the swampy Mississippi Delta of Arkansas. The criteria for their selection were many; each had to hold at least 5000 incarcerated to be efficiently managed and guarded and had to be as self-sufficient as possible, requiring very large tracts of unsettled public land (Burton et al., 2002). Further, the sites had to be suitable for the development of agriculture, have power and water resources, and be near transportation

routes for construction and supply but also be distant from large urban areas and strategic military facilities. Most of the efforts to interpret and preserve these sites have been managed by private interest groups; some were not even designated historic sites until relatively recently and little public funding is available. Some have U.S. National Park Service (NPS) involvement but inadequate federal funding. U.S. Public Law 109-441: Preservation of Japanese American Confinement Sites was enacted in 2006, allocating \$38 million to the subject, but only a small percentage of these funds has gone toward on-site preservation, restoration or interpretation (the program funds various project types such as oral histories, films, and reports (Congress.gov, 2018)).

There has been a wide range in the treatment of these camps for numerous reasons including, but not limited to: level of involvement of public interest groups such as former incarcerated or the Japanese American Citizens League; issues of land ownership; return of some sites back to Native American tribal governance; and ambivalence in the communities surrounding the sites.

Precedents to this study include inventories of camp structures where they remain in their original locations, much of which is described in Burton et al., 2002. Similar follow-on studies of physical assets include the work of Kimball Erdman at Rohwer, Eric Sandeen at Heart Mountain and John Hopper at Amache (NPS 2012; *Wyoming's*, 2012; Colorado Preservation, Inc., 2011). The research described in this paper presents first-hand observations by the author that focus on comparing the differences in the current physical conditions at each site and in the surrounding communities in terms of visual presence and acknowledgement of historic landscapes and artifacts. To this end, visual cues to the camps'

former existence (signage, memorials, physical remains *in situ*, and current interpretative infrastructure) were noted with the additional steps of inventorying and comparing physical assets in dispersal, wayfinding features, and ease of access across all ten subjects for the purpose of exposing a more comprehensive picture of the current legibility of the camps' narrative in the broader landscape.

METHODOLOGY



Figure 2: Reconstructed barracks building at the Tule Lake fairgrounds museum.

The author has conducted field work and photographic inventories of all ten former concentration camps and of camp artifacts in dispersal throughout the surrounding regions. Recognizing former camp structures in the contemporary landscape was facilitated by the distinct style of the camps' barracks buildings (Figure 2). Some have been converted to homes and other uses but are still recognizable with experience; many, particularly if repurposed as agricultural outbuildings, remain in a near-original state. Recognizing other building types was aided by communication with local residents and NPS personnel and by secondary research.

Coverage of the camps' contextual regions was straightforward for most sites because most are clearly defined by natural boundaries with roads on a regular grid and because arid conditions have moderated

decomposition. For example, Tule Lake, Manzanar, Heart Mountain and Topaz are located in basins surrounded by abruptly rising topography. In Arkansas, humidity, flooding and dense vegetation have caused near-complete erasure of Rohwer and Jerome.

Methods also include literature and archival research and examinations of the available inventories mentioned in the introduction. Further, the author has communicated with personnel involved with administration, access, or interpretation of these sites and with local residents; and at Tule Lake, has lived within sight of the camp in a home converted from a barracks building, has participated in an organized pilgrimage event and has contributed to the NPS's effort to develop its interpretation.

RESULTS AND DISCUSSION

Findings expose a wide range in conditions across the ten sites, from extensive interpretation and archaeological intervention at Manzanar to virtually no acknowledgement whatsoever at Gila River. Some sites have poor on-site treatment but have off-site memorials and/or visitor centers and museum displays. Site access and ease of wayfinding also varies. The number of buildings remaining either on site or dispersed locally also varies wildly. For example, in the Tule Lake and Poston areas, camp buildings are ubiquitous in the broader landscape while in other former camp communities there are almost no detectable traces.

There are some commonalities shared between the camp sites: they are all in agricultural regions that are still remote and they have all had the majority of their constructed features erased. Most feature some type of small memorial structure, such as 'honor rolls' listing the names of incarcerated military veterans. All of the host communities continue to enjoy some level of benefit from the camps'

land development, building stock, utilities infrastructure, or agricultural systems (e.g., irrigation networks). And finally, all but Gila River have become important pilgrimage destinations for former incarcerated persons and other interested persons.

Descriptions of current conditions at each site follow; for brevity and ease of comparison, results are summarized and presented in this order:

1. **Peak incarcerated population (Burton et al., 2002).**
2. **On a main road?**
3. **Wayfinding cues/acknowledgement signage**
4. **Presence and/or preservation of camp buildings and artifacts in situ**
5. **Presence of relocated camp buildings in the surrounding community**
6. **Interpretation**
7. **Memorialization**

Tule Lake, California

1. 18,789
2. Yes; CA Highway 139.
3. Roadside signs indicate a historic site.
4. More buildings exist than at all of the other camps combined; many are still in use as housing, vehicle maintenance sheds, warehouses and a store. Other minor artifacts abound. The camp's utility infrastructure and much of its



Figure 3: Typical home in the Tule Lake Basin adapted from a barracks building.

administrative portion are the backbone of the hamlet of Newell today.

5. Pervasive in the landscape; repurposed barracks are found at nearly every .4 kilometer interval within a 10 kilometer radius of the camp. Others widely scattered. Used primarily as homes and farm outbuildings (Figure 3).



Figure 4: Memorial built by an incarcerated stonemason at Manzanar.

6. Pine and Independence. Modern visitor center and extensive site interpretation. Managed by the NPS. Buildings from other camps have been moved to the site as interpretive assets.
7. On-site memorial obelisk built by an incarcerated (Figure 4).



Figure 5: Original buildings and palm allées at Poston I.

6. On-site, the camp's stockade is interpreted, but access only occurs on weekly guided tours. No other original structures are interpreted by signage. A carpenters' shop is currently being restored. An exhibit at the Tule Lake fairgrounds museum 16 kilometers away includes a reconstructed guard tower and barracks building.

7. On-site monument with historic landmark plaque.

Manzanar, California

1. 10,046
2. Yes; CA Highway 395.
3. Roadside signs indicate a historic site.
4. The interpretive center is the camp's former high school gymnasium; no other original buildings remain on site. Exposed remains of gardens and many other artifacts are featured in the landscape. The road grid is intact.
5. Not common, but some can be found in the nearby towns of Lone

Poston, Arizona

1. 17,814 (split between Poston I, II, and III sub-camps)
2. Noticeable remains are not.
3. None. Sites were found by looking at historical documents, aerial photos, and asking local residents.
4. A significant group of several original camp buildings and palm allées exists at Poston I (Figure 5). At Poston II there is a palm allée and a concrete foundation. At Poston III there are no visually discernable traces.
5. Many repurposed buildings are scattered throughout the area. Used primarily as homes, farm outbuildings and offices.
6. None yet. The remains of the elementary school at Poston I have recently been designated as a National Historic landmark and the Poston Community Alliance is developing a restoration plan for the site (U.S. Dept. of the Interior, 2015).

7. Off-site monument along a main road. It is multipurpose, including a tribute to the Colorado River Indian Tribes.

Gila River, Arizona

1. 13,348 (split between Butte and Camp Creek sub-camps)
2. No.
3. None. Sites were found by examining aerial photos and communicating with Gila River Indian Community (GRIC) members. The sites are on GRIC tribal lands and there is no open access to them. Visiting requires a compelling reason and a \$200 permit, though fees are waived for former incarcerated and their families.
4. No buildings. Some foundations, road footprints, ditches, and other subtle artifacts can be found.
5. Very few.
6. None. There was once an exhibit at the GRIC Cultural Center 6.4 kilometers away, but it has been closed for several years. (Cannady and Lomakema, 2012).
7. 'Honor roll' monument built by incarcerated at Butte. Each sub-camp has a poorly visible memorial marker.

Minidoka, Idaho

1. 9,397
2. No.
3. One sign near the site.
4. Ruins of the original guard shack and vestiges of a garden built by incarcerated mark the site's entrance. Remains of a root cellar and a swimming hole can be seen. A few buildings have been moved back to the site.
5. Very few buildings can currently be found.
6. On-site interpretive trail managed by the NPS. Off-site exhibit at the Hagerman Fossil Beds National Monument visitor center 34 kilometers away.



Figure 6: Signs indicate functional areas at Topaz.

7. 'Honor Roll' sign on site.

Topaz, Utah

1. 8,130
2. No.
3. Good directional signage. Scattered acknowledgement signs.
4. No buildings remain but there are numerous artifacts including roads, foundations, vestiges of a sewer pump station, and stone garden arrangements.
5. Repurposed barracks are scattered throughout the area.
6. Rustic on-site signage by the Topaz Preservation Board identify key artifacts and functional areas (Figure 6). An off-site interpretive center 18 kilometers away in Delta, UT, opened in 2015.
7. A modest memorial with two concrete signs, a flagpole, and an 'honor roll'.

Heart Mountain, Wyoming

1. 10,767
2. Yes; U.S. Highway 14A.
3. Roadside signs indicate a historic site. There are no signs acknowledging it in nearby Cody, the main hub of the region.
4. Three hospital buildings, a smokestack, some foundations and other minor artifacts.
5. Repurposed barracks are scattered throughout the region but not concentrated. Used

- primarily as homes, farm outbuildings and businesses.
- 6. On-site well-attended interpretive center in an area that attracts multitudes of tourists to nearby Yellowstone National Park.
- 7. A recently restored 'honor roll' monument built by incarcerated.



Figure 7: Amache's original water tower has been returned to the site. A building foundation is visible midground on the left.

Amache, Colorado

- 1. 7,318
- 2. Yes; U.S. Highway 50 (sparsely travelled).
- 3. Roadside signs indicate a historic site.
- 4. No buildings remain; the original water tower has been moved back (Figure 7). The original road grid and a few concrete foundations remain. The camp cemetery has been embellished and landscaped since the war era.
- 5. A building stock survey revealed that only 21 camp buildings remained, scattered across southeastern Colorado and western Kansas (Colorado Preservation, Inc., 2011).
- 6. There is on-site interpretive signage, a few exhibit panels and a guard tower replica. A small off-site museum in nearby Granada can be visited by appointment only and not during the summer. On and off-site interpretation is managed by volunteers.

- 7. A small shed protects an engraved stone installed by Amache's incarcerated. A contemporary memorial pillar has been added to the landscape nearby.

Rohwer, Arkansas

- 1. 8,475
- 2. No.
- 3. Its cemetery is a National Historic Landmark acknowledged by signage on Highway AR-1 from both directions.
- 4. There are two noticeable landmarks remaining, Rohwer's cemetery and hospital smokestack. There is no public access to the smokestack. The humid climate has taken its toll here and at Jerome; concrete foundations and other sparse artifacts are overgrown with vegetation, materials have decomposed, and road imprints are no longer discernable.
- 5. None found.
- 6. On-site information kiosk and interpretive walk. Small off-site museum shared with Jerome opened in 2013 in nearby McGehee (18 kilometers southwest of Rohwer and 28 kilometers north of Jerome).
- 7. Memorial grouping and headstones in the camp's cemetery.

Jerome, Arkansas

- 1. 8,497
- 2. No.
- 3. There are signs along the road on both approaches to the monument.
- 4. One smokestack, visible but not accessible.
- 5. None found.
- 6. None on site. Off-site museum in McGehee, AR.
- 7. Roadside granite monument near the site.

CONCLUSION

Most of these cultural landscapes remain in relative obscurity, with remaining assets at risk of further decay. Many are difficult to find or perceive even with intention; one has no public access. Conversations between the author and local residents has revealed that even they can have little knowledge of a camp's existence, importance or exact location. This is particularly the case for the Arizona and Arkansas camps.

Most, and in many cases all, buildings were removed from the camp sites shortly after the war. Conversations with local residents, former incarcerated and participants in NPS working groups indicate a prevailing assumption that the camps were dismantled because of a national sense of shame. In actuality they were dismantled to make their building stock, equipment, and land available to post-war homesteaders (Wilson, 2011). At some sites, particularly in the Tule Lake, Poston and Heart Mountain areas, repurposed camp buildings still strongly influence the visual landscape. At others very few traces can be found



Figure 8: Tule Lake's nearly 1000 barracks (6 x 30.5 meters each) are the dark buildings in the background (Burton et al., 2002). Photo: Bureau of Reclamation.

either on site or in dispersal.

The scale of the original camps is difficult to grasp in the present day. Due to their arid and remote locations, soil imprints can still be discerned in aerial imagery. This is not the case for the camps in Arkansas, as greater levels

of rainfall and vegetation have erased the footprints of Rohwer and Jerome. Scale is best discerned at Manzanar, Amache and Topaz, where care has been taken to redefine the many blocks that made up these camps. The scale of Tule Lake, the largest of the camps, is difficult to grasp without looking at war era archival photos (Figure 8).

Only Manzanar and Heart Mountain enjoy a strong presence along well-travelled roads with robust interpretive centers on site. This contrasts sharply with Gila River where no public access is allowed and no wayfinding cues exist. The others all have some form of acknowledgement in terms of directional signage but the type, quality, and quantity of signs vary. Most memorials, 'honor roll' signs and monuments were erected by incarcerated either during or after the war years. Interpretive development at Manzanar is superlative; interpretation at most is minimal; and at Gila River, Poston and Jerome it is nonexistent.

The most important camp to develop and interpret is, arguably, Tule Lake; it was the largest, longest operated and most notorious (Cannady, 2013). There is not room to discuss its many controversies here but it is the only camp to have had a stockade, jail, and military police force that further restricted the civil liberties of its incarcerated. That, and the fact that a great number of its physical artifacts remain make it distinctly suited for greater development but at present there is no funding allocated for its interpretation and management.

Improvements are under development at some sites. U.S. Public Law 109-441 continues to fund various projects that address interpretation, the purchase of artifacts or buildings for return to the sites, or physical improvements to site assets. Examples include: a 2017 grant to return a recreation building to Amache; a 2016 grant for repairs to a school building at Poston I; and a 2013 grant to

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acquire and repair a root cellar at Heart Mountain (NPS, 2018).

Additionally, universities occasionally conduct archaeological or other field studies at different camp sites and various private groups provide volunteer services or financial support. For example, the Topaz Museum Board received the donation of a camp building in 1991, raised money for its restoration and funded the construction of the Topaz Museum in 2015 (Topaz Museum, 2018). But more comprehensive intervention is necessary to preserve and recognize the remaining historical assets to prevent them from falling further into obscurity.

Observing the wide differences in the current physical integrity of these decaying landscapes of conflict illuminates the role of the landscape as a narrative vehicle. Though these sites of mass incarceration are not picturesque, the stories told by both their scattered and on-site traces have value and relevance. Increased preservation, improved access and enhanced interpretive and wayfinding design can keep these traces and places alive to bolster our understanding of cultural landscapes, to honor those who were incarcerated, and to remind or instruct Americans and others about attitudes and acts that do not merit repeating.

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The Design History of the City Parks from Romania in a European and Regional Context

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ABSTRACT

In the study, we distinguish 'public parks' from 'national parks' and 'urban parks'. In most cases, 'urban parks' are part of the urban landscape – but some of them are not public, and thus are not subject of the research. 'National parks' are in most cases public – as generally in Europe – but are usually located outside the cities. In this project, we will focus on the public parks designed in the 19th century. The main goal for the research is to try to provide a balance to the European perspective on the subject, by focusing on the design history of these Eastern European parks, in relation to design for contemporary and future use. A public park does not only function as a green space for the citizens, but more and more as part of the cultural identity of the cities. This paper focuses on a comparative design history of the City Parks of Cluj Napoca, Satu Mare, Targu Mures, Timisoara, Bucuresti, Iasi, Braila and Craiova, that can be used as a basis for the future development of the parks in a contemporary context. Regarding the city parks, the year of establishment, designers, area and location in the settlements are the key issues. The result is an overview and comparison of Romanian city parks and European examples.

INTRODUCTION

Based on their characteristics, the circumstances of the establishment and the respectable age, public parks of

the 19th century may be classified as historic gardens. Public parks played a significant role in the life of urban communities, and were important scenes of public representation of different strata of the society. Research on the urban public parks established from the mid-19th century to 1918 is also relevant for political, economic and ecological reasons, since the geopolitical map of Eastern Europe went through several changes in this period of turbulent historical events. Public parks that were established at this time, and still exist as subjects of ongoing changes nowadays, are also relevant places of the national history and memory. They are live green spaces and open spaces with an internationally less known heritage.

Results of art history research, including that on landscape and garden history, clearly justify that the effects of intellectual movements and schools of art in Western Europe always appeared at the eastern peripheries of Europe with a significant delay in modern history. Although the time of the great baroque achievements was a period of golden ages in the Transylvanian Principality, still architecture and garden architecture was characterised by renaissance constructions here. Even in the first decades of the 18th century, the inventories and property registers still reflect the dominance of typical Renaissance features. In Hungary and Transylvania, the baroque manor and palace constructions and the related gardens appeared only in the 1750s the first time. While in England the works of Pope, Shaftesbury, Kent, Chambers or Brown introduced the landscape garden style, and the concept of picturesque, based on the new theories of classicism and Palladianism in the first decades of the 18th century, in the Carpathian Basin the first instances of landscape gardens appeared only in the 19th century. The civilisation marked by a rapid progress in establishment and development of urban parks

in Eastern Europe, occurring in economic conditions characterised by underdeveloped industry and the dominance of agriculture, is therefore an interesting and noteworthy fact that deserves publication. With the decline of the feudal system, that is how the public park became the symbol of new civic values and social development.

OBJECTIVES

The overall goal of the research is to survey and analyse a series of instances of 19th century public parks in Eastern Europe, with a focus on Romania, in order to provide an overview and insight into the design history of the parks. The research propose to investigate whether there is any direct relation between the development history of urban public parks in Central Europe (including Romania) and Western Europe. Another question is how the citizen movements and the development of public parks in the Austro-Hungarian Monarchy (and its province, Transylvania that is part of Romania nowadays) were related to the development of public parks in the Romanian Principalities (Wallachia and Moldavia) that were under the authority of the Ottoman Empire in the first half of the 19th century.

The research is based on the description, analysis and comparison of the surveyed examples of 19th century public parks in Romania (Transylvania and the Romanian Principalities) from the aspect of design history, each park being considered as a case study site and analysed separately before a comparison is made.

SITES ANALYZED

The research started with a general overview of European history of public parks. 19th century public parks from Central and Eastern Europe were reviewed then finally, detailed analysis of Romanian parks from the 19th century followed. This included sites

that belonged to the 19th century Romania, and also 19th century urban public parks from the Habsburg Monarchy, and later the Austro-Hungarian Monarchy, that are located in Romania nowadays.



Figure 1. Location of the investigated city parks on the map of Europe

The research on Romanian urban public parks included 9 sites from the former Romanian Principalities (Bucharest, Craiova, Braila, Galati, Targu Jiu, Iasi, Barlad, Focsani, Suceava) and 12 in Transylvania (Brasov, Sibiu, Sfantu Gheorghe, Odorheiu Secuiesc, Targu Mures, Cluj Napoca, Gherla, Baia Mare, Satu Mare, Oradea, Timisoara, Arad), providing a total of 21 urban parks.

Following a selection process based on research literature, out of the 21, 8 sites were chosen for detailed research and comparative analysis.

Bucharest, Cismigiu Park

The first public park of the Romanian capital, with a history dating back to the 1830s. Upon the initiative of General Pavel Kiseleff and with a contribution by Baron Borroczyn, this was the time when drainage of the

wetland area at the site of the current park started (Grigore, 2018). The first plan for the park was prepared by Râmniceanu in 1842. The development and final layout was then planned by Carl Friedrich Wilhelm Meyer, the chief curator of Imperial Gardens of Vienna between 1842 and 1848 (Lancuzov, 2007). Based upon Meyer's plan a quality public garden was created in Bucharest, comparable even to Western European standards. Several international landscape architects and botanists shape the further history of Cismigiu Park, of whom the names of Louis Leyvruz, the Swiss gardener, Joseph Hartl, architect, Ulrich Hoffman, Wilhelm Knechtel and Franz Harer is important to mention, and also Friedrich Rebhuhn, landscape architect, who prepared the plan of the complete renewal of the park in 1910 (Filip, 1999).



Figure 2. Cismigiu Park in 1939 (Filip, 1999)

Craiova, Romanescu (Bibescu) Parc

In the 1840s, at the site of the Romanescu Park in Craiova, there was a garden of the Bibescu family created by a „German gardener”. The garden, that

was severely damaged in the Revolution of 1848, was then purchased by the local council for the establishment of an urban public park. However, the political events prevented the realisation, and the initiative was delayed for decades. Around the end of the 19th century, Nicolae Romanescu, the mayor of Craiova commissioned the French architect, Édouard Redont to prepare urban and landscape plans for the town. Redont prepared 34 sketches for the park, which won a golden medal at the 1900 Paris World Fair. The Romanescu Park in Craiova, established in romantic English garden style at an area of 96 hectares, with more than 4 hectares of water surfaces and nearly 35 km route system, had become the largest public park in the country at the turn of the 19th to 20th century.



Figure 3. Romanescu (Bibescu) Park Plan in 1897 (Anghel, 2010)

Braila, City Park

In Braila, a public association for the enhancement of the town was established in 1828, with the need for an urban renewal of the town amongst its purposes. As a result of this initiative, the plan of the Russian Riniev was prepared in 1830, and designated the boundary of the town along the defence line established by the Ottomans in 1821 (Stoica, 2009). The urban development plan of Braila, a settlement with rural character, plots unbuilt land into geometric units laying out new roads and streets, designates the location of the main public institutions



Figure 4. Braila City Plan in 1830 with the City Park (Andreicut, 2012)

and the port, which is one of the most important ones along the Danube. A large urban public park also appears on the plan, in the southeastern section of the town, based on a radial system of alleys. In 1835, the urban development plan was partly revised by the engineer Baron and Captain Borroczyn. The new proposal kept many elements of the Riniev plan, including the urban public park (Andreicut, 2012).

Iasi, Copou Park

The oldest public park in Iași, started to be developed in 1834, making the park one of the first public gardens in Romania. In its centre lies the Obelisk of Lions erected in 1834, dedicated to the first law on political, administrative and juridical organisation in the Romanian Principalities (Bogdan, 2004).

Although the designer of the originally 19-hectare public park is unknown, there is a reference to the "gardener of the park" from 1846. Later several international experts were involved in the development: the name of Wilhelm Rach is mentioned in 1850, the French Pierre Dieudonné in 1868, while in the beginning of the 20th century, the names of chief gardeners and designers A. Stoparek and Rudolf Grabovieschi appear in the documents (Vacaru, 2013). „The fashionable crowd of Moldavia’s capital are known to have used their Copou excursions to engage in displays of social cohesion and play: replacing their drawing rooms, the aristocratic Copou took on all of the functions of sociability, becoming

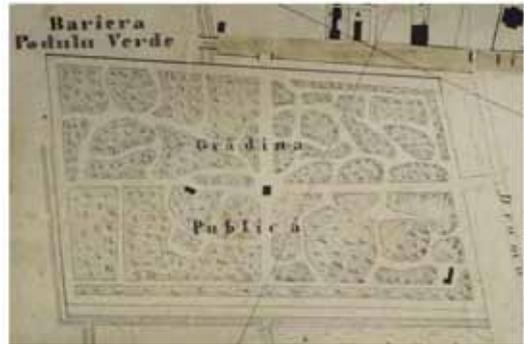


Figure 5. Copou Park Plan in 1857 (Vacaru, 2013)

an enormous public salon” (Cioflâncă, 2006).

Cluj Napoca, City Park

The story of the Promenade in Cluj Napoca dates back to 1827, when the Charity Association of Women rented the area with the purpose of providing a public promenade (Kelemen–Fodor, 1902). An important event of the development of the park occurred in 1838, when the municipality set up the Promenade Committee, and commissioned the engineer Sámuel Hermann to establish a promenade that meets the high cultural level of the city. Hermann’s plan includes a 1 km long triple walkway along the longitudinal axis, flanked by horse chestnut trees. On the sides of the axis of the Promenade, a park of landscape garden type is created, with several paths, sculptures and other works of fine arts, memorials (Fekete, 2004). The professionalism of the park development was ensured by the experts involved. First Mihály Buksa, later János Koppándi were the gardeners, then in 1871 Gustav Ritter became the chief gardener of the Promenade (Richter, 1886).

Satu Mare, Kossuth Garden

The first public park in Satu Mare was established in the second half of the 19th century, with the contribution of Gedeon Kiss, who was responsible for tree planting in the town that time. This public park was then redesigned by Johann Hein, a gardener who was

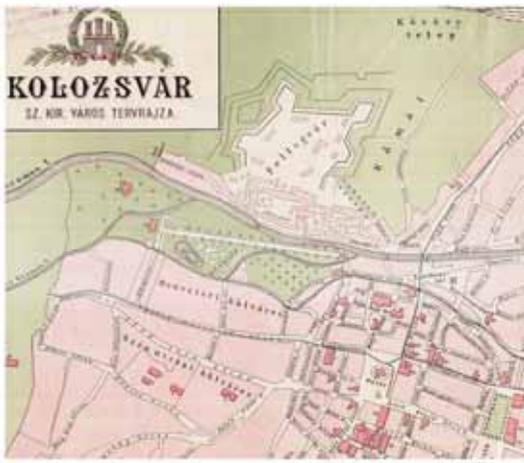


Figure 6. Map of Cluj Napoca from 1895, with the developed City Park - Hadtörténeti Intézet és Múzeum, Budapest

born in Hamburg, and prepared the plans of nearly 300 gardens. Also, he was the one who established the first Hungarian garden design studio in 1893 in Budapest, and the introduction of industrial garden construction is also attached to his name. In the year following the preparation of the Kossuth Garden (People's Garden by its initial name) plan, Hein won a gold medal for his garden plans at the Paris World Fair. Hein used the general framework of landscape gardens for the Kossuth Garden, applying a few elements typical for dendrological gardens. Nevertheless, the layout of the garden already shows the impact of geometric gardens. The northern section of the garden provided ground for the municipal tree nursery, and two buildings of the garden, the municipal steam bath and bathtubs and a pavilion for amusements, were built between 1900 and 1901. According to Borovszky, the area of the public garden was 22 Hungarian acres (Szilágyi, 2008).

Targu Mures, Elisabeth Garden

The Elisabeth Garden, on an island between the branches of River Mures in Targu Mures, was "equipped" by the engineer of French origin, Jean Houchard in 1816 and 1817 with a thermal bath, a pavilion for summer theatre performances, a pub and a tree



Figure 7. The Kossuth Garden in 1925 on map of Satu Mare - Desenată de Eugen Köröskényi. Colectia Bibliotecii Centrale Universitare Lucian Blaga, Cluj-Napoca), and the the Erzsébet Liget on the city map of Targu Mures in the middle of 19th century (1806-1869, Hadtörténeti Intézet és Múzeum, Budapest)

nursery (Szentgyörgyi, 1912). Later a gazebo, a tennis court, a football pitch and additional sport grounds were added. For a long time, this had been the only "amusement place" for the citizens. In 1858, the local council announced a fundraising to erect a memorial column to Jean Houchard. The access bridge to the island was constructed by Péter Bodor, a hydraulic expert and handyman, whose "musical fountain" is located on the Margaret Island in Budapest (as a copy of the original).

Timisoara, City Park System

The park system in Timisoara consists of three parks. A City Park was established in the 1850s between the two forks of the Bega Canal, designed by Earl Coronini, for whom a marble memorial obelisk was erected there. It was Baron Anton Scudier, a military commander who levelled the surface of Scudier Park and made plantings with his soldiers. The park was named after him, and in 1881 his life-size statue was erected in gratitude. The Franz Joseph Park was established with the conversion of the site used for the 1891 National Industrial and Agricultural Fair. It is a large scale English garden, linked to both the Scudier and Coronini Parks, and also to the 2-kilometer tree line along the right side of River Bega. The total area of the parks and plantations is 25 hectares, while the length of the tree lines exceeds 25 kilometers (Bellai, n.d.).



Figure 8. The park system of Timisoara at the beginning of the 20th century - Temesvár Szabad Királyi Város térképe és városbővítési terve, Hadtörténeti Intézet és Múzeum, Budapest. GI h 671/1

CONCLUSIONS

The research and the comparative analyses of Romanian and European city parks covered some basic data and characteristics, such as the area, year of establishment, main functions and compositional principles of the park, and the designers and experts who took part in the realisation (Table 1.)

1. Despite the fact that in modern history the intellectual movements and schools of art in Western Europe always appeared at the eastern peripheries of Europe with a significant delay, in the case of the development of urban public parks this delay was made up in a very short time in Romania.
2. Regarding the period of establishment, principles of composition and social role, the public parks of the major Romanian cities were at a similar level as their West European counterparts established in the 19th century.
3. As an evidence of a functional relation between the Romanian and European garden history and development, several famous European experts took part in the establishment of the Romanian public parks in the 19th century.
4. Similarly to the palace and manor-house gardens, the public parks in Romania are important

representatives of the East European garden arts, and make an organic part of the European garden art history.

5. The data on garden history and the comparative analyses of the research assist an objective exploration of the historical past, and – extended with the survey of the current situation – provide the basis for a comprehensive garden heritage protection and development strategy.

[Table 1. A comparison of the analyzed Romanian city parks]

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Table 1

City Park	Year of establishment (first mention)	Area	Designer/creator/developer
Cismigiu Parc, Bucuresti	1842	16 ha	Râmniceanu/Romania Carl Friedrich Wilhelm Meyer/Vienna (1848) Louis Leyvruz/ Switzerland Joseph Hartl Ulrich Hoffman
Romanescu Parc, Craiova	1840's	90 ha	"a german gardner" Edouard Rédont/France (1897)
City Park, Braila	1830	aprox. 3 ha	Rinieiev/Russia Baron Rudolph von Borroczyn/Germa-
Coposu Parc, Iasi	1846	19 ha	"a gardener of the park" Wilhelm Rach (1850) Pierre Dieudonné/France (1868) A. Stoparek Rudolf Grabovieschi (beginning of
City Parc, Cluj Napoca	1838	13 ha	Samuel Hermann Antal Kagerbauer (1868)
Kossuth Garden, Satu Mare	1890's	12 ha	Johann Hein/Germany (1890's) Gedeon Kiss
Elisabeth Garden, Targu Mures	1817	4 ha	Jean Houchard/France Peter Bodor
City Parc System, Timisoara	1850 – Coronini Parc 1881 – Scudier Garden	25 ha	Count of Coronini Baron Anton Scudier

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The Future of Planty Park in Cracow Compared to Other Examples of City Walls Being Transformed into Urban Parks

PECHA KUCHA PAPER

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ABSTRACT

From the 18th century on, everywhere in Europe, city walls became obsolete and were in many cases transformed into public parks; these 'ring parks' became an archetype in the urban landscape architecture. In this paper, starting from the case of Planty Park in Cracow, we will compare a number of other cases and investigate differences and similarities between them. The results of this study might give us information, ideas, and experiences that can be of use in the planning and designing for the future development of Planty Park. We will analyse how these types of parks as elements in the urban landscape relate to the context, users, and the society at large.

Research methods comprise: analysis of plans, site analysis, fieldwork, and conceptual development.

We will start with an overview of the plan development, which will be followed by a programme definition based on information from the municipality of Cracow. What do users, the municipality, and other stakeholders have in mind concerning the future of Planty Park? In the second step we will analyse and compare some other cases of parks of a similar type. The analysis comprises an analysis of the site, the design history, the design means, and the future use and users. The results will constitute a

basis for developing a strategy for the landscape development of Planty Park in the long run.

In the third part the design principles of this type of parks will be analysed. By comparing these cases we will see if and how these results can be used for the future development of Planty Park. The conclusions focus on different strategies for developing plans concerning the future of parks that have a long design history and a cultural meaning; conservation through development in a contemporary manner. In this type of parks the question how the landscape remains readable as a cultural monument and an icon for the city, while at the same time allowing for its contemporary use, is an important conclusion and point of departure for planning and design.

INTRODUCTION

One of the types of arranged municipal greenery present in European cities are ring parks (Polish: Planty), with the characteristic ring-like layout along the perimeter of demolished fortifications. Their shape depended on the time of construction, and hence they occupied different types of space (Kostof, 1992). Thanks to the application of such compositions, areas located in the vicinity of historical urban structures to this day allow to make good use of them for transport purposes, diversify the urban tissue, create ecological corridors offering numerous natural and scenic values combined with recreational elements (Ostrowski, 2001).

METHOD AND TYPOLOGIES

The research method was based on the comparative analysis of some selected examples of post-fortification rings. The analysis took into consideration the effect of the rings on both the general, municipal scale and on the local one. The conclusions, formed on the basis of this analysis will have the application value for the future development of the Planty Park in Cracow.

Ring parks organised on areas of former fortifications can be divided into three groups:

1. Inner-city rings with closed perimeters.
They clearly separate the historical core of the city from its later development, e.g. Muenster, Germany.
2. Open inner-city rings.
Physical closure of the park perimeter is impossible due to topographic obstacles, such as watercourses, canals, and water pools, e.g. Fortification Ring, Copenhagen.
3. External rings.
Parks which constitute the final limitation for the urban structure of the city, e.g. Naarden, the Netherlands.

A special potential of post-fortification rings developed as public green spaces is seen in their connection with the system of municipal parks. These rings, being one of the core elements of the general municipal structure, become a factor increasing the quality of the historic municipal structures, at the same time, being often the only possibility of introducing a green area into the dense historic city texture, linking it at the same time with extra-urban areas.

Case analysis:

1. Green Ring, Muenster.
Post-fortification ring, limiting the historic municipal structure of the city, with both local and supra-local effect. On the local scale, it introduces a high-quality park space into the area of dense architecture of the city centre with accompanying public functions. In the supra-local scale it is a key element in the municipal system of green spaces, opening into seven green corridors, connecting the city centre with an open landscape. The entire system has a concentric- radial character.
2. Fortification Ring, Copenhagen.
This post-fortification ring does not make up a continuous system. Its character is determined by the structure of the former fortification system



Figure 1a Muenster - Green ring in the context of city green spaces system. Source: Office for Green Spaces and Environmental Protection; Münster City Council. Source: https://gartenpolylog.org/system/files/189/ae506b36-51fa-46f0-ab08-8ca9445e8366/Stos_BAKK.pdf [Accessed 1 Jul. 2018]; Copenhagen – Municipal Planning Strategy 2014. Source: public domain; Green Ring, Vienna, STEP 2015. [Accessed 1 Jul. 2018]. Source: <https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379a.pdf> [Accessed 1 Jul. 2018].

connected significantly with the water supply system. A clear historic structure of the fortifications is completed here with municipal functions making up a core element of the municipal public spaces. The preservation of the clear system of the historic fortification as the carrier of the municipal identity paired with contemporary interventions is of great importance here.

3. Green Ring, Vienna

Green spaces planned within the post-fortification areas, in a form of a wide strip of arterial lines together with a construction of adjacent sequences of representative interiors. The composition is completed with numerous parks enlarging the green belt. In the city, now a 100-years old concept is revived, giving the priority to the system of green spaces consisting of 12 various types and making up a linear and concentric municipal system. Municipal space, shaped in this way,



Figure 1b



Figure 1c

affects the functional solutions of these historic green spaces (communication, recreation, leisure, representative function).

THE RESEARCH SUBJECT PLANTY PARK – HISTORY, FUNCTIONS, AND FUTURE

The development of cities in modern times was associated with the need to extend their limits. Planty Park, which is the subject matter of this study, an area of ca. 21 ha, 4 km long, from 40 to 120 metres wide, in the years 1821-1830 became an area of arranged public greenery. In 1976 the territory of the post-fortification park was entered in the register of historic sites and in 1978, along with the historical urban layout of the Old Town and the Wawel Hill, it was included in the UNESCO (Torowska,

2012, Łakomy, 2012).

Based on the analysis of Planty Park in Cracow, the following elements constitute important composition-related factors: function, identity, and the diversity of needs. What is essential for the holistic view of the investigated area is the analysis of:

- Links with other green areas in the city
- Their functions when they were coming into being and today
- Changes in the structure of green areas.

In Cracow, the limits of Planty Park are demarcated by the first ring road, where today traffic is partly limited to privileged vehicles only. The main paths that intersect the park are a continuation of passages of the transport system existing before the elimination of the fortifications. The parallel pathways adjust their route to adapt to compositional changes introduced in different periods: to the classicist, landscape, naturalistic, eclectic layout, as well as to transformations carried out in the spirit of Art Nouveau, and later on of Modernism.

There are numerous landmarks within the perimeter of the park, they all make up the definition of the current programme for the park, locked in conservative frames.

Post-fortification parks, due to their particular location, have become carriers of cultural values, and therefore they are predisposed to becoming certain “urban living rooms”. Thus, structures and functions assigned to them become a reflection of social needs and expectations. Ever since the time Planty Park in Cracow was established, despite its seeming stability, it has been subjected to a continuous process of transformations. Slowly becoming an internal frontage of the city, it assumes functions of city-wide significance, which have a considerable effect upon its identity (Kostof, 1992).

Quite a special case is the building

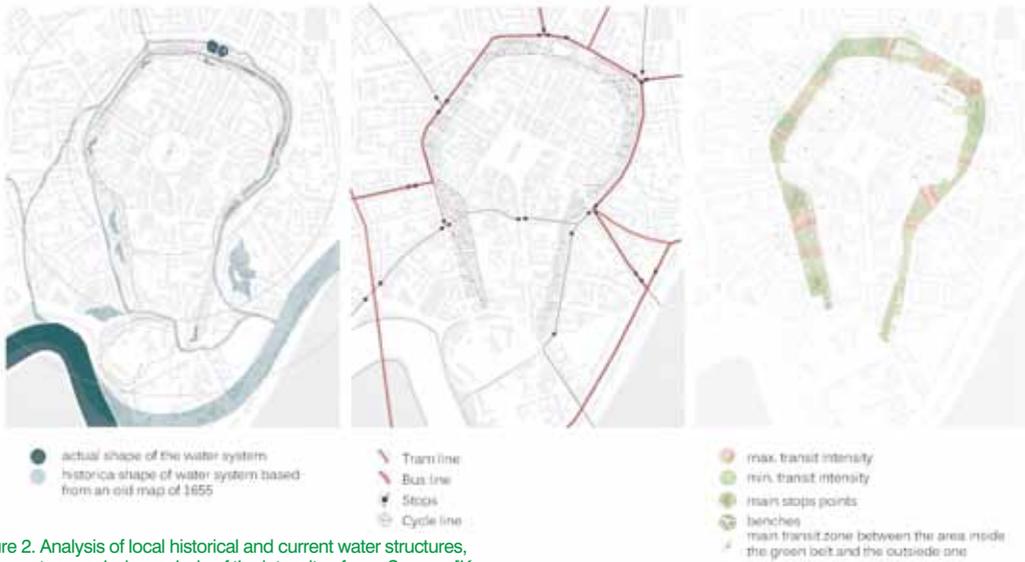


Figure 2. Analysis of local historical and current water structures, traffic system analysis, analysis of the intensity of use. Source: [K. Hodor, P. Careno]

of “Bunkier Sztuki” Contemporary Art Gallery. In 2016 a competition for the development of an architectural concept of the reconstruction, extension, and a superstructure over the edifice of the Gallery was resolved. The winning design by Robert Konieczny and the KWK Promes team decided to hide new exhibition spaces completely underground, so as not to introduce any structures that would alter the character of the park. Simultaneously, it proposed to open up the area in front of the very building to make it become an integral part of the green area along with the view of its underground exhibition space.

SUMMARY

With reference to the typologies presented above it can be stated that Planty Park in Cracow belongs to the type of rings with a closed perimeter (1st typological group) with buildings located along its outer perimeter (1st typological group). The historical analysis of its spatial and functional profile clearly indicates classic zoning of the public space of the park.

The strategies concerning green spaces in Cracow are now in the

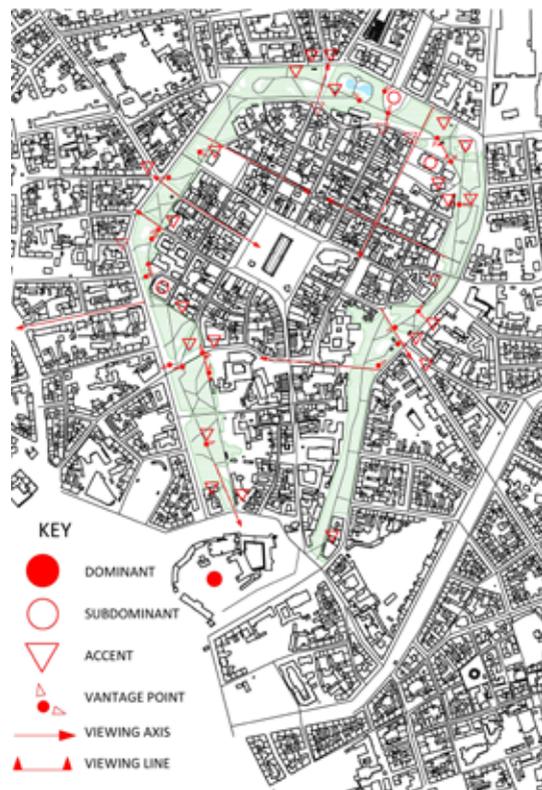


Figure 3a View analysis with marked dominants and view corridors. Source: K. Hodor, P. Careno. Views of the Planty Park. Source: K. Hodor

process of making. “The Directions for the Development and Management of the Green Spaces in Cracow, 2017-2030” defines the principles of harmonious planning and monitoring of green areas, which are meant to be



Figure 3b



Figure 3c

translated onto the improvement of the life quality of city residents. This strategy bears some similarity to the documents introduced in Vienna. It covers an attempt of integrating dispersed green spaces into one system to be furthermore developed.

The correct functioning of Planty Park, as an element of the municipal greenery, is determined by its connection with the green arterial lines joining the city centre and the open landscape (see: Muenster). In consideration of the cultural significance of Planty Park, it is necessary to plan its further development in such a way that emphasises the importance of the historic elements, paired with its adaptation to the contemporary requirements (see: Fortification Ring, Copenhagen).

The analysed examples of strategies point to the concentration

on the entire system of municipal greenery in which the post-fortification rings make up one of the central elements of the system, but without any detailed emphasis on the areas of the historic rings. On the local level they are protected with respect to their special historic and identification character, whilst their value for the shape of the structure is very prominent. It is important to open up the system of connections with other green areas and to specify the adaptation potential depending of the changeable conditions.

The recommendations based on the analysis, in general municipal (1) and local (2) scales:

1. It is necessary to connect Planty Park, currently isolated, with the system of the municipal greenery, and, at the same time, to make the concentric-radial system more visible, as a traditional system illustrating the development of Cracow as a city. The provisions of the city development strategy must be integrated with the documents of the local master plan, which would make it possible to execute all the connections within the city greenery.
2. It is also postulated to introduce new functions and forms of urban planning which are appropriate for the contemporary society so as to obtain the functional continuity of the city within its historic centre. These newly introduced functions should respect the historic values and local identity.

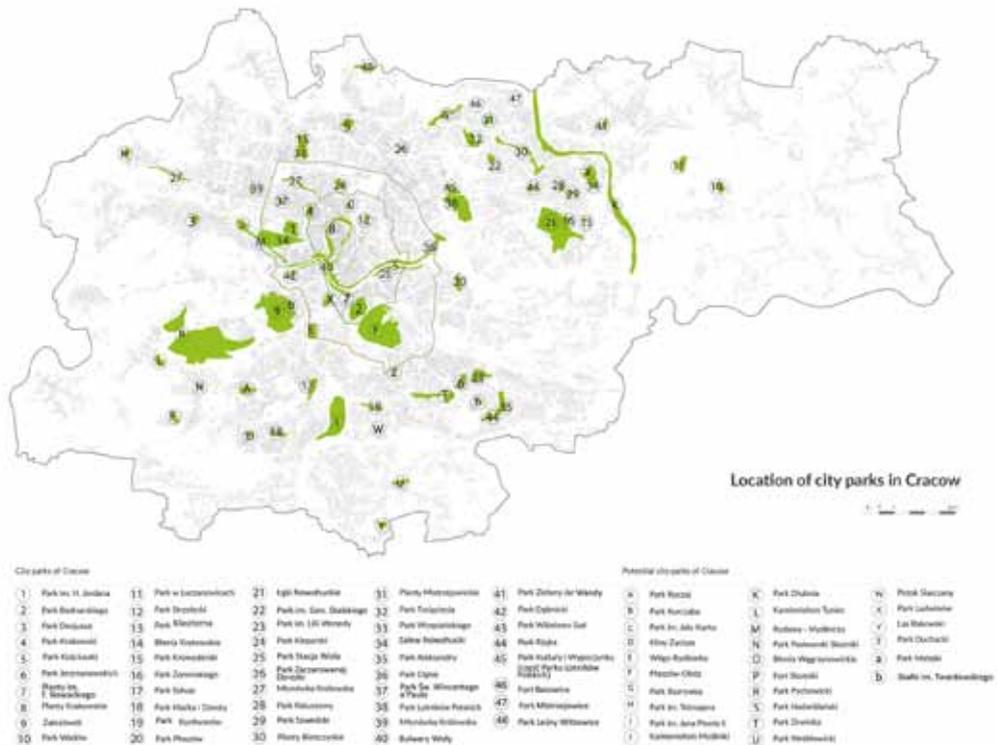


Figure 4. Identification of the existing green spaces from 2016. Source: K. Hodor, M.Vogt

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INTRODUCTION

Sites and Gardens with Historic-Cultural and Tourist Value. Contribution to an Identification Methodology with Public Visitation Objectives

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Sites and Gardens; Methodology; Value; Public; Visitation

ABSTRACT

In order to conserve and enhance cultural landscapes it is necessary to respect history and time, two inextricable concepts. It is also important to identify those landscapes to take actions and make decisions in order to protect them and provide the conservation measures they deserve. This work was developed in a master's thesis research study. It was carried out to fulfill the requirement of a characterization of "Sites and Gardens with historic-cultural and tourist value" in the northern region of Portugal. The aim of the study was to provide a work methodology for the identification of gardens and sites with public visitation interest.

The research was based in performing a territorial study to identify those sites and gardens that, along with their historic, cultural and artistic value, are also valuable for visitation. So the following questions were addressed: "what do we already know?"; "what is still missing?"; "how do we obtain and confirm the information already gathered?" The research was based on literature review, cartographic information sources, and site visits and it developed tools to analyze the results and select sites and gardens to be included in a guide for public visitation and interpretation.

The objective of this study was to elaborate and test a work methodology that would allow the identification and evaluation of sites and gardens of the Northern Region of Portugal with historic, cultural and artistic value and, necessarily, with value for public visitation. Thus, the identified sites and gardens should have importance and value in the present time. They should also serve the purpose of visitation by various types of public - tourists, scholars and garden lovers...- in a relatively extensive and heterogeneous landscape and in a diversity of social and cultural contexts. It was thus intended to bring together not only the most emblematic, and therefore celebrated gardens and sites, but also other public and private gardens, possibly not presently open to the public, and which could offer new and different experiences of fruition. To this end, in addition to consulting and gathering information from inventories carried out by state and municipal public bodies, guides and studies carried out and published in print and online, academic studies, among others, we sought to identify new spaces from cartography and satellite imagery, particularly from Google Maps / Google Earth. The objective was to explore the potential that new technologies, of easy access and manipulation, can introduce in these studies, namely in the unveiling of gardens and sites not yet recorded and inventoried.

In addition to the identification of potential spaces from bibliography and cartography, the methodology included a phase of assessing the physical condition of places - integrity and conservation status - and the capacity to support visitation. These aspects are particularly important considering the requirement that is usually placed on the physical quality of the spaces and on the facilities for visitors' reception.

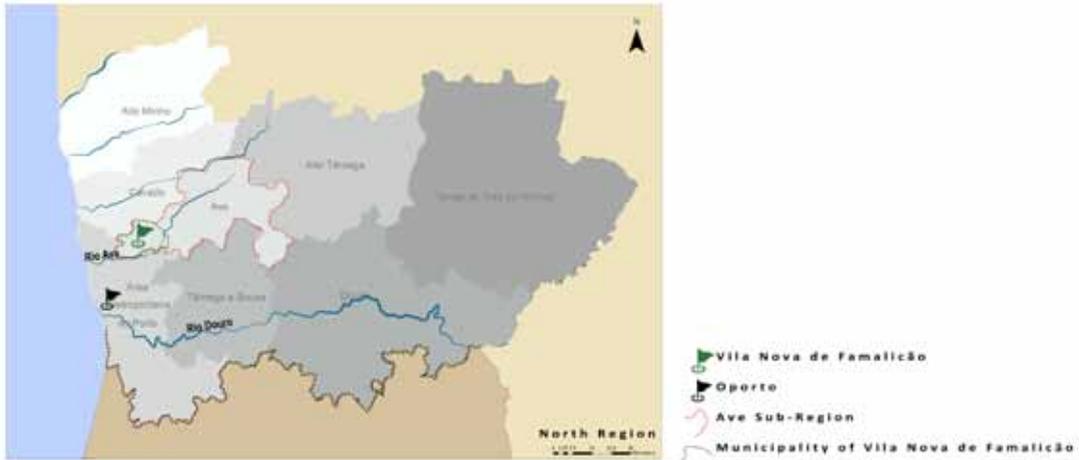


Figure 1: Study area: Administrative division; Territorial context.

For this reason, the study visits carried out in the context of this research were made in order to evaluate those factors, as well as the quality of the landscape surrounding the gardens. This is particularly important for the definition of garden routes, one of the objectives of this study. Thus, field visits were a fundamental stage of the work methodology, having been relevant to the evaluation of the time spent in the implementation of this phase of the methodology and, therefore, in the assessment of its feasibility.

THE METHODOLOGICAL PROCESS

Territorial characterization

Firstly, a large scale analysis of the territory was carried out to identify the main climatic, geomorphological characteristics, hydrology and land use which revealed a significant landscape diversity of the northern region of Portugal. It is considered that it is of great relevance the comprehension of the functioning of the natural and cultural systems for the understanding of the characteristics of gardens and sites and their relation with the broader landscape. In fact, landscape heritage is directly related with biophysical and socioeconomic issues, and the availability of natural resources (Figure 1).

Pre-inventoried heritage of sites and gardens: what do we already know? - Collection and analysis of Sources of Bibliographic Information

It was necessary to perform a collection and consultation of *sources of general bibliographic information* in order to obtain data on the landscape heritage of Northern Portugal. It refers in particular to inventories made by public bodies, universities and research centers, books and guides on gardens in mainland Portugal, as well as listings published in websites of municipality counties. The list of inventoried northern Portuguese gardens and sites was elaborated by the gathering of all the available lists.

Subsequently, it was searched for *sources of specific bibliographic information* that is books, articles in journals, scientific texts, academic theses, websites of private practices, with the purpose of deepening the knowledge on the sites and garden inventoried, and assessing their historical, cultural and landscape interest. Although dispersed, it was concluded that there is information available on a significant number of sites and gardens. For this reason, and in order to carry out this study within the time assigned to it, this phase of the methodology was only applied to the

Ave Sub-region. This is an area with a good amount of examples of this type of heritage although many of them still hadn't been surveyed and registered in listings. This would best allow one of the steps of the proposed methodology to be tested - the finding and confirmation of sites and gardens from satellite mapping and imaging.

To make the process easier it was produced a table which shows the gardens and sites by sub-region within the northern region of the country. For each of these spaces are indicated the sources of general and specific bibliographic information that refer them. This easily shows the amount and nature of references (monography, article, book chapter, etc) for each site. This also allowed the identification of the total number of sites and gardens in the North Region (998) and in each sub-region, resulting in a total of 279 in the Metropolitan Area of Porto, 137 in the Sub-Region of Ave, 190 in the Douro, 118 in Minho, 86 in Cávado, 21 in Alto Tâmega, 136 in Tâmega and Sousa, and 31 in the lands of Trás-os-Montes.

Finally, this table allowed to identify the most mentioned gardens in the bibliographical sources. This persistence in referencing can be understood as a superior interest of these places and, consequently, as spaces to be included in any itinerary, guide or other proposal of face-to-face visitation.

Heritage of sites and gardens: What is still missing? - Sources of Cartographic Information and satellite image

As one of the objectives of this work was to study sites and gardens that were not yet inventoried and registered in bibliographic sources, the next step was to look for *sources of cartographic information and satellite image*, which allowed a territorial study based on actual images. The cartography used was the ordnance

survey maps (1: 25000) of 1940 and 1997 and satellite image - google earth and google maps.

At this stage, and for reasons of feasibility, we limited the study to the municipality of Vila Nova de Famalicão, included in Ave Sub-Region, with an area of approximately 200 Km². This study resulted in the identification of

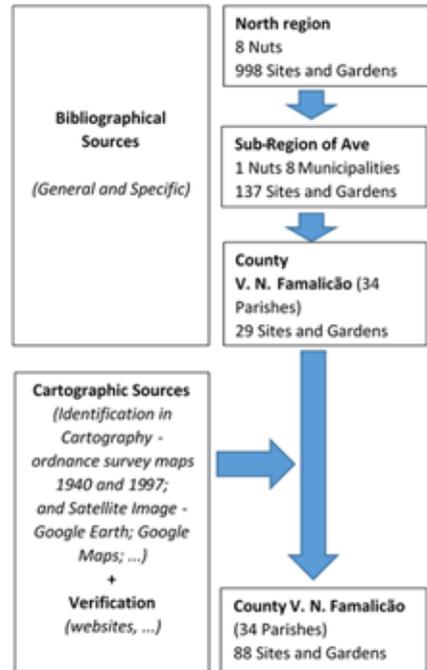


Figure 2: Summary of the work in the consultation phase of bibliographical and cartographic information sources.

88 potential sites and gardens, while in the analysis of bibliographic sources only 29 had been identified. Figure 2 is a summary of the research phases concerning the collection of information from *bibliographical and cartographic sources*.

For the realization of phases 2 and 3 it took 56 working days of a researcher's work, that is, approximately 3 months. However, we are aware that more prolonged work in time could bring more results because it is possible that not all sources of general and specific information have been identified. On the other hand, there is a significant ongoing research activity

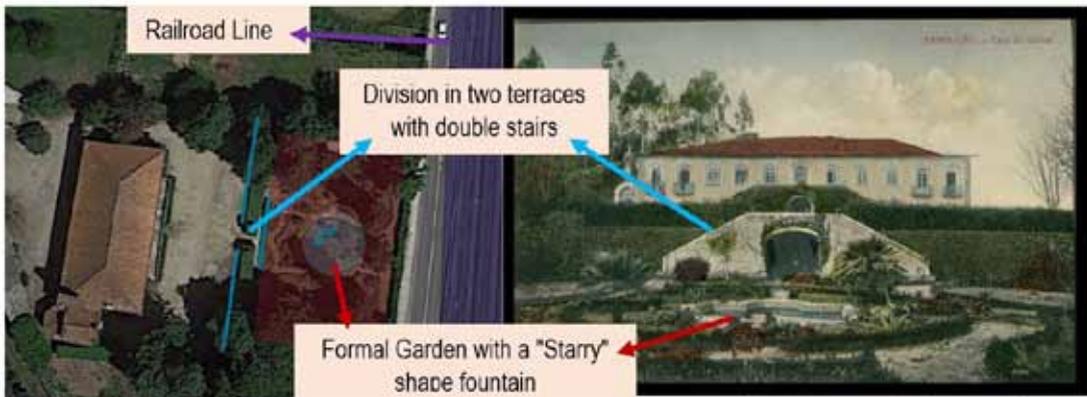


Figure 3: Example of cross-check between bibliographical and cartographic sources and iconographic information applied to Casa do Vinhal. Example of a process for identifying shapes from satellite image (Google Earth) compared with a colored illustrated postcard, undated. Edition of Typografia Minerva – Famalicão; In: <http://www.delcampe.net/page/item/id,306098155,var,BRAGA-VILA-NOVA-DE-FAMALICAO--Casa-do-Vinhal-Ed-Tipografia-Minerva-carte-postale,language,E.html>.

on sites and gardens, with permanent production of new studies and new findings. Therefore, it is up to the researcher to limit the time of the study, according to the depth that he wants to achieve and the time he can spend on it.

In a deeper research, it would be possible to access more specific sources of information such as council's minutes, newspapers, manuscripts, prints, and other documents under the tutelage of local administrative bodies, libraries, or private archives, among others. However, and since is a process that demands a significant amount of time, it was considered that this phase should only be carried out after visiting the places and confirm the actual interest for public visitation.

Analysis and organization of collected information

After the work of surveying and collection of landscape heritage, it was necessary to cross-check the data provided by the bibliographic sources with the information coming from the satellite image analysis. This cross-check allowed to confirm the permanence of the garden nowadays, to verify the borders of the property and to confirm and register its exact location (address and register of GPS coordinates). The overlapping

of the various sources of information also allowed to confirm or update the information initially collected, regarding the layout and composition of the garden or site. Complementarily, and for each case study, it was also sought to obtain iconographic information, namely photographs of different times, postcards, illustrations, etc. These sources proved to be scarce, but when available their crossing with bibliographical and cartographic sources resulted in a better knowledge of the places. Figure 3 presents a case study that brings together the three types of information.

The next step was the elaboration of a *Standard Datasheet* (Table 1) prepared to gather and organize the information obtained. The *Standard Datasheet* was tested for the sites and gardens inventoried in the municipality of Vila Nova de Famalicão confirming its suitability to the diversity of inventoried gardens and sites. For this reason it is believed that it can be applied to other places.

The datasheet also includes other data obtained by other means, in particular data concerning patrimonial and territorial legal protection. This work of confirmation and organization of information relative to the 88 sites and gardens of Vila Nova de Famalicão was conducted by a researcher, in a period of two weeks.



Figure 4: Garden of Casa do Vinhal (Private winner) and Garden of Paços do Concelho (Public winner).

ASSESSMENT AND SELECTION OF INVENTORY HERITAGE

Confirmation of Data and Evaluation of Maintenance Condition – Visits

The confirmation of the data collected and the assessment of the maintenance condition of sites and gardens is essential to understand their present value to attract visitors. The limited longevity of the living parts of the gardens, the loss of artistry on gardening, the exit of population to the large urban centers are some of the factors that contribute to the abandonment of these spaces. As consequence, they gradually become more degraded, with significant changes in their planting schemes or even in their layouts. Thus, the visits to the sites and gardens carried out by qualified professionals are of major importance.

Again, taking into account the premise of public visitation, diverse typologies of ownership and access regime were defined. The proposed *Datasheets of Field Survey* allow the collection and registration of elements necessary to evaluate the potential of visitation of sites and gardens organized according to the referred typologies (Table 2).

In addition to the individual interest of each site, it is considered that for the creation of garden routes it is important to include other landmarks

and cultural assets of the county under analysis. For this purpose, a *Cultural Heritage and Places of Public Interest Datasheet* was made.

Assessment of Visitation Potential

The Evaluation of Visitation

Potential is one of the most important steps of this methodology. It consists of defining the evaluation criteria and assigning a weight to each criterion (Table 3).

Greater weights were attributed to criteria considered to have greater impact on visitation level: *Cultural and social context* (30%), *Functional aspects and support to visitation* (25%), *Integrity and conservation status* (25%), *Landscape value of the setting* (20%). On the other hand, the weight of the various parameters within each criterion was differentiated. For example, in the criterion *Cultural and Social Context* it was given more value to the parameter *Potential or existing Artistic Value* (12.5%); in the *Functional Aspects and Visitation Support* criteria, it was given special attention to *Visitors facilities* (7.5%).

It should be noted that the *Landscape Value* deals with the relationship between sites and gardens, that is, places may not have great potential for visitation alone, but rather as a group value or because of the relationship with their setting. The parameter *Landscape scenery - Impact in the Garden* relates to the perception that the visitor has from

CONCLUSIONS

One of the purposes of this research project was to reveal the artistic, historic and cultural landscape heritage hidden behind walls, in private properties, in public gardens, in cloisters of forgotten monasteries, scattered throughout the territory, encouraging owners to conserve and manage their properties, and to open them to public visitation.

The methodology used, although constituting a time-consuming and complex process, has proved to be effective, revealing sites and gardens unknown. It was also noted the need to be applied by a team, with partnerships in the administrative bodies of the territory under analysis. It is quite exhaustive and able to be applied to different scales, allowing different approximations to the territory and to the object under study. It uses new functionalities of information technologies and confirms its usefulness in an initial phase of the territorial survey of landscape heritage. It confirms the need to visit gardens as a fundamental strategy for assessing their actual value, conservation status and artistic quality.

inside to outside. It intends to answer the questions: "Does the quality of the landscape setting where the garden stands influence garden experience?" The *Landscape scenery - impact on access* parameter relates to the perception that the visitor has from outside to inside. It calls into question whether the site or garden alone is worth of a trip, according to its setting visual quality. Finally, the *Quality of Experience* is also considered essential in the evaluation of the sites visitation potential, having a score of 10%. For each parameter was defined a scale of 1 to 3, being assigned, in the filling of the scoreboard, applied in the selection phase, allowing a standardized result.

SELECTION OF SITES AND GARDENS

The selection of sites and gardens for a guide and visitation route is carried out through the application of the criteria defined for the evaluation of the visitation potential. All sites and gardens considered eligible for this phase are submitted to an evaluation, in the scale of 1 to 3, considering each of the parameters and their percentage weight (Table 4).

This is a decision support method that intends to reduce the degree of subjectivity on the selection of places since all are evaluated according to the same criteria and through a predefined scale. The end result is a list of sites and gardens with the greatest potential for visitation, which may be included in a guide with public visitation purposes.

Within the scope of this work, and given the time restrictions, it was only possible to visit 9 public and 2 private sites and gardens. Paços do Concelho garden (public) and the garden of Casa do Vinhal (private) obtained the best scores (Figure 4).

The total time spent performing the various evaluation and selection phases was seven weeks.

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TABLES

Table 1: Model of sites and gardens standard datasheets (Content Sheets)

Name: Designation / other designations	
Information sources:	
Bibliographic - General: (Acronym)	Bibliographic - Specifies: (Acronym)
Identification in Military Letters: (Yes ("Designation") / No)	Google Earth: (Yes / No + Top View (+ others) obtained on Google Earth / Maps)
Classification:	(Yes / No - Own classification (Acronym) / Associated with ... (Acronym) / Protection (limit of protection area + plan)
Area:	(If known)
Location:	
Civil Parish: (Description)	
Address: Partial or Complete (Desirable)	GPS coordinates: (Main entrance)
Property Regime:	
Public: (Place "X")	Owner: (Singular Person / Institution; Name)
Private: (Place "X")	
Contacts:	(Phone, Mobile, Email, Fax, Website, ...)
Observations:	(History, Century, Author, initial / current use, characteristics)

Table 2: Model of datasheets of field survey (part 1)

Location:	
Civil Parish: (Description)	
Accesses: (Main Accesses / Secondary Accesses / Streets)	
Address: (Complete)	GPS coordinates: (Main entrance)
Data Confirmation (Fill)	
Construction year / year:	Author:
Initial Use:	Current Usage:
Property Regime: (Place "X")	
Public:	Owner: (Singular Person / Institution; Name)
Conditioned access public:	
Schedule: (Fill)	

Private (family use):	
Private access to public / conditioned: Schedule: (Fill)	
Contacts:	(Phone, Mobile, Email, Fax, Website, ...)
Services and Useful Information	
Formal parking: (Place "X")	Own: In the vicinity:
Services (Restoration, accommodation, ...):	Internal support services for visitation:
Own: (Place "X") Which: (Fill) In the vicinity: (Place "X") Which: (Fill)	Guided Tours: (Place "X") Organization of activities: (Place "X") Which: (Fill) Other: (Enter "X" / Specify)
Internal circulation:	(Fill in, eg Pedestrian, handicapped, ...)
Enclosure:	(Urban, Rural, Unique elements in the landscape, Integration in the landscape, ...)
Inventory Chips (form of registration of artistic elements).	
Stroke (Fill)	Green Structure
Linear: Biomorphic: Angular: Other: (Fill)	Existing typologies: (Arboretum, Clearing, Border ...) Significant examples: (Trees, shrubs, clusters, ... - Common and scientific name)
Maintenance: (Adequate, Sufficient, Insufficient)	Maintenance: (Adequate, Sufficient, Insufficient)
Maintenance Status (General)	Good (well maintenance (function and aesthetics) Reasonable (sufficient maintenance - no loss of function) Bad (Low maintenance - compromises the function and aesthetics of the element) Danger (No maintenance)

Elements built (paths, edified, ...)	Decorative elements, furniture, ...
Name: (Fill out)	Name: (Fill out)
Materials: (Fill out)	Materials: (Fill out)
Season / Year of construction: (Fill out)	Season / Year of construction: (Fill out)
State of Conservation: (Good, Reasonable, Bad, Danger)	State of Conservation: (Good, Reasonable, Bad, Danger)
State of Conservation (General)	(Good - Well preserved (good aesthetic and structural appearance), Reasonable (small problems - Preserved (minor faults in conservation, don't present serious problems) Bad (Degraded (endangered several serious problems) Danger (urgent intervention - danger of loss of heritage, advanced degree of degradation)
Historical Information	(Fill)
Visit Notes	(Fill)
Photo registration	(Done or not done)

Table 2: Model of datasheets of field survey (part 2)

Table 3: Criteria for the evaluation of visitation potential

Criterion	Rating (0 - 3)	Criterion Weight %
Cultural and Social Context		30
Property and Accessibility	0 - Private of domestic use 1 - Private of conditioned access 2 - Semi-public access 3 - Free public access	7,5
Legal classification - Cultural Heritage	0 - No rating 1 - Rated / is under way: Monument of Municipal Interest 2 - Rated / is under way: Monument of Public Interest 3 - Rated / is under way: National Monument	2,5
Historical Importance / Influence	0 - No associated historical moments / moments 1 - Figures / associated historical moments of local importance 2 - Figures / associated historical moments of Regional importance 3 - Associated Historical Figures / Moments of National Importance	7,5
Potential or existing artistic value	0 - Low 1 - Medium 2 - High 3 - Very high	12,5
Functional Aspects and Visitation Support		25
Parking	0 - No parking 1 - Parking nearby (paid) 2 - Free parking nearby or own parking (paid) 3 - Own parking (without payment)	2,5
Internal circulation (Pedestrian)	0 - No access for people with reduced mobility. 1 - Partial access for people with reduced mobility (main road only) 2 - Partial access for people with reduced mobility (main path and some secondary access) 3 - Total access for people with reduced mobility	2,5

Criterion	Rating (0 - 3)	Criterion Weight %
Visitors facilities - Visitation services (signage, interpretation centers, guided tours, ...)	0 - No services 1 - Services available by dialing and / or payment 2 - Little supply of services available 3 - Wide range of services	7,5
Visitors facilities - Reception Services (Restoration, WC's, Kiosks, ...)	0 - No services nearby or own 1 - Services nearby 2 - Own services 3 - Own services and nearby.	7,5
Integrity and conservation status		25
State of Modification (Integrity Degree - Character Maintenance)	0 - Advanced degree of destruction or modification 1 - Average Degree of Modification 2 - Little modified 3 - Not modified	12,5
Degree of Maintenance	0 - Maintenance free 1 - Low	12,5
Landscape value of the setting		20
Landscape scenery - impact on the Garden (perspective from inside to outside)	0 - Negative 1 - Moderately Positive 2 - Positive 3 - Very Positive	5
Landscape scenery - impact on access (from outside to inside)	0 - Negative 1 - Moderately Positive 2 - Positive 3 - Very Positive	5
Quality of Experience		10
On-site experience (Well-being, rest and contemplation)	0 - Unpleasant 1 - Very Pleasant 2 - Pleasant 3 - Exceptional	10
Total		100

Table 4: Example of scores table (scoreboard) applied to Casa do Vinhal.

Casa do Vinhal	1 to 3	Criterion Weight %	Weighted
Cultural and Social Context			
Property and Accessibility	0	7,5	0
Legal classification - Cultural Heritage	2	7,5	0,5
Historical Importance / Influence	0	7,5	0
Potential or existing artistic value	3	12,5	1,25
Subtotal	5	30	1,75
Functional Aspects and Visitation Support			
Parking	0	2,5	0
Internal circulation	0	2,5	0
Visitation Support Services	0	7,5	0
Reception Services	0	7,5	0
Subtotal	0	25	0
Integrity and conservation status			
Conservation state	2	12,5	1
Degree of Maintenance	1	12,5	0,5
Subtotal	3	25	1,5
Landscape value of the setting			
Landscape scenery - impact on the Garden	1	5	0,5
Landscape scenery - impact on access	1	5	0,5
Subtotal	2	10	1
Quality of Experience			
On-site experience	1	10	1
Subtotal	1	10	1
TOTAL	11	100	5,25

The Future of the Maksimir Park: Historical Urban Parks in a New Local and Global Context

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Keywords:

design history, levels of intervention, theory & practice, park as cultural monument, design methods

ABSTRACT

In this paper we will develop a design approach as a basis for plan development on the future of Maksimir Park in Zagreb. Maksimir is a 19th century public park which is located in the eastern part of the city of Zagreb. Goal of the research is to investigate and organise design knowledge as a starting point for a redesign of the park. The research method is based on fieldwork, map analysis and design experiments. We will start with an analysis of the functioning of the landscape as a natural system, a socio-economic system and a cultural system. In a second step we will start a concept development based on analysis of the site, design history and future use. The results of design experiments will be a basis for developing a strategy for the landscape development of the park in the long run based on design experiments.

The conclusions focus on a strategy for developing plans for the future of parks that have a long design history and a cultural meaning; conservation through development, that is the historical development of the plan remains readable in a contemporary context.

INTRODUCTION

As Kensington Gardens is to London, the Tuileries to Paris, Tiergarten to Berlin, Laxenburg to Vienna — so is Maksimir Park to Zagreb. For more than 200 years, generations of Zagreb's

citizens, from their first baby steps to retirement, find their joy, peace and rest in a big city park — Maksimir (Šćitaroci & Šćitaroci, 2014; Aničić & Samardžija, 2015). At the moment the park needs maintenance and has to be adapted to contemporary demands of functioning and use.

This paper focusses on an integrative design approach for the redesign of the Maksimir Park in Zagreb to make it better fit for the future.

The Maksimir park is a 19th century public park of historical importance. The key question is how insight into the landscape development can be a basis for future plan development in a contemporary context. This is not only a matter of site analysis and evolution of the landscape over time but also a search to learning from earlier experiences and making use of that in contemporary plan making.

The study on Maksimir Park is part of an international research project (HYPPE), initiated at the Faculty of Landscape architecture and Urbanism in Budapest in collaboration with Departments of Landscape architecture in Belgrade, Brno, Cluj Napoca, Cracow, Ljubljana, Nitra, Vienna, Zagreb. The overall goal of the research is to investigate and analyse a series of examples of 19th century public parks in Central and Eastern Europe to give a first overview and insight into the design history and how that information can be used in the planning and design of future use of those parks.

Goal, problem analysis and research questions

The goal is to develop a design approach for a public park of historical importance that is fit for future functioning and use in a changing urban and cultural context.

The problem analysis for an existing park, designed in the 19th century, is different from the design of park on a site where there has been no park before. The essence is how to

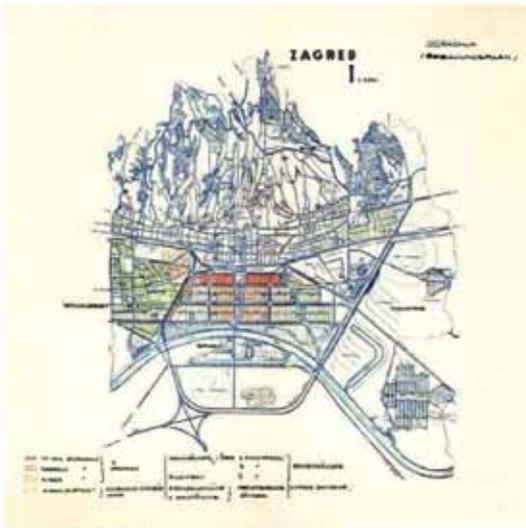


Fig. 1 Zagreb, General Regulation Plan, 1932

Fig. 1 The city of Zagreb in its larger context in 1932 used by the CIAM group; mountains, river Sava; the Maksimir Park is on the upper right (Klarin, 2014). It shows already at that time the two main directions of development; more or less parallel to the river and perpendicular to the river the new urban extension.

integrate the landscape development over time, the change of context and a contemporary program into a design approach for the future.

Research questions:

- How is the site conditioning the functioning and use?
- What have been changes over time that influence future use?
- How to develop a design approach that takes into account the design history but also creates conditions for future functioning and use?

Research method and research material

The research method is based on fieldwork, map analysis and design experiments (Zeisel, 2006). It is further adapted and elaborated in an analytical framework which is focussed on the analysis of the landscape as a natural system, as a socio-economic system and a cultural system (Toorn & Guney, 2001).

Research material

In searching for references on the

design history of the park it is first of all remarkable that in most studies on European history of gardens and parks, the Maksimir Park is not included; even Gutkind (1964), Chadwick (1966) and Gothein (1979) do not mention Maksimir. Taylor (2008) is the only exception by giving a short description with some historical facts but no plans.

Most information and knowledge about the park is in Croatian (Aničić & Samardžija, 2015; Mudrinjak, 1982; Vitasović Kosić & Aničić, 2005) and this is a major part of the study of the design history in general, to include this information in the analysis and development of the plan. The Department of Landscape architecture of the University of Zagreb is a rich resource for information, research material and references on Maksimir. This is also a first effort to reposition the park and its rich design history in a European context.

THE SITE AND FUNCTIONING OF THE PARK AS PART OF DIFFERENT SYSTEMS; NATURAL, SOCIO-ECONOMIC, CULTURAL

We distinguish functioning from use. Functioning is referring to the working of a landscape as a system and enables all types of use. It creates conditions for use in the form of space, clean water, fresh air, soils for different types of use. We distinguish in the landscape three types of systems; a natural, a socio-economic and a cultural. The three function at the same time at the same place and overlap and influence each other because all three stand for different forces behind the form of the landscape. The natural forces function independently from the others but do also influence them. Use always refers to how people use the landscape; we distinguish different types of use, users and of (land)use. Use is specific for a location in a certain period.

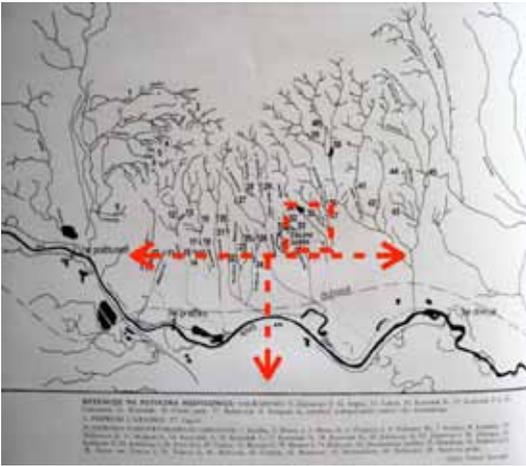


Fig. 2 Maksimir park in its context; topography, water courses, creeks and river. How is the park functioning as a socio-economic system both internally and externally? The park is functioning for the city of Zagreb at large as part of the urban green system and for leisure. Location and connections by public and private transport between the city and the park influence use and users. At the moment the public transport is served by a tramway. Both public and private transport use the Maksimirska cesta which runs east-west, as main artery between the city centre and the park.

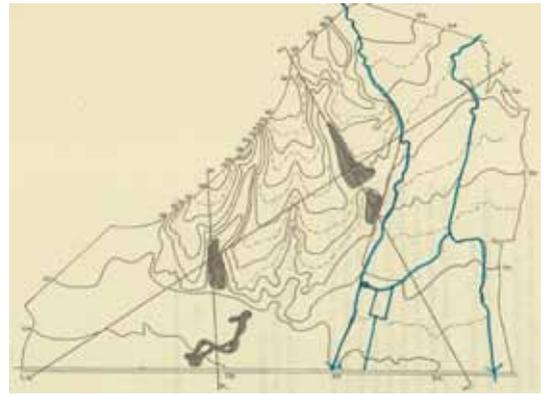


Fig. 3 Maksimir park; topography, streams, and water bodies. The system of streams and lakes, system is of paramount importance for the Maksimir Park. The permanent stream Bliznec, which is one of the numerous streams on the slopes of Medvednica, runs through the park area and until recently (with several other periodical streams) was the main source of water supply to Maksimir's lakes. Today the lakes are supplied with water from the Bliznec stream (flows into the second and fifth lake), and occasional streams are almost negligible. The constant flow of water into the lakes was enabled in 1997 by building retention / accumulation in Jazbina, allowing equalization of water levels and achieving continuous and uniform flow (60-100 l / s) in the Bliznec stream (Denich, 2003).



Fig. 4 Maksimir park; the Belvedere point as the centre of the 'matrix structure' Functioning and use is also influenced by a design history of two hundred years and made the park a cultural monument (Toorn, 2014). Three major steps in the spatial development of the park have contributed to that status; the original plan, the landscape style, the period of degeneration in the 20th century (Rechner Dika & Toorn, 2018). It gives the park also a historical meaning in the urban landscape of Zagreb. The park as part of the urban green system of Zagreb at large is functioning as green space that contributes to a healthy living environment for citizens and visitors. Due to its large size its meaning as part of the green system is considerable. Over time the evolution of thinking about cultural heritage has also extended to parks, we now also consider parks as cultural monuments. Maksimir definitely falls into this category and as such contributes to the identity of the city as a whole.

The park as part of the landscape as a natural system

The park is situated between the Medvednica mountains and the Sava river; basically on a slope (Fig. 1, 2). It means that natural drainage is very much part of the daily functioning of the park as a natural system and is the most dominant process in the natural landscape (Fig. 3).

While the water system is basic for the functioning of the park as a natural system, the plantation forms the largest part of the land use. The northern part is still used as forest, while the southern part is more of a park with built elements, solitary trees, bushes, water bodies and meadows.

A new context; the park now being part of the urban landscape

When the park was founded, it was located outside the city (Fig. 1). Even in the general plan for Zagreb of 1932, Maksimir was still outside the built up area of the city. Now it is surrounded by urban quarters and part of the urban landscape and urban green system. It means that use and meaning as urban green space and part of the urban green system has changed; more local users from neighbouring quarters are making use of the park due to its proximity. In general the meaning of green space for the functioning of the urban environment is getting more and more important because of the growing air pollution especially in the cities (Quality, 2013).

Climate change

A second major change in the context of the park is the climate change. Climate change is a global issue that has local impacts. This relation between global and local is especially important for plan making. For this paper we focus on two aspects of climate change in Zagreb; a higher average temperature and a higher amount of precipitation. Both will influence the hydrological cycle; for Zagreb it means more peak run-offs and change in the urban micro climate due to higher average temperatures and growing urban heat islands.

For design it means more attention to improving of the urban micro climate by creating more green space (Konijnendijk et al., 2013) and attention to water storage in order to improve the infiltration of rain water by using more permeable materials in metalling and pavements (Goff & Gentry, 2006).

New demands from society at large

A third major change are the new demands from society at large; trying to minimise the shortage of fresh water in the future, contribute to the energy transition and — with the growing pollution in all European cities — creating healthy environments for people. In the last decennia sustainability has been gradually replaced by three issues; water storage, energy transition and the creation of healthy environments for people. Most important is that here people are also included and these factors represent the new demands from society in general; all are well defined and can be measured. Catherine Ward Thompson has produced a vast body of information, knowledge and insight on this issue that is immediately applicable for landscape architects (Ward Thompson et al., 2010; Ward Thompson, 2011). Also here the local conditions do influence directly what is most appropriate and effective.

Fig. 5. Changes that influence the functioning and use of the park. Application of these factors to the Maksimir park takes a special study but is very important to elaborate on. Here we can only set out the headlines of thinking and integrate them into a design approach. It seems that for Maksimir in its natural and urban context all three are important issues. Moreover the role of urban parks in cities change. First of all parks are more and more viewed as green elements in a system of green spaces that function as an urban green system in the city; a park system. Secondly, due to the huge increase of air pollution in the cities, urban green spaces are becoming more important as places for fresh air, not only for children and people with respiratory problems but nowadays also for the urban population at large. Finally, the increasing importance of leisure time both for locals and tourists has changed the role of parks in the urban landscape (Konijnendijk et al., 2013).

The park as part of the landscape as a socio-economic system

While the water system is crucial for the natural system, the road system forms the basis for the socio-economic system (Fig. 2).

At the moment the public transport is served by a tramway. Both public and private transport use the Maksimirska cesta which runs east-west, as main artery between the city centre and the park.

— The borders of the park and their relation of the park to its context

The four sides of the park are different in character. On the west and north side the park borders a neighbourhood. On the east side is the campus of the university and its buildings. All around the park there is no clear boundary and there are several entrances, the main entrance is on the south side.

— Internal functioning and users

Three factors influence the internal functioning; the boundaries, entrances and internal road / path system. The main socio-economic function of the park is leisure; there are different types of users who make different use of the park; jogging, children's play, cycling, walking. The forest in the upper part has a modest role for timber production. Some of the ponds were used as fish ponds in the old time but that is no longer the case. All these functions are made accessible by a road / path system that is predominantly from the different plan interventions in history. Except for the central entrance allée there is no clear structure or organisational principle in the path system.

The landscape as a cultural system

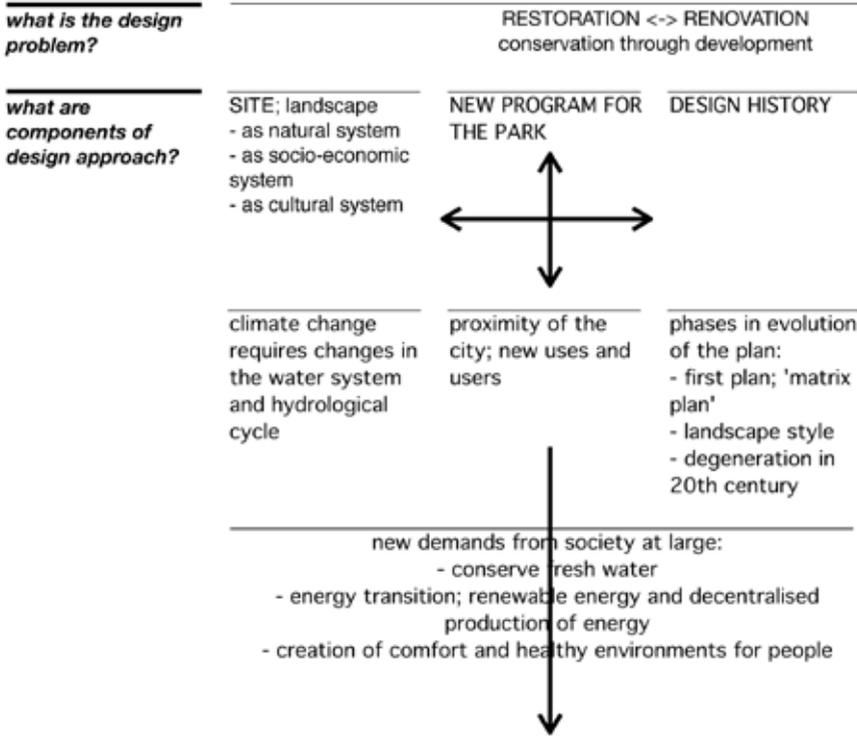


Fig. 6a. Diagrammatic overview of design approach; design experiments

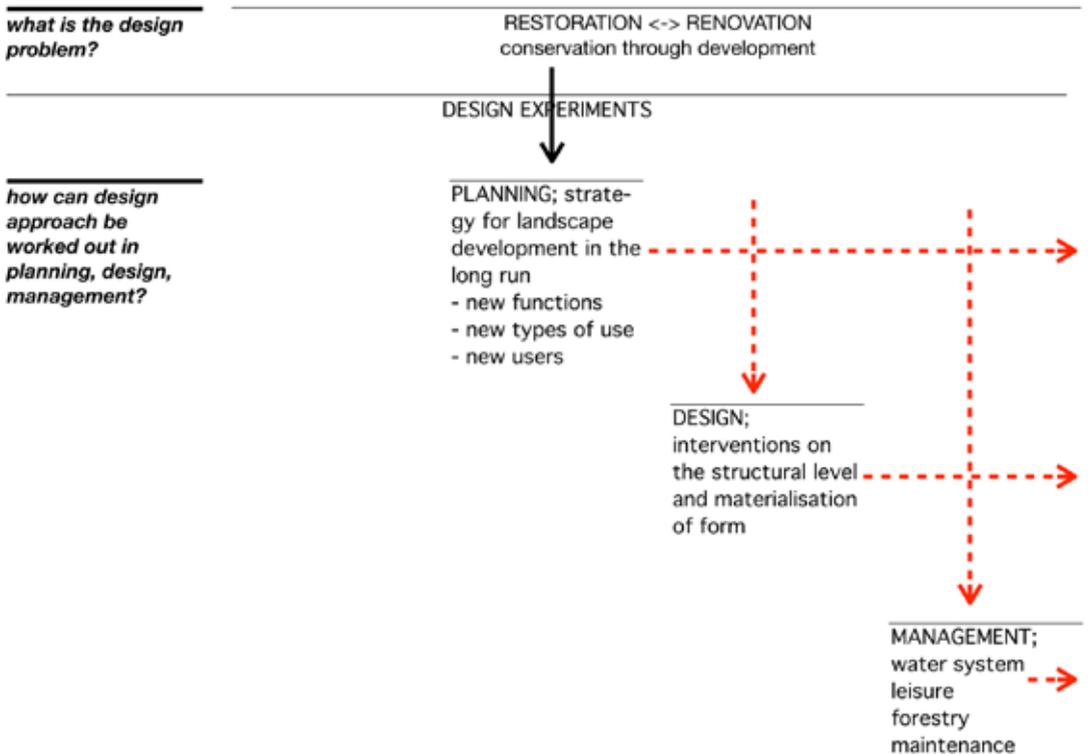


Fig. 6b. Diagrammatic overview of design approach; planning, design, management



Fig. 7. Maksimir park; one of the lakes. Already in the old times the lakes were used to regulate the flow of water coming downhill but they were also used as fishponds. In the future the lakes might — apart as spatial elements in the plan as a whole — also have a third function of energy production. This multi-functional character, if it is well integrated into the plan, can also enhance the overall quality of the plan.

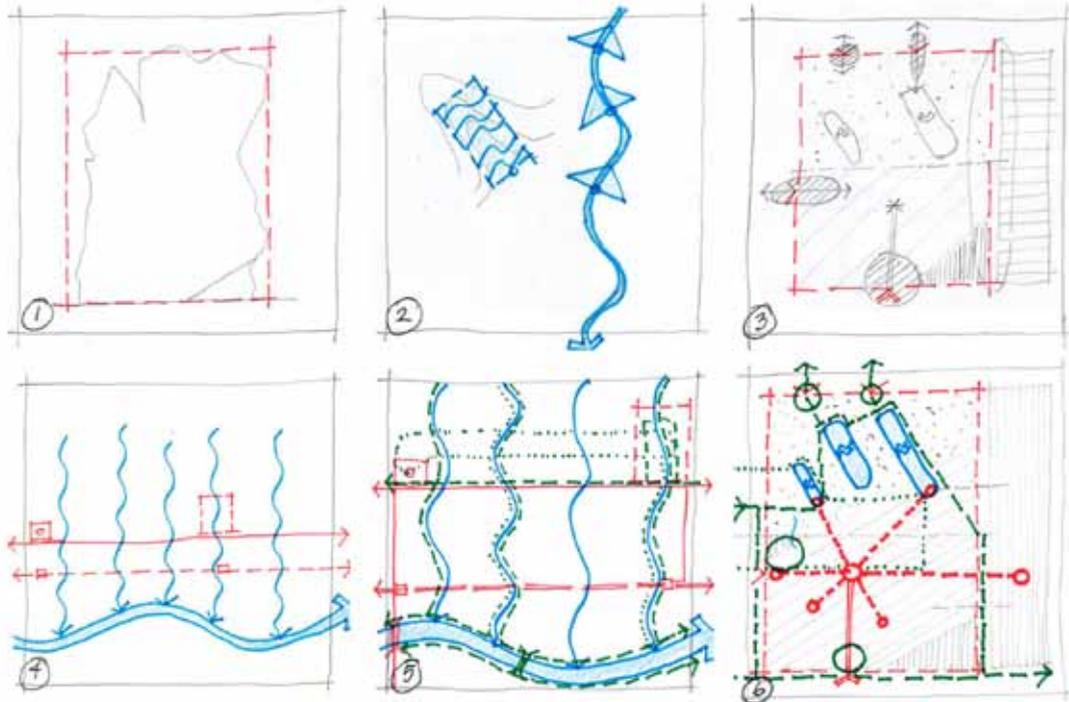


Fig. 8a. Planning

The very first issue to tackle is the defining of the boundaries and formalise them (#1). Second step is the improvement of the water storage and the infiltration into the underground to diminish the run-off into the river Sava, at the same time building hydropower units in creeks and water reservoirs (#2). A third step would be to reorganise use in the park and integrate into the park system of Zagreb by improving connections to the city for slow traffic. This would also include to displace the zoo to a better location in the city with more space. The concept of park systems where parks are not only considered as elements but also as parts of an urban green structure, is very interesting for Zagreb because of the relation to the water system since the city itself is also part of that same water system. From a viewpoint of landscape as a natural system the parks should take into account the structure of the main water flow, that is North -> South. From the viewpoint of use and users the East - West connections are important; connecting the city centre with the Maksimir park.

How is the park functioning and used as a cultural system?

Design history, the park as representation of nature & culture in the city make it into a cultural monument (Fig. 4).

CHANGES OVER TIME THAT INFLUENCE FUTURE

FUNCTIONING AND USE

Changes in context, urban, climate and society at large

The changes over time comprise three issues that have influenced the functioning and use of the park (Fig. 5). In the urban context the park has changed of context, the climate change

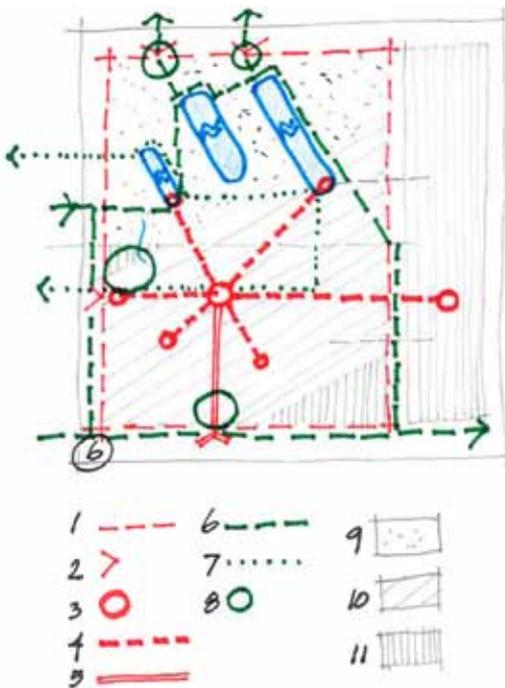


Fig. 8b. Design

A contemporary program for the park includes new functions, new uses and new demands from society at large.

Design interventions in the context of water management would be the creation of new reservoirs. For energy transition the regulating of creeks and water flows could be used for generating electricity.

The extension of the park into an urban green system and improving access to the site by public transport and slow traffic (pedestrians, cyclists) would be issues to stimulate physical movement in the context of creation of healthy environments (Barton et al., 2003).

Reorganising use refers to the increase of local users from the neighbourhoods around the park, thus creating four different sides of the park which also includes redefining the boundary. Also an increasing number of tourists will come and visit the park as cultural monument.

The 'matrix' from the very first plan has been adapted around the belvedere point on the hill, creating view lines in different directions.

Legend

- 1: redefined boundary, 2: entrances, 3: special elements, 4: viewlines, 5: existing central allée, 6: bicycle tracks, 7: foot paths, 8: special uses at the entrances, 9: the forest area, 10: the park area, 11: existing zoo.

has specific influences on the park and finally new demands from society.

In search of a design approach; design experiments

In most design processes design experiments are used — implicitly or explicitly — for generating concepts and approaches (Zeisel, 2006). Where history and precedent tend to focus on continuity, design experiments are

needed to develop new concepts, new frames of reference (Toorn & Guney, 2001). The basis for design experiments is comparative analysis with the key question: 'what if?'

In this case we have used four research questions; how will climate change influence the water system?, how will the immediate proximity of the city change use and users?, how can the energy transition be implemented in the park area and its surroundings? how will increase of free time and tourism influence the park?

These issues are each a challenge for the future and for each are separate actions necessary and also taken. For landscape architecture there is a special challenge; to tackle these problems in an integrated way, which is typical for a design approach (Fig. 6a).

DEVELOPMENT OF A DESIGN APPROACH AND DESIGN CONCEPT

Developing a design approach is based on three components; the site, the design history and a new program (Fig. 6a). The site has been analysed above where we have seen water as the dominant feature. It means the natural system is determining for a large part the functioning and use of the park.

We will first pay attention to the new program for the park; what will be new functions and new uses and users for the park?

Conservation or renovation?

For a park that is this old and has seen different plan interventions in the course of time and that does already have a protected status, the very first question for the design approach is: restoration or renovation?

Without making detailed calculations of the cost, the budget for restoration would be far too large to accomplish and limit certain types of use in the future. It leads to a design approach of renovation as a strategy for

the landscape development in the long run. For elaborating renovation for the park — besides accommodating new functions and uses — , we propose to develop a design concept that allows for keeping the subsequent design interventions in the past ‘readable’ in the landscape. It means conserving elements and structures from past interventions so that the development over time can be understood (‘be read’) while at the same time introducing new functions and uses that respond to contemporary needs.

The new program for the park will partly be determined by the natural system, partly by the design history of the plan evolution and partly by the new demands from the citizens of Zagreb and of society at large.

Design as a search for synthesis between site, former plan interventions, new functions and use

Design has the potential of synthesising different functions and use in a meaningful unity, in a plan for the future (Fig. 6b). For the park as part of the natural system, a new function is water storage. Romnée et al. (2015) have worked out a case study for stormwater management in a Brussels’ quarter, its approach and principles could be used here. Improving the water system by creating by creating lakes means more possibilities for infiltration so that the run-off diminishes by creating new water reservoirs to enlarge the storage capacity which gives more time for infiltration.

This water system could also be used for energy production (hydro-power) and as such contribute to the socio-economic system. The creeks and water reservoirs that are part of the water system have the potential of making use of the water flows for generating electricity (Mackay, 2009).

While leisure at large is the prime function of the park, the forest will still produce some timber but that will

be less than the maintenance cost of the forest. The park could attract also more visitors from outside Zagreb and tourists due to the unique historical character of the site. The park is also a cultural monument and as such contributes to the identity of the city also in international context which will attract also more tourists to the city. This cultural monument incorporates natural functioning, contemporary use and historical meaning (Toorn, 2014).

An integrated approach to planning, design, management

Design experiments form the basis for integration of new functions of water storage and energy transition, of integrating the Maksimir in a park system can be worked out in an integrated approach. Such an approach seeks to integrate context, internal structuring and materialisation of form as levels of intervention (Fig. 8a, 8b).

Management

First important issue for management would be implementing and maintaining the boundaries. Within the boundaries the different management areas of the park can be defined; the upper part with predominantly forest and water reservoirs, the lower part with more of a park character and the context. Different maintenance programs will follow on the basis of these management areas.

CONCLUSIONS

A total restoration towards the old plan before the construction of the lakes seems rather unrealistic from a financial point of view also coupled to the overdue maintenance. A reconstruction with new interventions of reservoirs and new types of use and users seems to be more realistic and valuable in the contemporary context because of lower cost and allowing new functions; conservation through development.

The contribution of design to plan making. Design is a unique means to

integrate and synthesise different types of information and knowledge into a meaningful unity. In this paper we have developed an approach in which site, design history, program and new demands from society have been integrated into planning, design and management of the Maksimir Park in its urban context. A key method for achieving such a conceptual unity is design experiment.

Research in design as a link between theory and practice. In this paper we have made use of different types of research in the development of a design approach. An analysis of the functioning of the landscape, design experiments, study of contemporary use and users all contribute to an integrated design solution which takes into account both material and immaterial values.

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5.3. CONSERVATION AND DEVELOPMENT

GROUP O

Finding a Way: Green Space
Connectivity Through The Dense Urban
Fabric of Porto, Portugal
Paulo Farinha-Marques

Virtual Reality for Contested
Landscapes
Jørgensen Karsten
Landscape Interventions for Embracing
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Pierre Oskam

The Design History of Maksimir Park -
Plan Evolution and Contemporary Use
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A Peri-Urban Combat Zone Where
Urban Edge Meets Rural Periphery
Across an International Boundary
Richard Stiles

INTRODUCTION

Finding a Way: Green Space Connectivity Through The Dense Urban Fabric of Porto, Portugal

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Keywords:

Urban green spaces; connectivity; least-cost networks; densely urbanized cities

ABSTRACT

The city of Porto presents optimal conditions for the occurrence of a wide range of plants and diverse set of urban green spaces. However, high construction density and imperviousness cause fragmentation and isolation of existing green spaces, restricting biodiversity connectivity and experience of nature for residents.

The objective is to identify and design a new ecological structure for Porto, to be included in the Municipal Master Plan. The approach is heavily based on concepts of connectivity, multifunctionality, conversion of green spaces and reclamation of built-up areas.

All existing green and natural spaces were mapped and categorized, and the most important spaces were highlighted. The main network of green and natural spaces consists of least-cost connectivity networks, created with spatial analysis software, linking the spaces previously identified.

The main weaknesses and opportunities of this network were identified. The group of existing green and natural spaces was enriched with the proposal of new public green spaces, including tree-lined streets, to improve green space connectivity and accessibility of the population to green spaces.

The results were synthesized to propose the layout of the new municipal ecological structure of Porto, whose connectivity improvements and public access allows it to evolve into a green infrastructure.

Porto is a heritage city located in Northern Portugal, where Douro River meets the Atlantic Ocean. A mild coastal environment and a rich cultural history create favourable conditions for a wide range of plant species and a diverse set of urban green spaces (Farinha-Marques et al., 2012, 2014). Alike other southern European cities, Porto reveals a high construction density and imperviousness, causing high fragmentation and isolation of the existing green spaces. Such context restricts biodiversity connectivity and experience of nature for urban residents.

The objective of this work is to identify and design a new municipal ecological structure for Porto, to be included in the Municipal Master Plan. Our approach intends to complement the definition of ecological structure according to Portuguese law with the concepts of connectivity, multifunctionality, conversion of green spaces and reclamation of built-up areas.

According to Portuguese legislation (Ministério do Ambiente, Ordenamento do Território e Energia, 2015a, 2015b), the ecological structure is composed by the set of areas whose main function is the conservation of environmental and landscape values, due to their biophysical, cultural or landscape characteristics, ecological continuity and planning.

Our approach for the delineation of the municipal ecological structure of Porto explores and follows the concept of *green infrastructure*, disseminated by the European Commission and the European Environment Agency, which recommend its integration into spatial planning instruments and programs, in order to tackle pressing environmental and social issues. An urban green infrastructure is an interconnected network of all kinds of green areas in an urban context; in this way, their contribution to regulate flood risk and

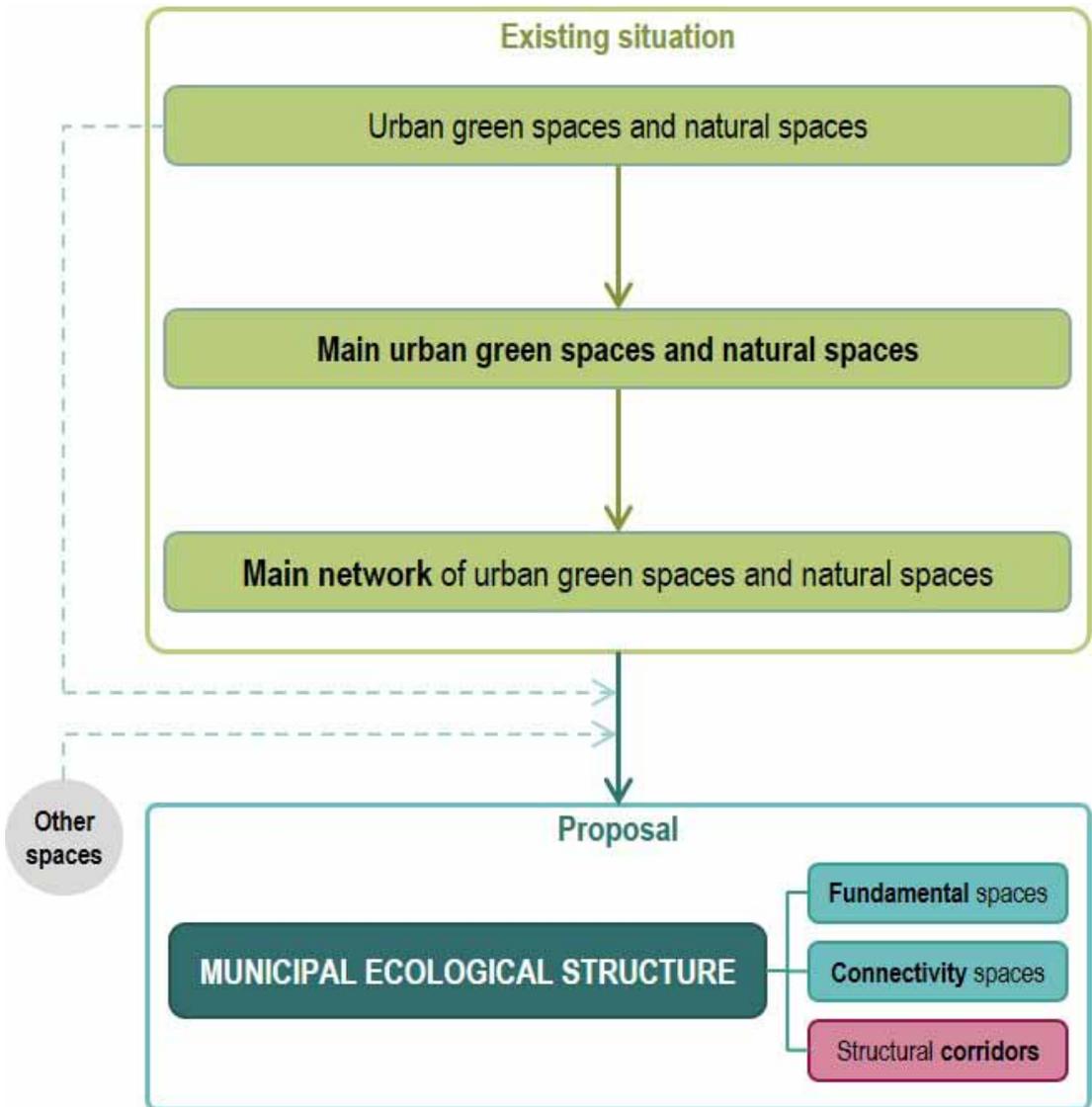


Figure 1. Methodological diagram.

temperatures, to improve air and water quality and to maintain the ecosystem resilience is enhanced (Commission of the European Communities, 2009; European Environment Agency 2011). The provision of these services is largely influenced by the degree of connectivity, multifunctionality, accessibility and biodiversity of the green spaces (Millennium Ecosystem Assessment, 2005; Landscape Institute, 2009).

Cultural ecosystem services should also be considered in spatial planning programs (Millennium Ecosystem Assessment, 2005;

Tengberg et al., 2012). In fact, many urban green areas present high heritage values; the protection of urban green and natural spaces allows for the celebration of their often rich cultural and historical background and also facilitates the preservation of architectural landmarks associated with them.

Regarding connectivity, besides visual connectivity, it is desirable that the spaces are physically connected to each other, promoting opportunities for the movement of biodiversity, allowing greater involvement of citizens

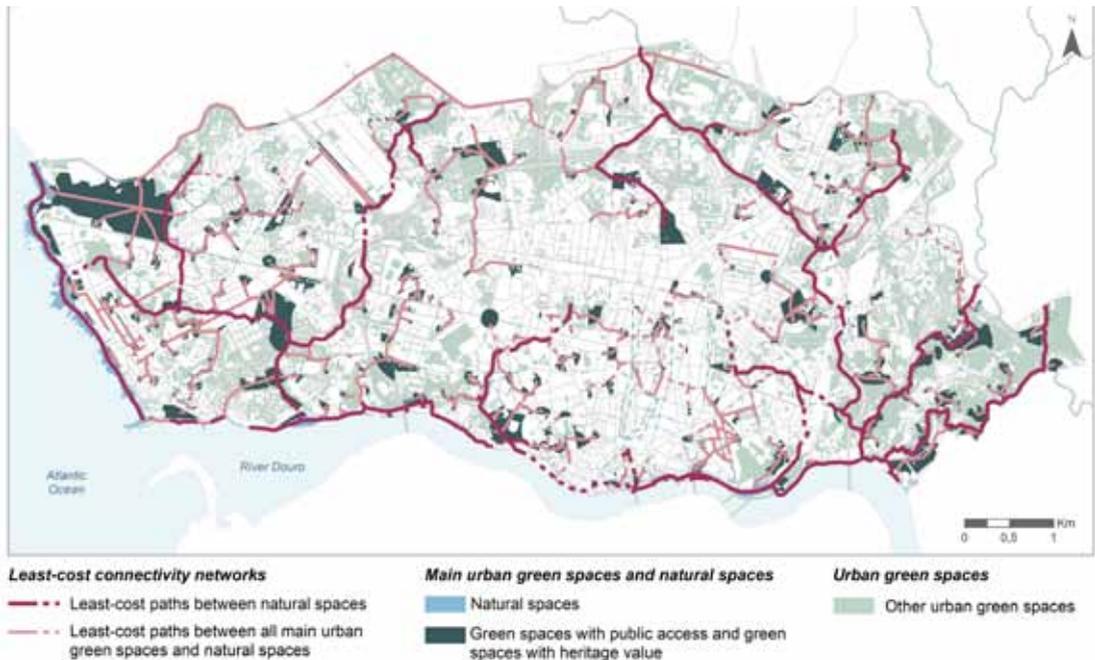


Figure 2. Main network of urban green spaces and natural spaces.

with nature and non-built space, and encouraging more sustainable forms of transportation (European Environment Agency, 2011).

MATERIAL AND METHODS

The methodology includes two main stages: 1) identification and analysis of the existing situation, regarding natural and urban green spaces and their connectivity; 2) proposal of a new municipal ecological structure, working upon the previously acquired knowledge (Figure 1).

Analysis of the existing situation

As a first step, the existing green and natural spaces of the city of Porto were surveyed, mapped and analysed. All spaces were categorized according to several attributes, namely green space type, habitat type and heritage value. The mapping and characterization process was developed with ArcMap 10.5, in 2017, based on the most recent spatial data available for Porto at the time (orthophoto maps of 2014 and Google Earth imagery of

2016).

Natural spaces are outdoor spaces of natural origin, whose functioning and existence is independent of human action; all watercourses, River Douro margins, beaches and cliffs were included. Urban green spaces are outdoor spaces, created by human action and dominated by vegetation. Urban green spaces are here considered as spaces with vegetation cover higher than 50%, clear public interest and a minimum area higher than 200 m² –600m² (depending on the city zone and green space abundance). Several green space types were considered: 1) public parks and gardens; 2) green squares; 3) green spaces associated with apartment blocks; 4) private green spaces with heritage value; 5) green spaces associated with civic buildings; 6) green spaces associated with streets; 7) public green roofs; 8) agricultural areas; 9) urban woodlands; 10) green spaces associated with motorways; 11) green vacant lots.

In the context of the municipal ecological structure, the most important

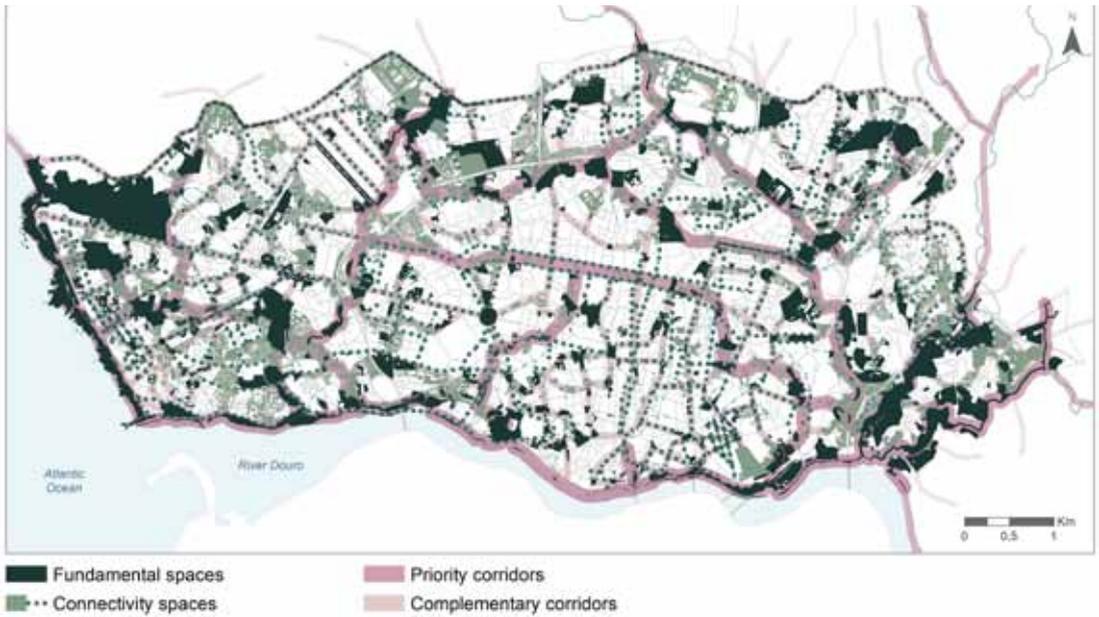


Figure 3. Proposal of the municipal ecological structure.

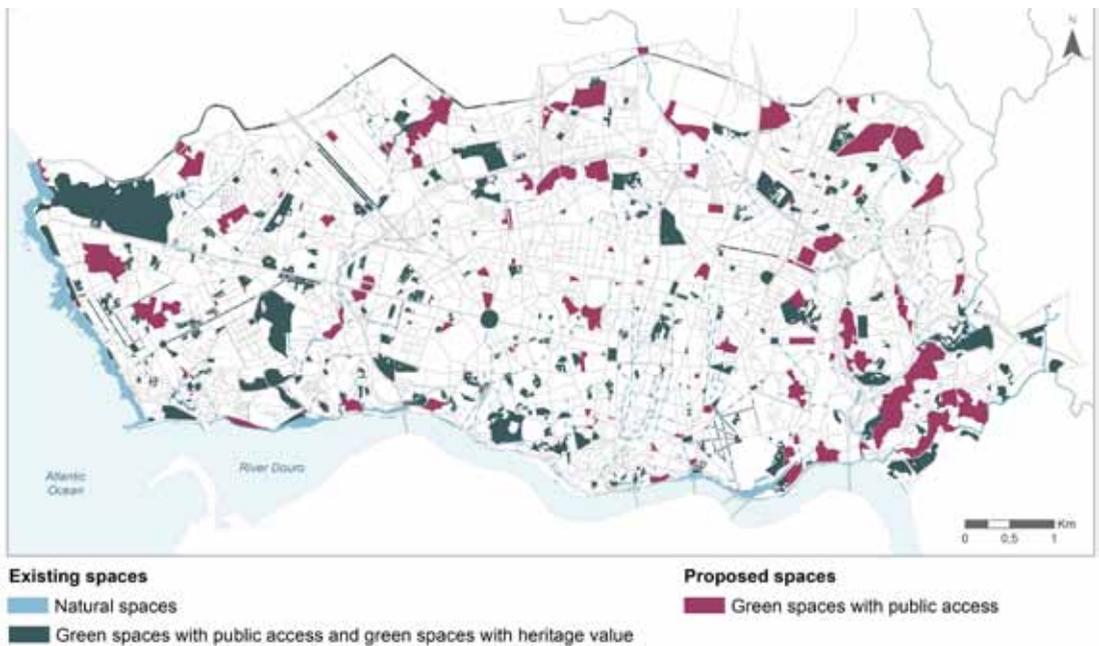


Figure 4. Fundamental spaces of the municipal ecological structure.

spaces are those that contribute to the good functioning of the urban ecosystem and brings more benefits for urban residents. Therefore, the group of the main urban green spaces and natural spaces is composed of all natural spaces, urban green spaces with easier accessibility and urban

green spaces with heritage value.

The group of the main urban green spaces and natural spaces work as the backbone of an interconnected network, generating *least-cost connectivity networks*. This exercise was developed with the tool *Cost connectivity* (Spatial Analyst, ArcMap



Figure 5. Examples of some of the existing fundamental spaces of the municipal ecological structure: a) a park (*Parque da Pasteleira*); b) a watercourse (*Rio Tinto*); c) a beach (*Praia do Carneiro*); d) a green square (*Largo da Maternidade Júlio Dinis*).

10.5). For this analysis, the *cost values* were defined in terms of the relevance of each territorial unit for the biophysical connection between green and natural spaces. This means that natural spaces were considered the most important for the generation of connections and were assigned *low cost values*, whereas buildings and large road infrastructures were considered barriers for biophysical dynamic processes and were assigned *high cost values* (Table 1). In the case of urban green spaces, their relevance was defined according to the weighing of five factors: 1) public access; 2) heritage value; 3) habitat diversity; 4) dimension; and 5) core area. These factors were scored from one to three; the sum of the scores (5 to 15) resulted in the ranking of urban green spaces, which were then assigned different *cost values* (Table 1). The connectivity analysis was run twice with different input areas: 1) only natural spaces; 2) all main urban green spaces and natural spaces.

Proposal of the municipal ecological structure

The delineation of the municipal ecological structure of Porto starts with the identification of the main urban green spaces and natural spaces and the main network between these spaces. The identification of the main spaces highlights the existing spaces with greater relevance regarding their accessibility, multifunctionality and biodiversity. The identification of the main network, that is based on the concept of connectivity, indicates the green corridors that are easier to accomplish.

The proposal of the municipal ecological structure results from the analysis of the existing situation of natural and green spaces, that shall be complemented and enriched. The key steps of this procedure were:

1. proposal of a new set of public

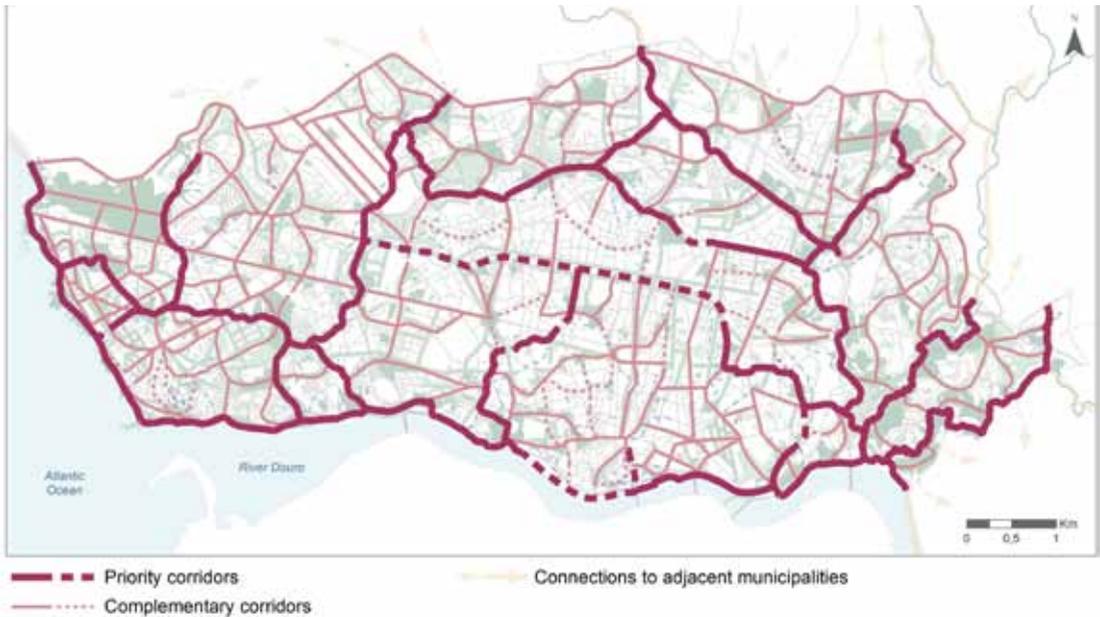


Figure 6. Structural corridors of the municipal ecological structure.

2. green spaces;
2. identification and highlighting of the most important links of the main network;
3. identification of the weakest links and recommendation of new spaces to promote the connectivity;
4. suggestion of new links between natural and green spaces to strengthen the network.

RESULTS AND DISCUSSION

Analysis of the existing situation

The procedure described above, resulted in two *least-cost connectivity networks*, where all green and natural spaces are connected to, at least, one other space, by *least-cost paths*. The representation of such performance is presented in Figure 2 and it was considered as the main network of urban green spaces and natural spaces (the dashed lines indicate paths that are only accomplished through very isolated green spaces).

Proposal of the municipal ecological structure

A critical analysis of the main network of green and natural spaces (Figure 2) immediately reveals that, currently, some areas of the city are completely devoid of green spaces and corridors and that most of the connections are relatively fragile and depend only on a spatial sequence of isolated green spaces (stepping stones).

The proposal of the municipal ecological structure (Figure 3) is composed of: 1) **fundamental spaces** (existing and proposed); and 2) **structural corridors**, that are physically embodied by the **connectivity spaces**.

The fundamental spaces of the proposed municipal ecological structure are those with the highest environmental and social values. They contribute to the good functioning of the ecosystem and promote access of citizens to their benefits, already including existing and proposed new spaces (Figure 4).

All the existing main urban green spaces and natural green spaces, previously identified, were considered as anchor points of the new municipal ecological structure (Figure 5); these should, therefore, be preserved and

improved. At the same time, a set of new spaces is proposed with the objective of expanding the amount of green spaces with public access in the city of Porto; these should enable a good environmental and social performance.

Several opportunities for the occurrence of new public spaces were identified throughout the city and those that revealed greater relevance to strengthen the network of green spaces were highlighted. Thus, the following spaces were added: 1) new green spaces in areas of the city with low occurrence of main urban green spaces, and 2) new public green spaces that will strengthen the connectivity of the weaker corridors.

Most of the proposed spaces do not currently have a defined use and include, essentially, green vacant lots and some abandoned non-green spaces. This procedure also intends to suggest the conversion of some urban green spaces with greater environmental performance (e.g. urban woodlands), that currently have restricted access, to public green spaces, to take advantage of its ecological potential for the direct benefit and experience of city dwellers. The new green spaces should aim at becoming multipurpose public parks and gardens; ideally some of them could also incorporate a variety of functions such as public facilities buildings, allotments, sports facilities, providing that the vegetation cover remains higher than 50% and permeability higher than 35% (Farinha-Marques et al., 2012, 2014).

The fundamental spaces of the proposed municipal ecological structure are to be connected by structural corridors. These corridors are based on: 1) least-cost paths represented in the main network of urban green spaces and natural spaces; 2) new connections to strengthen the existing main network.

The layout of the corridors attempts to follow the maximum of

adjacent or sequential green and natural spaces, in order to guarantee its ecological continuity. Thus, in addition to the fundamental spaces, the proposed municipal ecological structure includes connectivity spaces, which are essential to maintain functional connections between the fundamental spaces. Among these spaces, there are diverse types of urban green spaces, as well as some spaces with vegetation that did not qualify as urban green spaces according to the used criteria (vegetation cover lower than 50%, dimension lower than the minimum mappable area or private spaces with no prior public interest). The role of tree-lined streets can be highlighted as connectivity spaces; they are crucial to guarantee the environmental and social connectivity of the municipal ecological structure, especially in more densely urbanized areas. With this in mind, we recommend the reinforcement of the existing grid of tree-lined streets, including new plantations and densification of tree cover in order to improve its performance.

The structural corridors were hierarchized according to their importance for the ecological metabolism and social dynamism of the city (Figure 6). The *priority corridors* run through the main natural spaces and guarantee the most significant connections between them. The *complementary corridors* are more numerous, increasing the complexity and connectivity of the network, promoting opportunities for the circulation of natural resources (water, organic matter and nutrients, species of fauna and flora, etc.) and opportunities for the enjoyment of population; these are essential to facilitate ecological links between small green spaces and to bring the experience of nature and biodiversity closer to the city's residents, especially those living in more densely built up areas.

CONCLUSION

The city of Porto reveals an interesting proportion of green and natural spaces (around 30% of its area), however there are some disparities in its distribution. In the periphery of the city, especially in the western and eastern extremities, there are several large green spaces, interspaced with some smaller ones, that almost create a green continuum. However, in the city centre there are very few natural and green spaces; these present rather small areas significantly isolated.

Accordingly, the existing set of main green and natural spaces show a similar scenario. At this point, it becomes more evident that the urban green spaces in the northern area reveal low environmental and social relevance, as most of them have not qualified for the set of existing main spaces. Similarly, the connectivity analysis generated fewer connections in the centre and northern section of the city, and these are generally only achieved through isolated green spaces.

The proposal of the new municipal ecological structure of Porto was delineated after a thorough analysis and reflection of the existing situation. The identification of the main strengths and weaknesses, in terms of public green space availability and connection, resulted in the proposal of numerous new public green spaces and the outline of more connections to strengthen the network. The conversion of several large areas, either not yet urbanized or abandoned, in large public parks would be an essential step to improve the functioning of the urban ecosystem and to provide accessible experiences of nature and biodiversity to urban residents. On the other hand, smaller gardens and tree-lined streets proved to be a key solution to bring green spaces to the most densely urbanized areas.

Our approach to the delineation of the municipal ecological structure

is strongly based in cost efficiency and environmental and social values. The identification of the least-cost connections between green spaces highlights the corridors that will more easily become physically materialized, and the reclamation and transformation of already vegetated spaces means less costly interventions. The focus on connectivity, multifunctionality, biodiversity and accessibility allow the intensification of ecosystem services easing their provision to urban citizens.

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TABLES

Table 1. Cost value associated with each type of territorial unit.

Type of territorial unit	Cost value
Natural spaces	1
Urban green spaces with very high value (14-15)	6
Urban green spaces with high value (12-13)	8
Urban green spaces with medium value (10-11)	10
Urban green spaces with low value (8-9)	12
Urban green spaces with very low value (5-7)	14
Open non-green spaces	20
Built-up areas and large road and rail infrastructures	28

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Virtual Reality for Contested Landscapes

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Historically important landscape; Virtual Reality; Documentation; Palestine; Cultural heritage sites.

ABSTRACT

This paper outlines the efforts and research activities made at the Norwegian University of Life Sciences (NMBU) towards documentation and preservation of heritage sites and historically important landscapes in Palestine. More specifically, this paper will focus on efforts that made for introducing a digital library based on Virtual Reality (VR) technology that immortalize historical sites in three-dimensional, VR-ready models creating a publicly accessible digital library of historically important landscape and heritage sites. The digital library will act as a medium for the preservation, documentation, interpretation and intervention, assisting in research, education, tourism and an increase in public awareness regarding the value of cultural heritage landscapes.

INTRODUCTION

Natural factors like earthquakes and human factors like negligence, deliberate demolitions and wars, put in danger our collective cultural heritage. The intended and unintended destruction of cultural heritage in conflict zones has been highlighted during the war in Syria, but has been on the agenda for a long time. (Walasek, 2015) Different strategies are necessary to meet the various needs. Common for all strategies is the significance of documentation of the cultural heritage objects and contexts. Ancient landscapes and sites, spread around Palestine stand as reminders and evidence of a long and rich cultural

history. However, most of these sites are in deteriorating conditions. The heritage landscape and historical sites in Palestine disappear at a high rate. There are no clear professional planning strategies for dealing with them. There is a lack of awareness of the importance of heritage sites and historically important landscapes and no mechanism is in place to convey the importance and meaning of such historical places to new generations. In response to the continuous deterioration of heritage landscape and cultural sites in Palestine, School of landscape architecture at NMBU have united efforts with local institutions in Palestine to record and document endangered sites (Hassan and Jørgensen, 2014). Conventional methods of documentation of cultural heritage sites and landscapes such as photographs, physical models, text materials and drawings, among others, create an incomplete image of the settings of cultural heritage sites. Through the fast-growing technological advancements in VR technology and easier access to more affordable computer graphics hardware (Oculus Rift, Gear VR, Google Cardboard, HTC Vive and SonyVR), it has become possible to create a diverse range of VR applications that are geared for documentation and preservation of heritage site and historically important landscapes.

RELEVANCE OF VR TO LANDSCAPE AND HERITAGE SITES

According to Hassan (2002), heritage sites are sensitive spatial fabrics that are constantly in inevitable physical flux and a documentation of their current situation is required to show the impact of these changes. Conventional methods of documentation such as photographs, physical models, text materials and drawings, among others, create an incomplete image of the



Figure 1. Virtual Reality at Birzeit University

settings of cultural heritage sites. 3D digitalized models for documentation purposes provide a virtual copy of the real settings, making it easier for users to observe these settings interactively and dynamically and provide a comprehensive presentation for historical theories that are usually presented in a written media and technical illustrations. The use of three dimensional visualizations and VR technologies for documentation and presentation of heritage sites and historical landscapes has become a very successful technique worldwide. It has become possible to capture many aspects of our surroundings and visit historical sites virtually, and have the freedom of choice in movement and observation. In addition, documenting of heritage sites not only describes the context in which the materials were found but also acts to monitor the remains of past human activities.

Haddad & Akasheh (2005) argued that the documentation process, which may be undertaken as an aid in various activities, such as the protection, identification, monitoring, interpretation and registration of stolen historical objects, could benefit tremendously from various modern techniques that are currently available, especially from VR technologies. Jokilehto (1996) emphasized that the heritage issues should be discussed as “a question of education and training, of multidisciplinary collaboration and of communication between the population and the decision making bodies”. One could assume then that communication is the key tool to understand a certain problem and proposes solutions. The first step would be to start looking for the appropriate communication tool that would facilitate better understanding, documentation, training and collaboration. King et al. (1989) suggest



Figure 2. Hisham Palace reconstruction model

that visualization is the key to effective public participation because it is the only common language to which all participants technical and non-technical can relate. It provides a focus for a community's discussion and facilitates better communication.

Considerable studies have stressed the benefits of using three dimensional visualizations and VR models for the documentation, communication and learning information. A study by Pimentel and Teixeira (1995) aimed at the evaluation of the VR potential for education and emotional satisfaction in a simulation of the real world at the Computer Museum in Boston. The observations showed that people spontaneously prefer to learn through the interactive experience instead of reading text. In a study at the Enneam Archaeological Museum in Belgium, Pujol and Economou (2007) indicated that VR offers the possibility to reconstruct and manipulate elements of historical processes. The study

further concluded that VR is attractive, motivational and useful for descriptive content objects and processes. A recent comparative study using interactive and VR systems in museums for culture heritage sites by Michael et. Al (2010) shows that interactive exhibits including VR, have been rated higher than traditional learning methods for communication and learning of cultural heritage sites.

THE DIGITAL LIBRARY

The concept for introducing a digital platform is a continuation of the research efforts that have taken place in cooperation between NMBU and institutions in Palestine. The project objective is to develop an interactive digital platform for heritage sites and historically important landscapes in Palestine. The platform will act as a medium for the preservation, documentation, interpretation and intervention, assisting in research,

education, tourism and an increase in public awareness regarding the value of heritage landscapes. The concept focus on the aspect of “edutainment”. Edutainment is an upcoming field that combines education with entertainment aspects, thus enhancing the learning environment to be more engaging and fun-filled. The technological platform is based on commercially affordable technologies and open source tools such as mobile-based VR technology, Augmented Reality, panoramic spherical photogrammetry, 360 video capture, spatial database, Geographic Information Systems (GIS), 3D Modelling, 3D mapping, Google street view, and Google maps. The platform has been built around the following fundamentals:

Documentation: The digital documentation plays a vital role in preserving the memory of the heritage. This is a highly relevant aspect, given the problems of physical preservation

in Palestine. There are several reasons for this, from the simple effect of time and weather, to more serious causes: such as the occupation, accessibility, earthquakes, neglect, abandonment and vandalism. When cultural heritage sites are spread in large amounts in a territory such as in Palestine with limitations in accessibility, certain tools are needed to collect and manage the data in order to introduce it to the community.

Storytelling: Technology is changing the ways that we tell stories, allowing for greater interactivity, participation, and emotional engagement. Therefore, the project will introduce innovative technologies for the presentation of complex cultural heritage sites with immersive 3D computer graphics, which are based on new concepts, partly adopted from other computer graphics areas to the specific needs for heritage presentations. The focus is to develop



Figure 3. Spin-off of Hisham Palace project: uncover of carpet mosaics and presentation at UN event.

new concepts for the integration of historical, architectural, and cultural data related to a cultural heritage site, into an immersive VR environment suited for presentation of the digital content.

Education: VR provide possibility for interaction with subjects through games or challenges. In addition, various types of information can be added in the VR environment, allowing access to a variety of useful information. Because of its entertainment qualities, VR also encourages users to remain engaged while in the virtual environment. The new generation is highly dependent on computers, smart-mobile phones, video games, and TV screens. This situation bring up a new pattern of learning. Therefore, it is very important to integrate these new visual technologies in order to bring on-site educational experiences and enhance public awareness towards cultural heritage sites.

Accessibility: In many cases, it might be not possible to make actual visit to a site. The limitation to actual visitation of a site can be connected to different reasons: the remote location of the site, too expensive, too inhospitable, too dangerous, or simply the site does not exist anymore. For the Palestinian case, the political situation is playing a major role. The segregation that is been implemented prevent locals to visit and experience many historical sites and landscapes with significance to the national history. One example is the restrictions implemented to visit historical and holy sites such as the Dome of the Rock and Al-Aqsa Mosque in Jerusalem. Another example is the restriction of movement between Gaza and the West Bank. In addition, many from the Arabic and Islamic world are unable to make visits to Palestine. VR technologies could convey an experience of the landscapes and sites that are physically and visually inaccessible. VR is of course

not expected to replace actual site visits. However, it could provide an alternative visual platform to experience inaccessible sites and facilitate people's ability to learn and explore remotely.

Tourism: The monuments of the past not only carry a powerful spiritual potential but also promote the development of the tourist infrastructure, which potentially ensures an additional income for the country's economy. VR has great potential for marketing destinations and it could enhance the promotion and selling of tourism in Palestine. The visuals and experiences that VR provide with its ability virtual tours makes it an optimal tool for providing rich data to potential tourists seeking destination information. Using VR, a tourist could make better-informed decisions and have more realistic expectations, which may lead to a more satisfactory vacation (Cheong, 1995; Hobson & Williams, 1995). The latest developments represented by the affordability of mobile-based VR technology is providing acceleration and momentum for more possibilities for using of VR for tourism.

PROJECTS

The early introduction of VR technology to Palestine started by the year 2007 through a cooperation project between Birzeit University (BZU) in Palestine and NMBU in Norway. The project was a spin-off project from earlier cooperation projects between the two universities. The overall purpose of the cooperation was to enhance capacities and skills relating to education, research and the conduct of landscape planning. The research curriculum has provided key personnel for teaching and research in a new master program. BZU has extended its capacities, and in 2008 a master program in landscape architecture was launched and coordinated with the existing bachelor and master programs in planning. This



Figure 4. Ancient terraces of Battir landscape in Bethlehem

was the first particular achievement of the projects. The second particular achievement was the establishment of a Virtual Reality Laboratory (VR-Lab) at BZU by 2007. This project was funded by the World Bank Quality Improvement Fund (QIF). Conferences, seminars and local meetings have been arranged in order to disseminate information on research, policies and planning relating to the Palestinian environment. Among these was an international conference at BZU on “Conservation and Management of Landscape in Conflict Zones” in November 2007. Training in the use of latest technology and dissemination tools has been an important part of such inter-institutional arrangements. Extensive participation with authorities, other universities, NGOs and associations, has been part of the project. The project has enabled the Palestinian academic community to be better prepared for the planning challenges facing the society in a future nation-building phase of Palestinian history.

The work on the digital library started with Hisham Palace in Jericho by 2009. The coherent unity of the site and the scarcity of studies made it a suitable study case to use for this project. According to the Palestinian Ministry of Tourism and Antiquities – MTAP (2008), Hisham Palace is the most important monument from the Islamic period in the Jericho region. The reconstruction and modelling process of the Hisham Palace site was planned through a set of stages: data collection, site analysis, and creation of a 3D digital library of project components, 3D modelling of the site, model assembly and then presentation using VR-Lab (Ghadban et al., 2013). Robert Hamilton’s (1959) book “Khirbat al-Mafjar: An Arabian Mansion in the Jordan Valley” was used as reference literature. In this project, a team of planners, architects, archaeologists, historian and 3D modellers used VR technology as visual communication tool in order to gain better understanding of the interactions, attributes, characters and hidden information about the ancient

site. The VR presentation sessions provoked discussions connected to the right interpretation and demonstrated that the method has the potentials to be used as a collaborative visual tool for communication among various disciplines. The discussions were very useful for defining future steps for development of the VR model. An example is the consideration of further development of a dynamic model that could include different scenarios based on various interpretations mainly among archaeologists and historians. Through the ability to freely move around in the 3D digital model, the group for example discussed an incorrect assumption in Hamilton's vision, such as the alignment of palaces columns and the roof tiling in the interior court of the palace. The presentations sessions provided important feedback to the modelling team by recommending strategies of how a certain reconstruction scenario should continue.

Hisham Palace project represents a pioneering case in Palestine and the outcome of this project experience has already inspired other institutions to use VR technology for studying other historical sites. In 2010, MTAP started a project in cooperation with Leiden University from the Netherlands for Tell Balata archaeological park. Team members from Hisham Palace VR project were involved in Tell Balata project by using their technical competence to construct a VR model for Tell Balata archaeological park. Another spin-off effect from Hisham Palace VR project is the amount of interest that was reported on the visualization of the hidden mosaic floor through the VR model. In October 2016, MTAP decided to uncover the mosaic floor carpet to the public for one day. In addition, the Hisham Palace VR project brought the attention of the United Nation (UN) and in September 2016 it was included into the program for the UN International media seminar on peace in the Middle

East in Pretoria, South Africa.

The work on the digital library has continued through the following years with introduction of new technologies for documentations and inclusion of new sites and participation of local and international institutions. The following is a list of ongoing fieldwork and research activities:

- The reconstruction of historical layers of Tell-Et-Tell archaeological site (biblical Ai) in cooperation with BZU. The ruins are located north of Jerusalem.
- 3D mapping of Tell Balata archaeological site in Nablus in cooperation with BZU.
- 3D mapping of Askaria archaeological site in Ramallah in cooperation with University of Campania Luigi Vanvitelli in Italy and BZU.
- 3D mapping of Manateer farm landscape of Al-Teyra in cooperation with BZU.
- 3D documentation of ancient terraces of Battir landscape in Bethlehem in cooperation with BZU.
- 3D documentation of the old city of Nablus in cooperation with UNESCO and Al-Najah University.
- Developing a VR application for Hisham Palace based on the concepts of digital storytelling. The concepts facilitate a platform for the integration of historical, architectural, and cultural data through an immersive Virtual Reality Environment.
- Empirical research towards measuring the local community acceptance using VR technology.
- Dissemination activities of the digital library are planned to take place summer 2018 at selected schools and museums: Palestine Museum in Ramallah, Al-Nayzak Museum in Birzeit, and YAM Museum in Ramallah.

OUTLOOK

The introduction of digital library based on VR technology enables heritage sites and landscapes, often inaccessible to the public or even no longer existing, to be recreated and experienced again. This brought major improvements in the fields of education, tourism and planning, and thus provides new tools for interpretation and preservation. As this paper has demonstrated, VR offers useful applications for heritage preservation that deserve greater attention from researchers and professionals. Digital documentation is amongst the most innovative tools that are available in heritage studies. It can assist further in recording and conserving heritage sites and landscapes. The use of VR approach to present the ancient life in Palestine is an important step towards raising awareness of the cultural heritage, by making it more understandable to the public. The digital library platform will elevate the public awareness towards cultural heritage sites and make them aware of the richness of the environment that they are living. Consequently, this will help the protection, preservation and monitoring of endangered sites. In addition, the use of this approach for documentation has motivated academic and other institutions to participate in this project activity. We envisage that many other historical sites will be added to the digital library platform aiming at producing a national digital register for heritage sites and historically important landscapes in Palestine. The project activities prove that even in a contested region like Palestine, there are potentials to use new technologies in presenting and communicating the past and thus providing the public with models reflecting as well as challenging the dominant ideologies and cultural heritage.

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Landscape Interventions for Embracing New Wilderness

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decline, abandonment, new wilderness, landscape intervention, embrace

ABSTRACT

Under the guise of improving human wellbeing, capitalist societies focus on economic growth and expansion, while neglecting the decline of abandoned urban structures. We approach the results of this abandonment as “new wilderness” landscape: a hybrid of spontaneous nature and architectural decay. Abandoned, wild places still have a negative connotation. However, these places are an inevitable part of the urban fabric, containing potential social and ecological benefits. The question is: how can landscape interventions make this idea of wilderness more acceptable, so that the beneficial aspects can be recognized and allowed to develop? Hence this research, makes the case, it is through small interventions that could alter people’s perception and allow natural succession. Four projects working with the aforementioned new wilderness concept were selected. By reviewing their attitude towards new wilderness, several conflicts between human intervention and wilderness arise. These conflicts aid us in emphasizing accessibility, flexibility and difference as guiding principles for landscape design as tool for embracing new wilderness.

INTRODUCTION

Urban decline as taboo

“Without targeted action, many local and regional governments are unlikely to gain control over the socio-economic and physical decline of an ever-increasing number of urban settlements” (Wiechmann in: Haase

et al, 2012, p. 40). The effects of shrinkage¹ are “fought against”, while large scale urban planning has proven to fail more often than to succeed. The difficulties in finding an appropriate response to decline, are associated with the strong linkage between planning, development and growth patterns, that lead one to the idea that decline is a threat or taboo (Sousa and Pinho, 2015, p. 17) However, we cannot afford to think that all abandoned buildings, industrial sites, forgotten farmland and overlooked interstices can be either transformed, hidden or simply ignored; their scale and complexity makes necessary to engage with these sites; however, we cannot forebear redevelopment accordingly to private investors’ expectations or call for governmental action. In addition to the negative connotations of abandonment, finding a response is complicated by insufficient knowledge on how to approach this problem.

Accepting abandonment

Within the “third-generation city”² new balance must be sought between social use and ecological values, that build upon human scale activities (Casagrande, 2013). The romantic attitude³ towards decay and nature could be re-interpreted; not only as an aesthetic pursuit, but as an ethical issue to mediate the accumulating consequences of rapid growth around the world. We aim to welcome the notion of abandonment, human neglect and wilderness as part the existing fabric, what results in several missions: developing an understanding of this hybrid landscape as a whole, how design could provide room for unpredictability and how it could alter the negative connotations of abandonment or wilderness.

Embracing “new wilderness” within the totality of the landscape

Shrinkage could be seen as equal

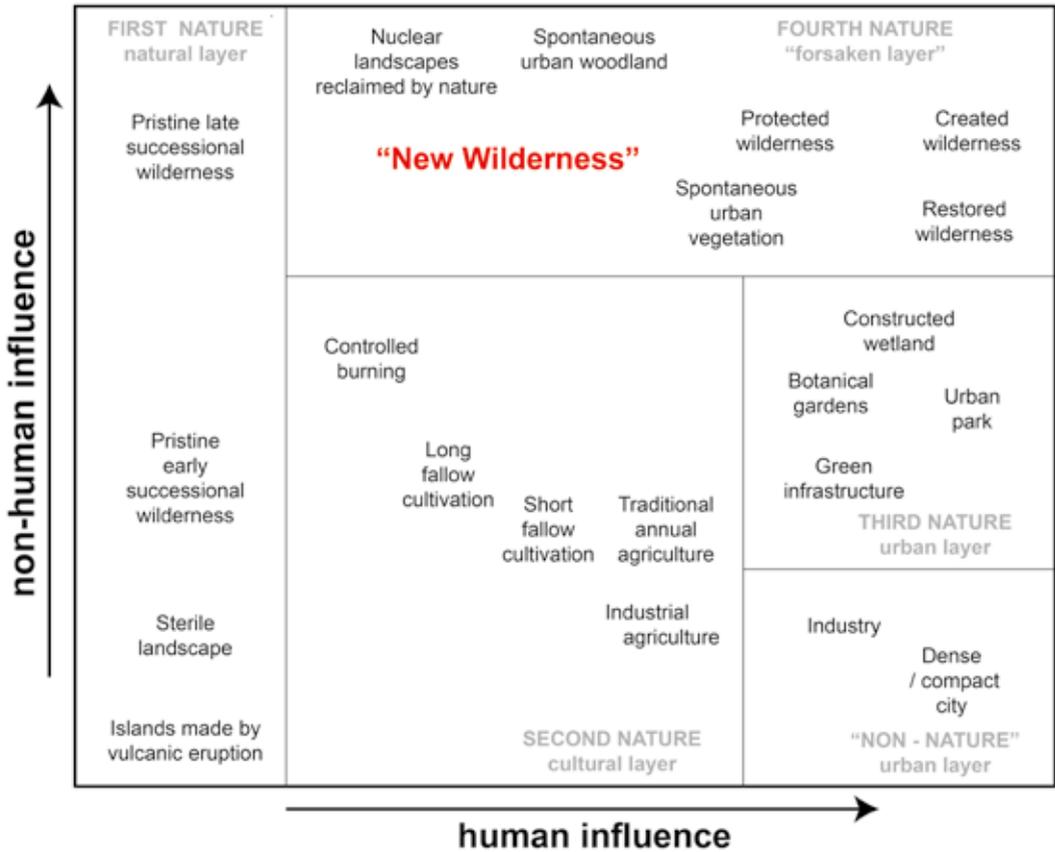


Figure 1: Matrix positioning types of nature and new wilderness

to growth -- seeking "to optimize to consequences, rather than to end them" (Sousa and Pinho, 2015, p. 17). The consequences of decline is a "wicked problem" (Tietjen and Jørgensen, 2016), and it is critical to respond strategically and adaptively to each situation. One way to address the unplanned is by "letting it go"⁴. Wilderness of abandoned spaces differs from ancient forests, agricultural land or park nature; abandoned places are characterized by neglect of former use, crating "new wilderness" or "fourth nature" (Kowarik, 2005). We could call an alternative layer besides the distinction of a natural, cultural and urban layer: a "forsaken layer" (Figure 1).

"Re-wilding", is often focused on reaching a pre-clearance state (Jørgensen, 2015, p. 458). We

emphasize on the existing situation. Where in shrinkage areas the challenge is to embrace the presence decaying buildings and chaotic nature as the landscape, densely populated areas could struggle to keep new wilderness open. This observation reveals separated parts of the same issue. Seeing how projects could embrace wilderness in different settings, could provide a set of principles that might aid in articulating design solutions.

LITERATURE REVIEW

Socio-ecological benefits of abandonment⁵

Abandoned places, "terrain vague" as coined by Sola-Morales, allow a sense of freedom, a place of possibility, and can host different forms

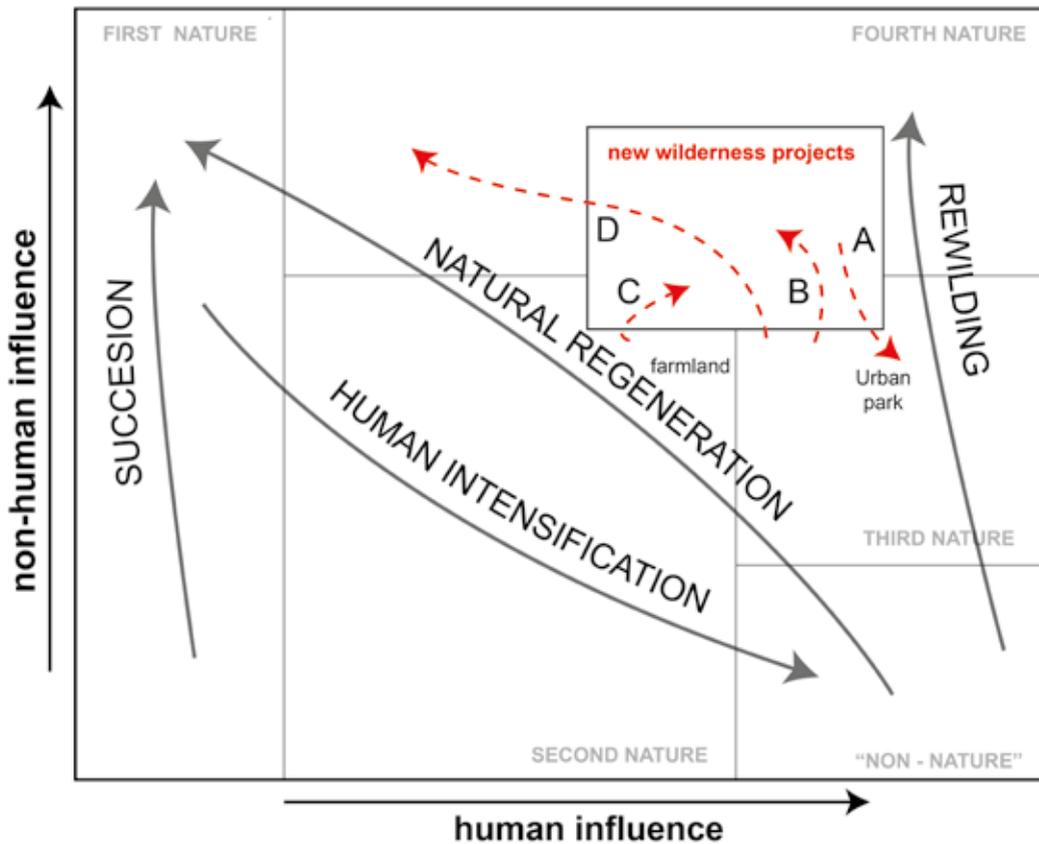


Figure 2: Types of action and position of the projects

of play - from destructive, hedonistic, artistic, adventurous and explorative (Edensor, 2005). Spontaneous vegetation and chaotic material spur the imagination, and has been proven beneficial in children's playgrounds. The passing of time, tangible through vegetation cycles, decaying textures, and changing morphology is an ongoing palimpsest expressing a site-specific, authentic character or "genius loci". Therefore also "new wilderness" offers an alternative to the predictable spaces in our daily lives and becomes "a means to critique the over-regulated way contemporary urban space is formed" (Edensor, 2005, p. 94). It could offer biodiversity, demonstrate succession within the urban fabric and allow room for species that find no place in for example intensified

agriculture. Newly formed micro-climates, often due to the abandoned buildings, shape new unique balances (Kowarik, 2013). Making vacant lots part of daily life could provide access to unique green places, create jobs, pollination opportunities, and rain water retention; reduce municipal spending and raise land value. Challenges are the different priorities of stakeholders, increased risk of vandalism, a fear of disorder, eco-gentrification and costs to purchase land (Anderson and Minor, 2017). Wilderness often obscures visibility of the site, can contribute to a reduced sense of safety or become the source of undesired encounters with animal wildlife (Rall and Haase, 2011). Green places with consistent human cultivation, are perceived more safe (Kuo, 2003). However, spaces

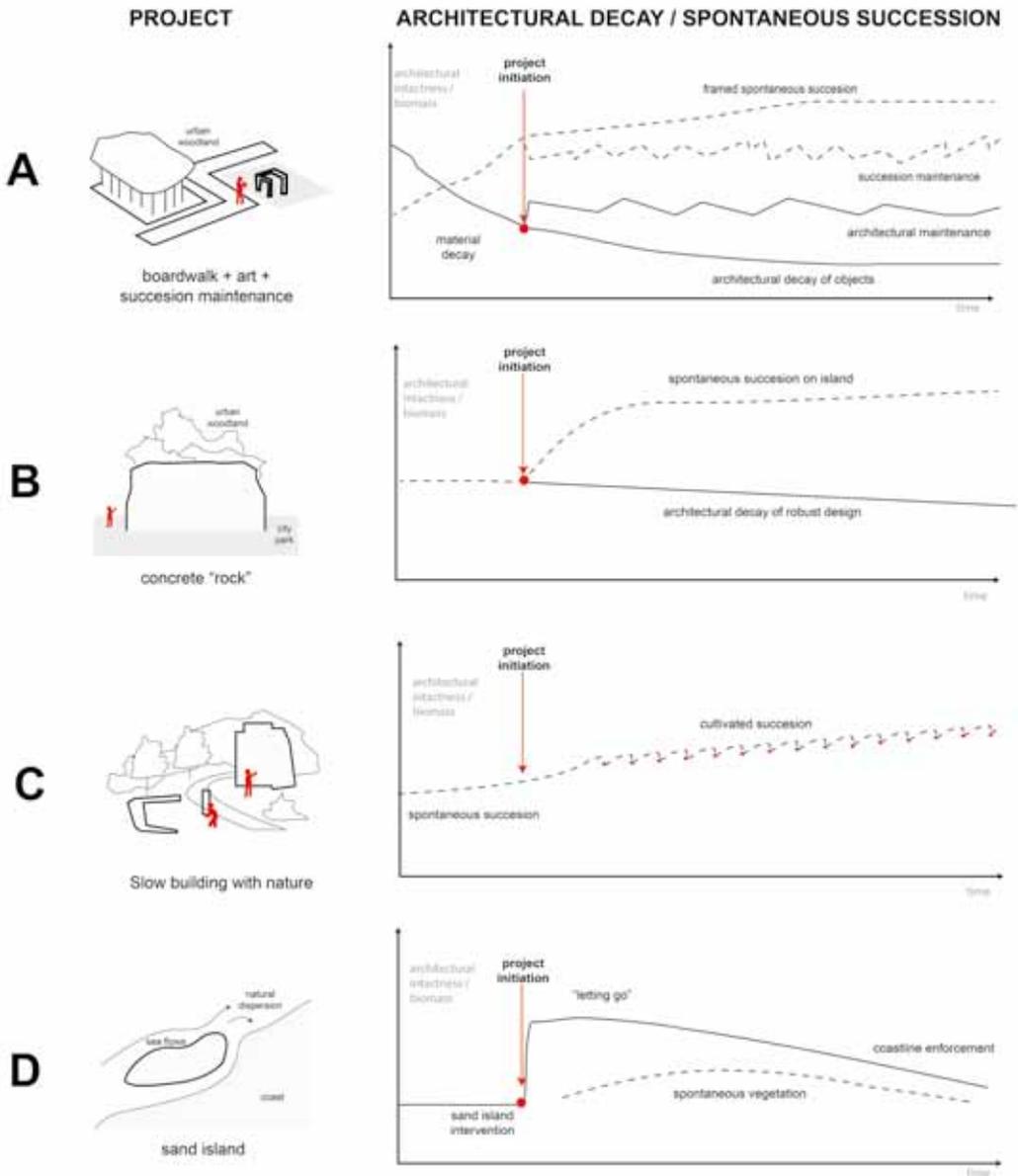


Figure 3: Project review diagram: main elements and interventions

that contain unpredictability can be more valued by surrounding residents (Jorgensen, Hitchmough and Dunnett, 2005). As a hybrid of human and natural properties without authority, new wilderness connects life with the local spot. Design could play a role making these spaces recognized and valued, without altering their existent qualities and potential benefits.

MATERIAL AND METHOD OF THE APPROACH

The grounded theory approach is used as a method to reflect the experiences of the researcher with literature review (Strauss and Corbin, 2008). The inquiry of qualities of abandoned places was done through a "collective case study" (Diedrich, 2013). Over forty abandoned places in Portugal were regularly visited

during a period of 12 months, where sketching, recording, photography and notes were used to collect data. The fieldwork by foot was sometimes with a group of residents or tourists, other times in collaboration with a fellow researcher⁶, while most visits were done alone.

For this paper, four design projects (Table 1) have been chosen to reflect upon the question how abandonment could be applied as a part of design. Following the grounded theory approach, the projects also were visited. The site visitation was guided by “the inventive analysis” in landscape architecture (Lassus, 1998) where the visitor aims to become one with the place without pre-determined, result orientated analysis, staying open for unexpected encounters. After review, conflicts between design and new wilderness became apparent.

TOWARDS A TIPPING POINT FOR A NEW WILDERNESS VALUATION

We consider that designers often are hasty in re-territorializing space. Nevertheless, leaving space completely undefined seems not to be the solution; especially abandoned lots often have lost their potential to autonomously develop and further degrade over time. Small changes can influence user behavior and ecological growth beyond their conventionally linked scale or investment. The term “urban acupuncture” is an idea that multiple small-scale projects have a cumulative impact to a larger scale (Casagrande, 2010). “Minimal interventions” as tactical and small designs can impact the understanding of a landscape and “produce transformation in the landscape experience” (Riley in: Lassus, 1998, p. 9), creating an altered notion of a place like Gordon Matta Clark’s cutting projects, or Rosalind Krauss’s indexing in photography. Landscape design could provoke another idea of

new wilderness and affect how people engage with it.

DISCUSSION

Towards understanding what role interventions could effectively play, four projects were visited. We examine what aspects could help promote the new wilderness concept and determine how they shape the image of existing preconceptions of new wilderness. In what way do these projects adopt and create room for wilderness? Moreover, what could these projects tell us about possible future design for new wilderness?

A) Natur-park Südgelände: Wilderness aesthetic and identity

Natur-Park Südgelände was an abandoned railyard with a thriving woodland succession – an example of new wilderness. After decades of abandonment, the introduced maintenance, boardwalk and art pieces enhanced the user experience and biodiversity, creating a controlled wilderness aesthetic, which made it more visually accessible to the visitor (see figure 3). Some decaying objects have been re-positioned for aesthetic display, that helped create a strong identity for the park. The clear contrast of the boardwalk and the abandoned land, fits the “difference” concept (Braae, 2015) where the intervention and the intervened landscape have such a contrasting language, one becomes a stage for the other. A conflict arises between the integrity of wilderness and democracy of space, opposed to regulation and ownership; the abandoned buildings are not accessible anymore, walking is confined to pathways and the graffiti tunnel can only be used for spraying on scheduled times. The project appears to embrace the visual experience of new wilderness, accessed urban forestry and decaying heritage. However, this comes at a price as Natur-park Südgelände ultimately

became a “third nature” urban park with “fourth nature’s” appearance (see figure 2), only containing small areas of “the forsaken”. This case shows that, to go beyond the wilderness aesthetics towards a true acceptance of its spontaneity, approaches could experiment more with limited, or open-ended programming, and less intensive interventions.

B) Derborance Island: Wilderness presence and visibility within the city

Derborance Island is a concrete plateau with the planted vegetation on its top left untouched, creating a visible wilderness and an oasis for biodiversity within the city (figure 3). This robust design insures a resilient and protected place (figure 2). Interestingly, the “island” has been disliked by surrounding residents (Gandy, 2013). The original plan included a telescope for an observation point on its border and could have helped enhance visibility of the wilderness within the city by framing its aesthetic and ecological worth. As the project is now, the high border between the maintained park and the wilderness makes it difficult for the visitor to immerse themselves and acclimate to a wilderness environment. A future project could work with bringing the visitors closer to the wilderness by enhancing the physical or visible accessibility of the wilderness.

C) Ecocathedraal: Wilderness interaction and protection

The Ecocathedraal consists of interventions while letting nature around “re-wild”. It is an example of natural regeneration and artistic cultivation on a former agricultural land, that results in the project having elements of second, third and fourth nature (figure 2). The Ecocathedraal is opening up people’s acceptance of spontaneity, where the interventions are a reaction to the behavior of natural processes and vice versa (figure 3). The work is

a dance between decay, spontaneous nature and people. However, the set of rules are a blueprint given by the initiating artist Louis Le Roy. In another context, this project would have problems maintaining these rules, as well as protecting the natural processes. Interaction and playful exploration with wilderness can only be accomplished when nature has its own space, and its growth is considered at least equal to those of human visitors. It might be necessary to create conditions that natural elements can be guaranteed to grow undisturbed.

D) De Zandmotor: Experiencing change and acknowledging natural forces

The Zandmotor island is an example of using the natural processes of nature as an instrument for human purposes--- building with nature (figure 2). This attitude demands an adaptive and open perspective: the island is built, but its future shape is left to the hands of sea and wind. There is a deliberate approach to bring awareness of the natural processes that are beyond human control, and that the desired completed image, is only achieved through nature’s response to the human intervention (figure 3). Meanwhile, the project became recognized, attracting tourists, kite-surfers and a diversity of bird species. The typical visitor is enabled to experience the ever-changing shape of the island, comprehending that it would eventually disappear. This idea of limitation and decline could illuminate temporal notions to the visitor, and in turn could help them accept such aspects in abandoned lots.

CONCLUSION

Landscape projects that advocate for embracing or gracefully “letting go” architectural decay and spontaneous nature, provide a platform and a tipping point for acceptance of “new

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NOTES

wilderness” as part of the landscape totality; and can demonstrate the value of their aesthetic, ecological and social benefits to the surrounding or broader context. It could bring the idea of new wilderness to the next level -- where it is not only valued pragmatically at a distance but adopted within the urban fabric and daily life. In reviewing four projects, several conflicts between human and nature arise. There is: manicured wilderness aesthetic versus untouched authentic nature; clear constraints and rules versus authority-free loose space; protected territory versus accessible interactive wilderness; and finally maintaining predictable environments versus allowing change. Landscape design projects for new wilderness could facilitate transitional, clear but adaptive borders between what is controlled and not, so interaction and spontaneous development are made possible in-between. In new wilderness, the distinction between the human sphere and inaccessible wilderness is gradual and changing.

Drawing on the reviewed projects, accessibility, protection, flexibility and difference are principles that could mediate this in-between. Interventions could increase acceptance of new wilderness by enabling access to new wilderness; permitting change and unpredictability through flexible designs; and creating structures to frame the wilderness in such way it becomes comprehensible, accessible for visitors, while simultaneously guarding wilderness from superimposition. In reflection upon shrinkage or decline, it is relevant to be adaptive to the continuously changing borders between human, natural and new wilderness territories. Minimal interventions applying “acupuncture” could be a strategic approach.

¹ Before the industrialisation of Europe, cities were mainly dependent of and shaped by agriculture. The rapid growth and urbanisation as result of industrialisation changed the image of the agricultural European landscape towards an urbanised one, fragmenting the landscape with highways and large-scale building projects. With the globalisation of market and industry, agricultural production is no longer profitable in a small scale on poorer land, industry is moving elsewhere, jobs and population are densifying in urbanised areas. This dynamic contributes a great deal to the abandonment of industrial, agricultural and residential structures

² The “first-generation city” before industrialization was more or less in balance with its context while the “second-generation city” was formed by light urbanization within natural constraints. The “third-generation city” was shaped by rapid growth and industrialization, exploited the land and now often has to deal with abandoned fabric (Casagrande, 2013).

³ During the romantic period, the narrative impact that the classic and medieval ruins inspired was valued, as we can see in works like Italian artist Piranesi’s drawings of ruination or built ruin folly’s in romantic landscape gardens.

⁴ “Processes of decay and disintegration can be culturally [as well as ecologically] productive, and, in a certain context, it is possible to look beyond loss to conceive other ways of understanding and acknowledging material change” (DeSilvey, 2017, p. 5).

⁵ “The growing interest in marginal urban landscapes has tended to repeatedly emphasize the utilitarian potential of so-called ‘waste spaces’ rather than their intrinsic qualities. There is an implicit mistrust of ‘letting things be’ or thinking creatively about how spontaneous processes of ecological change might enrich the city in unexpected ways.” (Gandy, 2013: 263).

⁶ Sitong Luo, PhD candidate at TU Delft, Faculty of Architecture, Urbanism & Building Sciences. Sitong’s PhD work explores the open-ended design question of urban leftover spaces with an analytical framework of multiple lenses and studies three case studies of design transformation.

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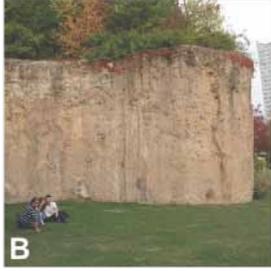
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TABLES

Table 1. Photos and summary of selected projects

 <p>(Image by Author)</p>	<p>A) Natur-park Südgelände, Berlin, Germany</p> <p>Over four decades of abandonment, this railyard became an untouched wilderness in an urban setting. The original railway wilderness had been altered by a new path system, succession maintenance and art objects (Kowarik and Langer, 2005). It was included for its strong integration of post-industrial heritage, urban woodland and social function.</p>
 <p>(www.gillesclement.com 20-5-2018)</p>	<p>B) Derborance Island, Lille, France</p> <p>A 2,500 square meters concrete rock, designed by Gilles Clément invites the “third landscape” in the urban environment. On the artificial rock, nature can develop undisturbed. The space introduces a wilderness landscape within a dense urban context, that demonstrates the contrasting beauty of visible disorder and natural spontaneity (Clement, 2015).</p>
 <p>(I Wouda, 2007)</p>	<p>C) Ecocathedraal, Herenveen, The Netherlands</p> <p>The Ecocathedraal project started with simply stacking leftover bricks gifted by the municipality. Its initiator LeRoy saw the wild, overgrown nature area as place where nature and humans could freely interact. The incremental development of walls and paths, provides a platform for dialogue and discussion on decay. This project builds upon continuous interventions that help heighten awareness to the transformation of the site.</p>
 <p>(www.dezandmotor.nl 20-5-2018)</p>	<p>D) De Zandmotor, Kijkduin, the Netherlands</p> <p>De Zandmotor island project works with the forces of the sea and the wind to cause coastal fortification. This project can be seen as building with nature: landscape forms evolve from the entropic development through a specific intervention. The island broadens the perspective of approaches towards decay by using wilderness or decay as motor.</p>

The Design History of Maksimir Park - Plan Evolution and Contemporary Use as Basis for Future Plan Development

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ABSTRACT

In this paper the design history of Maksimir Park in Zagreb will be analysed as a basis for future plan development. Maksimir is an 18th century public park which is located in the eastern part of the city of Zagreb. The overall research question is: how did the interventions influence the composition and use of the park? Also, what are the original values and particularities that distinguish the Maksimir park from similar parks in Central Europe, and which should be retained and / or restituted?

The methodology is based on the case study approach with additional use of fieldwork, map analysis and analysis of texts.

First a timeline will be set up organising the different plan interventions chronologically. Each plan will be briefly described and analysed in terms of goals, interventions and relations to the site.

Secondly we will pay attention to the relations between site, subsequent interventions and contemporary use. Thirdly we will develop a first framework for future planning and design in the context of site, use and design history.

INTRODUCTION

Park Maksimir is the first public park in south-eastern Europe and one of the most important parks of the Austro-Hungarian Empire. Maksimir

is created at the same time, or even earlier, than similar parks in other parts of Europe. It should be emphasized, however, that Maksimir, at the time of its emergence, is significantly larger in relation to the number of inhabitants or the size of the city. In mid-19th century, Maksimir encompasses an area of 402 ha, which is approximately half the size of Bois de Boulogne and twice the size of Regent's park, while at the same time the city of Zagreb has only barely 15,000 inhabitants, unlike Paris with over one million and London more than two million people (Obad Šćitaroci and Bojanić Obad Šćitaroci, 2014). Mudrinjak (1982) states that at the time when park was created, the surface of Maksimir area was even 650 ha (of which 192 ha park, 191 ha arable land, 58 ha meadow, 173ha forest, etc.) and was located quite outside the city limits. Today, the park occupies an area of 316 ha, the city of Zagreb has about 800,000 inhabitants and it can be said that the park location is closer to the centre (cca 3 km) than to the periphery of the city.

In this paper the design history of Maksimir Park in Zagreb is analysed, interventions over time are chronologically organized and presented and also the influence of plan interventions on overall park composition and contemporary use is discussed. The result of this research forms a basis for further research and developing design proposals for the future of the park.

The methodology is based on the case study approach, an analytical overview of published and available maps and other material. There are only a few preserved historical plans: Plan from 1846, by engineer Leonard Baron Zornberg - today the oldest known geodetic map (Figure 1a.), Zornberg plan from 1846, corrected, renewed and amended by M. Kadi in 1989 (Figure 1b.) and Plan from 1852, by Ivan Zasche (Figure 2.).

The comparative detailed analysis of Maksimir's graphic documentation (Milić, 2002) proved that Zornberg's and



Figure 1. a) Zornberg map, 1846 / b) Zornberg plan, 1846, corrected, renewed and amended by M. Kadi, 1989

Zache's maps are both "really precise and reliable documents of the park condition in the mid-19th century".

PARK DEVELOPMENT, 1787 – TODAY

The Maksimir Park is situated in transition area between the southern slopes of Medvednica mountain and the Pannonian plain (Sava river plain) in the northern - eastern part of the city of Zagreb as a part of diocese estate which, at that time, was covered with hundreds of hectares of large, old oak forest surrounded by meadows and fields.

Baroque layout, 1787 – 1828

The decision to turn the old forest, surrounding fields and meadows, outside of the city, into the public park was made by Bishop Maksimilijan Vrhovac (1752-1827) in 1787, and the opening ceremony was in 1794. In honour of its founder and his vision of making a park for all inhabitants of the city, the park was named Maksimilijan's Peace - Maksimir. The original park plan was made by an unknown landscape architect from Würzburg (Ivanković, 2009), which unfortunately, has not been preserved.

Vrhovac imagined a park in a baroque, geometric style with many

expensive buildings, "with triangular and square plantations of gardenia, carnation, mace, magnolia" (Mudrinjak, 1982). In just six years, the main contours of the park were laid out: large forest areas were cut, the main 800 m long alley, a tavern was built opposite the main entrance and a few buildings were built as the beginning of the future estate (Gostl, 1994). Groups of various shrubs and flowers were planted, arbors with tables and benches were put along the main alley and a hunting park was formed (Mudrinjak, 1982). The main motive, the main alley, led to the central elevation from which deep views of the surrounding space opened through ten linear, star shaped, forest openings.

Landscape layout, 1828 -1869

Change of design concept and approach was brought by Vrhovac's successor, bishop Aleksandar Alagović (1760 - 1837), who wanted to redesign it in English landscape style and "make it accessible and interesting for leisure" (Mudrinjak, 1982). Due to his dedication to other obligations in the period from 1828 to 1837, Alagović did not make major changes or improvements in the park.

The most important creator of Maksimir park was archbishop and Cardinal Juraj Haulik de Varally (1788-1869) who gave it its final



Figure 3. Aerial view, 2014/16

form in English landscape style. Haulik achieved his vision, inspired by the Laxenburg park (Ivankovic, 2009), with the help of Vienna's masters - landscape architect Michael Riedl (Schonbrunn, Laxenburg and Hetzendorf), gardener Franjo Serafin Körbler, architect Franz Schücht (Laxenburg), sculptor Josip Käzmann, head of construction works Leopold Phillip, vitraj master Anton Kothgasser, the engraver and painter Eduard Gurka, and he also employed quite a few of Zagreb masters. The second formal opening of the park was in September 1843. In 1839 park was renamed into Jurjaves or Jurjavec, but soon after Haulik's death the original name was restored.

Haulik keeps the basic division of space into the public park and the economic part – the estate (eastern part). In the new park composition, Haulik retains already built main elements of the baroque composition (the main alley) and at the same time upgrades and further develops the concept in English style (Figure 1.). He uses the natural terrain features (primarily gentle wavy topography and

water elements) that contribute to the remarkable plasticity of the composition through plane (meadows) and volume (forest) exchange, which are, along with water (lakes and streams) basic design elements.

Besides opening meadows, many roads, paths and bridges were constructed, numerous buildings, predominantly classicistic design features (main entrance door, guest hut, Swiss house, Gazebo, Haulik's villa, gatekeepers house, Peaceful cottage, Birch cottage) were built on carefully chosen locations with beautiful wide views, also the first two lakes / fishponds were made (the former forest pond was redesigned and extended into the first lake, and a couple of years later the second lake was added). Sculptures (Reaper woman, Fishermen, Children's Group, The crucifix and the St. Mother of God) and pavilions (Echo pavilion, Bellevue, Nature temple, Public temple, Umbrella pavilion) were also carefully placed in the park. The space was enriched and enhanced by planting many different and exotic tree species, bushes and flowers, so it could be said that Maksimir was once also a "peculiar botanical garden" (Mudrinjak, 1982).

Besides developing of the Maksimir park, Haulik at the same time also improved the estate part. Many buildings and facilities were built – silk factory, dairy farm, apiary, pigeon house, and for the purposes of the Archdiocese's court he raised – an orchard, poultry farm, pheasant farm and turtle pond (Gostl, 1994). All buildings, pavilions and other structures are shown on the Figure 2. and a list is given in Table 1.

Golden age of Maksimir finishes with Haulik's death in 1869 and begins the period of degradation, neglect and decay that continues to this day.

Stagnation and degradation, 1869 – 1994

The period of significant degradation of Maksimir started in

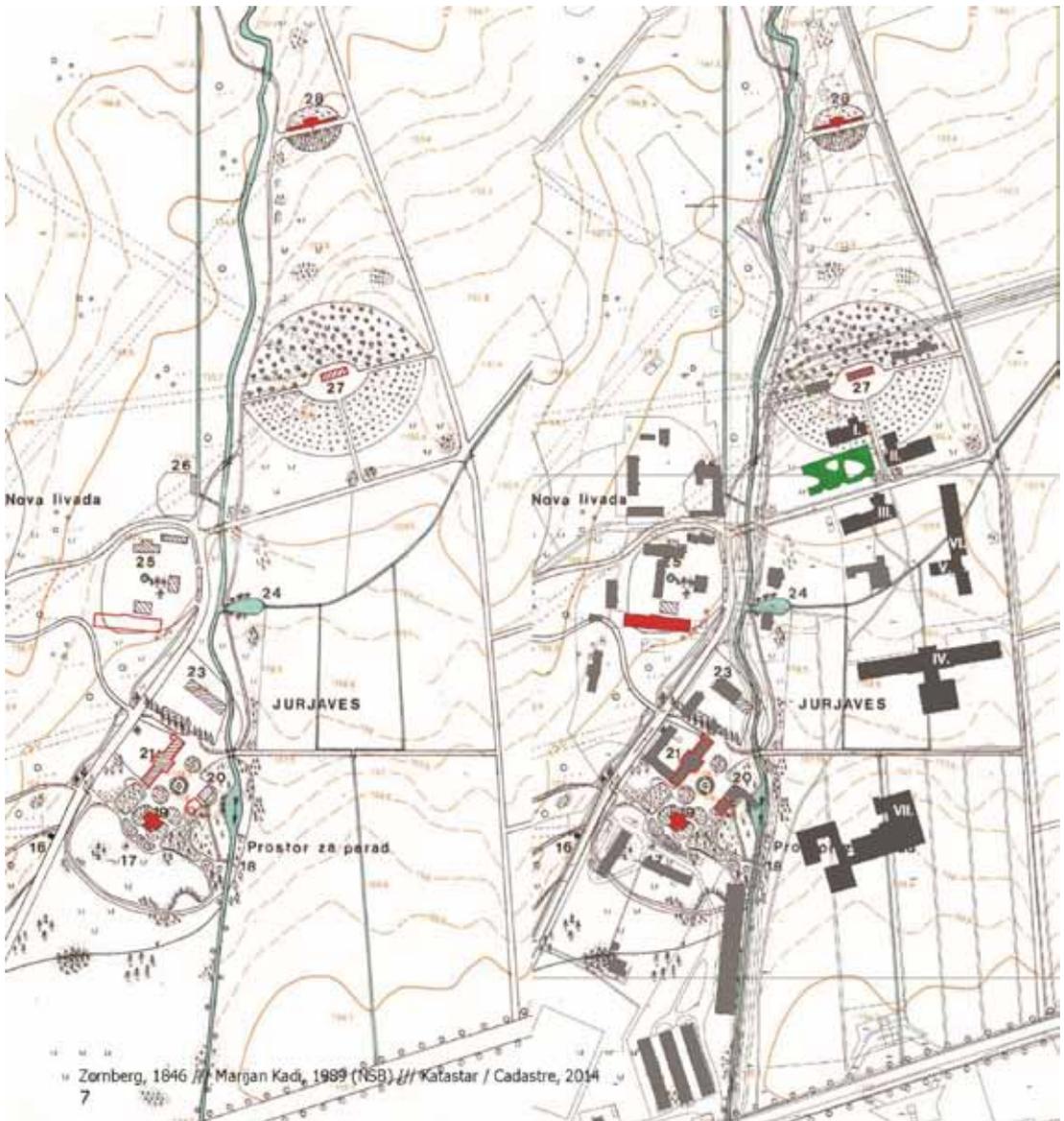


Figure 4. Zornberg 1846 / Kadi 1989 / Cadastre 2014

1921 when the Zagreb Archdiocese sold the whole property to the state, mostly due to division of the whole complex between different owners and authorities - the park became the property and falls under the direction of the city of Zagreb, and the estate area is managed by today's Faculty of Agriculture and Faculty of Forestry. During the next decades the park is neglected and gradually loses some of its basic design characteristics.

The natural and cultural values of Maksimir are recognized in the mid-20th

century - since 1948 it is protected as a nature park, and in 1964 as a cultural monument. Double protection, significantly different and even contradictory in its nature, did not result in park preservation, yet the degradation continued. Despite continuous emphasizing that "architectural and vegetation modifications that would be in contradiction to the stylistic value of Maksimir should not be allowed, and that preserving the landscape composition integrity" (Mudrinjak, 1982) is necessary, many numerous significant

BUILDINGS	SCULPTURES	GARDENS AND GROVES
Old Tavern Maksimir	Reaper woman	Rosary
Restaurant	Group of children	Haulik's villa garden
<u>Kiosk</u>	<u>Fisherman from Naples</u>	<u>Hydrangea garden</u>
<u>Gatekeeper's cabin</u>	St. Jura	Bee garden
<u>Swiss house</u>	St. Mother of God	<u>Swan islet</u>
Pheasant pharm	<u>Obeisk</u>	<u>Dhalla valley</u>
St. Jura's chapel	Croucifix	Swiss valley
Bishop Haulik's villa	<u>Stone seat</u>	<u>Pine valley</u>
Peaceful cottage		Big meadow
<u>Birch cottage</u>	PAVILIONS	<u>Acacia meadow</u>
Poultry farm		Umbrella valley
Dairy farm	<u>Echo pavilion</u>	Nightingale grove
Silk house	Umbrella pavilion -	Druidian grovej
Leech pond	(Mogila in 1925)	<u>Linden seat</u>
Sawmill	Nature temple	Sjedite kod dva hrasta
<u>Bubara</u>	Public temple	Voćnjak
<u>Aplary</u>	(St. Jura)'s chapel)	Hmeljarnik
Belevue	Gloriette	
<u>New Haulik's villa</u>	Maury pavilion	

LEGEND: Non existing existing restored

Table 1. Buildings, structures and pavilions in Maksimir

changes not in line with historical matrix have happened – end quite contrary, have permanently changed and affected its basic characteristic (Figure 3.).

First of all, due to the intensive expansion of the city in the 20th century, Maksimir is now within the densely built urban matrix, and in certain parts built areas have affected park border zones. The northern part of Maksimir has been permanently detached from its hilly forest background (Medvednica /Sljeme) and thus has partially lost its recreational character and became a city park with limited boundaries (Milić, 1960). Due to the immediate contact with built areas, Maksimir also lost the character of boundless green area with closed instead of endless views.

In the opinion of numerous experts, one of the major degradations of the historic park matrix, in terms of inappropriate change of use, occurred in 1925 when a zoo was established in the most valuable part of the park - on the islet. In the original concept of the park, this area was very attractive with various facilities, which was completely negated by the introduction of a specific fenced complex of the zoological garden that also opposed the idea of open space accessible to all city inhabitants

Also in 1892 and 1911, the Zagreb Archdiocese constructed two more lakes / fish ponds in the park (today's

third and fifth), which are more shaped like accumulation lakes and do not establish an appropriate relationship to the existing design matrix (Mudrinjak, 1982). The construction of the third lake also closed the Swiss valley.

During this period, numerous valuable park elements (Table 1.) have been lost permanently, also due to the lack of maintenance and inappropriate planting there has been a decline of quality and natural spreading of forest due to succession and thus meadow areas declined, inappropriately designed and placed summer stage has been put up in 1987, etc.

The estate part has been permanently changed due to numerous buildings and other facilities that were built by the both Faculties. The first buildings were of a pavilion type, and due to their size, design and location they were in harmonious relation to the existing layout, but the construction (size and location) of a much larger 4th Pavilion was in opposition with main directions and views (Figure 4.). Also in the southern part of the estate, many inappropriate buildings were built (used by military in 2nd World War).

First steps to reconstruction?, 1994-today

Foundation of the Public Institution "Maksimir" in 1994, marks a starting point of, at least partially, the restoration of Maksimir. From the beginning of the 21st century to the present day restoration works have been done: Echo pavilion, Kiosk, Swiss house, Gatekeepers house, Main entrance, Birch cottage (it burned in fire and was re-built), Dahlia valley, Acacia valley, Linden seat and Stone seat, the Hydrangea Garden, Two Arch Bridges. The fourth lake was also renovated, inadequate urban equipment has mostly been replaced, pathways are maintained, children's playground has been modernized, forest regeneration is in process, etc. In recent years, the Faculty of Agriculture intensively

participates in restoring protected buildings within the campus - Old stable and Apiary.

In the period 2014-2016, the Zoo has undergone a comprehensive modernization and reconstruction of the zoological garden, which included the construction of contemporary designed buildings (old and new entrance, catering facilities etc.), animal dwellings, etc.

Regarding to above examples, we can certainly talk about a positive trend of relations towards valuable landscape heritage, although for the time being it is primarily about renovating individual buildings and structures, with the vision for development of the whole park still being unclear.

USE OF THE PARK 18.- 21. CENTURY

From the very beginning, Maksimir served to all Zagreb citizens for walking, relaxation and rest, which was the basic idea of his founder Bishop Vrhovac. From the first half of the 19th century the park was used for various manifestations and public events (folk entertainment, folklore plays, theatre performances, but also events of political character).

It also played an extremely important role in the development of various sports disciplines and organized physical culture in general (e.g. skating from 1853, water polo from 1919, curling, etc.). Due to the enrichment and development of various sports facilities in other parts of the city, Maksimir lost some of its importance in this regard, although still different sports activities are carried out, but in the smaller extent.

Today many inhabitants and visitors see the ZOO as most important part of Maksimir (Mudrinjak, 1982) which results with it being the most visited location within the park. Although, originally, the lakes were used as fish ponds, today only the fifth lake has this purpose (sport

and educational fishing). One of the specificities and attractions at the very beginning was the sailing boat on the first lake, later wooden boats (up to 1850) and even the steamship (1892).

The estate was also open to the public, especially to the interested farmers, with even agricultural exhibitions and competitions held regularly (Milić, 1960). The same author particularly emphasizes that Maksimir, besides recreational has always had pronounced educational goals, and that the "didactic nature of the park was an important part of its concept".

It can be said that, despite all the changes in history, Maksimir has maintained its essential role as a space for relaxation, walking and recreation (running and bicycle riding). Users are most attracted by peace and quiet, clean air, lakes, recreation and open spaces (Vitasović and Aničić, 2005). The same research showed that users come most frequently during the summer and least frequently during winter especially during weekends and holidays. As it can be expected the users mostly visit the main alley and the Kiosk, the Zoo, less attractive are meadows between Mogila and summer stage and lakes area respectively, and forest areas are used the least.

DISCUSSION AND CONCLUSION

One of the original particularities of Maksimir park, a public open space, arises from its location and the fact that it was built quite far outside the borders of Zagreb city at that time. Park Maksimir was initially conceived in the Baroque style, and then by the resolute political decision the idea of design changes in English landscape style. In reality, the park was built simultaneously with the overlapping of these two ideas. The dominant baroque alley with a kiosk as a focus, seems to be the only materialized Baroque idea. However, Haulik's realization of forest

linear openings in function of (only) visual connections between important buildings in park and the estate, despite the fact that these openings do not follow any other (communication or residence) quality, linear openings are subtly superimposed, even opposed to the idea of freely formed openings with clumps. Exactly these subtle superpositions dramatically, in some points of the park, result in unexpected changes of experience and can be considered as a unique design value of park Maksimir. It needs to be added that the characteristic elliptic plantations in Dahlia valley, around Silk house and the Apiary, with their exact geometry, also oppose the concept of free, English landscape park design.

In the present state, due to neglect and lack of maintenance, both essential design characteristics are significantly damaged or missing and need to be returned (in the extent possible) in the future intervention. Is it necessary to consider design character of the first and the second lake versus the later lakes in the same way and would such an interpretation contribute to the duality of the original design, yet needs to be considered.

The analysis shows that the intensity of all the design interventions and the number of design elements declines with the depth of the park, and that the gradual transition can be seen, from a quality and in detail designed entrance part with the lakes, dense paths and a series of relatively close buildings or sculptural elements in the southwest zone, to the almost intact forest with sparse and modestly dimensioned pathways with a minimum of communal equipment in the northeast zone. Part of this original quality of nature transition of the 'wild' forest from the Medvednica slopes into a sophisticatedly designed city park is unfortunately lost permanently due to the loss of this continuity as a result of buildings construction along the park edges, but the remaining design

(and ecological) qualities are worthy of restitution and preservation.

This transition of qualities is adequately followed by the distribution of content whose density and intensity of use decreases with the depth of the park. In the present state when the surrounding post-construction initiated the emergence of roads around almost the entire perimeter, it would be realistic (and perhaps desirable - to reduce the pressure on the main entrance) to articulate more lateral entrances to the park that would allow more intensive use within the whole park. To prevent causing further deterioration of the original design and functional concept of the park with such intervention, future guidelines for park renovation should clearly identify the importance of these new entrances as secondary, and accordingly the size and the character of any demanding use that would appear in the park.

But the biggest question of the interpretation of the double, basically opposing protection still remains - natural park (natural and ecological values) and / or cultural monument (historical and artistic values)? Original, even the present character of the park, in which there is a subtle transition from the south-western highly culturally coloured part, towards to a large extent preserved natural forest in the northeast, in making such a decision should be the leading idea. What is beyond doubt is the need to protect the integrity of the remaining park space as the largest public open space in the city of Zagreb.

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Tree Diversity in the Three Botanic Gardens of Lisbon: From the 18th to the 21st Century

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ABSTRACT

The aim of this paper is to study the tree composition of the three botanic gardens in Lisbon, from the 18th to the 21st century. The objective is to know the tree diversity of these gardens and what species have been preserved since its creation until nowadays, as well as to create a tool for the historic gardens restoration, which will allow to establish plans of planting according to the different epochs (according to the dates of the plant lists and survey carried out in 2014 under the research project LX Gardens). Each of the studied gardens was established in different centuries: the Botanic Garden of Ajuda in the 18th century, the Botanic Garden of Lisbon in the 19th century and the Tropical Botanic Garden in the 20th century. The selection of gardens from different eras allows the study of how different garden typologies appear and common species are selected, contributing to the study of tree diversity in History of Portuguese Garden Art. All the information related to the arboreal composition was organized in a single synthesis table, where it is possible to compare the arboreal layout of the gardens over the years. Therefore, it was possible to perceive which

species were present since the construction of the garden and how many were introduced. The results revealed three prominent species. The first one is *Dracaena draco* (L.) L. (dragon tree), found in eleven of the thirteen surveys. The other two, are found in ten of the thirteen surveys: *Psidium cattleianum* Afzel. ex Saline (strawberry guava) and *Catalpa bignonioides* Walter (Indian bean tree).

In the last tree surveys (2014), 233 different tree species were identified. Of these, 26 are common to the three gardens, 49 were found only in two of the gardens, and the remaining 158 are just located in one of them.

INTRODUCTION

The main purpose of this paper is to present the research carried out on the tree composition of the three botanic gardens in Lisbon. The three case studies are: Botanic Garden of Ajuda (1768), Botanic Garden of Lisbon (1873) and Tropical Botanic Garden (1912). This study provided knowledge on the current tree diversity in the three gardens, the evolution of that composition from the 18th to the 21st century, as well as the comparative analysis of species (over the centuries and by gardens).

This data collection was based on the research, in specialised libraries and archives, of old catalogues of the gardens, *Index seminum* and lists of existing plants. As for the current tree survey, data was provided from the research project LX GARDENS - Lisbon's Historic Gardens and Parks: Study and Landscape Heritage Inventory (financed by FCT: PTDC/EAT-EAT/110826/2009).

After organizing all lists, the number of trees that are repeatedly found over the years in the gardens was counted. Ultimately, the purpose is to analyse how often species occur in the gardens and those that remained in the gardens throughout their existence.

MATERIAL AND METHOD OF THE APPROACH



Figure 1. Localization map of the three botanic gardens in Lisbon: Botanic Garden of Ajuda (1768), Botanic Garden of Lisbon (1873) and Tropical Botanic Garden (1912). (©Andreia de Sousa)

The studied gardens (figure 1) are the three botanic gardens in Lisbon: Botanic Garden of Ajuda (1768), Botanic Garden of Lisbon (1873) and Tropical Botanic Garden (1912). The three gardens are listed as a National Monument by the Ministry of Culture. A brief mention of the relevant dates of each garden and the presentation of the method used to know the evolution of their arboreal composition over the years is made.

BOTANIC GARDEN OF AJUDA (3,5 HA) HISTORY

The botanic garden of Ajuda was created in 1768 on the initiative of Marquis of Pombal (1699-1782). It was the first botanic garden in Portugal, created by the Italian Domingos Vandelli (1735-1816), WHO RECORDED THE 5000 SPECIES THAT EXISTED IN THE GARDEN

OF HIS TIME AS A DIRECTOR. In 1811 he was replaced by Félix Avelar Brotero (1744-1828), who came from the Botanic Garden in Coimbra. Brotero felt the need to rearrange the garden in accordance with the Linnaeus' system (Carlos Linnaeus 1707 – 1778), according to his catalogue with information on the 1370 species (Castel-Branco, 1999).

In 1994 the garden started to be restored under Cristina Castel-Branco's coordination, who intended to bring back the atmosphere of that epoch, recover botanic diversity, minimise maintenance works (installation of an irrigation system, improvement of the drainage network) and create the conditions required to open the garden to the public. The botanic collection was placed on the upper plane, with the recovery of the layout using an old plan of the garden (figure 2), and species were arranged according to the phytogeographical regions

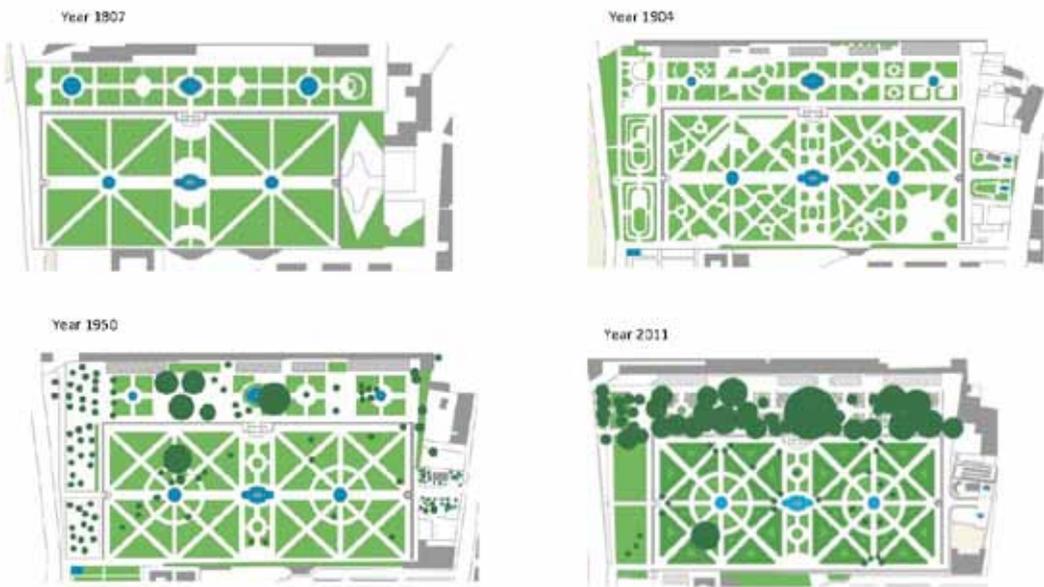


Figure 2. Botanic Garden of Ajuda in 1807, 1904, 1950 and 2011. (©Andreia de Sousa & Adriana Anico)

(Africa, Mediterranean Region, North and Central America, China and Japan, Central and Atlantic Europe, Macaronesia, Australia and New Zealand, and South America) (Castel-Branco, 1999).

Evolution of the arboreal composition over time

In order to study the tree diversity of this garden, the study that was the basis of Melani Rosa's Master's thesis in Landscape Architecture (Rosa, 2013) was used. In the 1771 inventory 344 species of live plants found in the garden were recorded (pertaining to the years 1768 and 1771). Only the species with tree size, 108 overall, were selected from this list. The 1815 catalogue, drawn up by Brotero, described 804 living species overall, 108 of which were species with tree size. The 1997 inventory drawn up for the Sílvia Mendonça's term paper only recorded 107 species, 82 of which were considered as having tree size (Rosa, 2013).

In the 2015 list, carried out under the project LX Gardens, only trees were inventoried, with 163 in total (Vasconcelos, 2017).

Based on these lists was created

Table 1 that show the number and name of tree species in common in the botanic garden of Ajuda throughout time. It can be noted that between 1771 and 1997 there is the lowest number of trees in common, merely 17. Between 1997 and 2015 there are 53 trees in common and this period is the one in which this number is the highest.

BOTANIC GARDEN OF ISBON (5,6 HA) HISTORY

In 1873, under the auspices of the Count of Ficalho (Francisco Manuel de Mello Breyner, 4th Count of Ficalho, 1837-1903), the works for the new botanic garden began in a vacant land near the College of Nobles and the well-known "Sitio das Amoreiras", bought in 1859 specifically with the purpose of constructing the garden in that site. Most of the layout of the garden upper plane known as "The Class" is due to Edmund Goeze (1838-1929). In 1876 Edmund Goeze was replaced by the French gardener Jules Daveau (1852-1929), who remained in the garden until 1892. Jules Daveau performed his main tasks



Figure 3. Botanic Garden of Lisbon in 1856, 1904, 1950 and 2011. (©Andreia de Sousa & Adriana Anico)

focused on the lower part of the garden. Henri Cayeux (1869-1963), a French national like Daveau, recommended by the latter, signed a contract on 16 December 1892 and became the next head gardener of the green space, a position that he held until 1909. To ensure continuity of the work carried out by the former gardeners, Cayeux focused on the aesthetic work that the garden required (figure 3), and he introduced and reproduced ornamental plants such as *Dombeya x cayeuxii* E. André, the rose *Belle portugaise*, the “Étoile de Portugal”, “Lusitania” and “Dona Palmira Feijao”. In 1894 the cultivation of chrysanthemums with large flower heads began and annual exhibitions of these plants started to be held in the greenhouses of the garden, continuing to take place until 1898 (Tavares, 1967).

Evolution of the arboreal composition over time

Works were reviewed to assess the tree diversity of the Botanic Garden of Lisbon: the *Index Seminum* of 1878 (Count of Ficalho), the *Index Seminum* of 1951 (Flávio Resende), the listing by Tavares in 1967 and the listing carried out under the project LX Gardens in 2014.

In the 1878 *Index Seminum*, made five years after the garden's creation by director Count of Ficalho and the head gardener at the time Jules Daveau, there were 1508 species, 63 of which with tree size. In the 1951 *Index Seminum*, with botanists Luís Sobrinho and Romariz, 1345 species are listed, and the number of tree species is 174.

In the list of 1967 included in the book published by Tavares 664 species are identified. Of these, 198 had tree size. In the last list, corresponding



Figure 4. Tropical Botanic Garden in 1904, 1950 and 2011. (©Andreia de Sousa & Adriana Anico)

to 2014, drawn up under the project LX Gardens, 353 tree species can be found. Table 2 shows the evolution of species tree diversity in the garden. Only fifteen tree species in common were found between 1878 and 1967. The period between 1967 and 2014 shows the largest number of trees in common, 71 in total. The number of tree species in the garden has increased over the course of its evolution, amounting to 353 species in 2014, the highest figure since the garden's creation.

TROPICAL BOTANIC GARDEN (6,4 HA) HISTORY

The Tropical Botanic Garden, with 110 years of history, was subject to geographical and administrative changes. It was created in 1906, during the reign of King Carlos I (1893-1908) as Colonial Garden with a view to teaching Tropical Agriculture as an addition to the Agronomy and Veterinary Institute. In 1907 it was installed in the greenhouses owned by the Count of Farrobo, located at Quinta das Laranjeiras and the corresponding lands attached thereto (where the Zoological Garden is currently located). In 1914 it was moved to the area of the Belém Palace enclosure, where it is set

until nowadays, figure 4, (Fragateiro, 1935; Silva, 2009). In 2007 was given its current name of Tropical Botanic Garden. From 2015 onwards, the National Museum of Natural History and Science of the University of Lisbon is responsible for the garden's management.

Evolution of the arboreal composition over time

Five lists were consulted to assess the evolution of the tree collection in the Tropical Botanic Garden: the first was from 1911, when the garden was not yet in its final location; the list of 1912, the first year the garden was already in its current and final location; finally, the lists of 1994 and 2015 published in a garden catalogue, the latter regarding the project LX Gardens.

When the garden was being relocated from the Counts of Farrobo palace, in São Domingos de Benfica, to its current site in Belém, in Quinta de Baixo, the garden's director was B. d'Oliveira Fragateiro and the head gardener was Henri Navel. This list of 1911 included 261 species, 103 of which were species with tree size. In the 1912 list, drawn up by the director and gardener who prepared the 1911 list, when the garden was in its current location, 453 species were included, 205 of which with tree size.

In the 1943 list, when the director was the same, but António Marques Louro was head gardener, only 66 of the 1943 plant species mentioned had tree size.

The 1994 catalogue was drawn up by Maria Cândida Liberato. This catalogue includes 469 plant species, among which are 193 species with tree size. For 2015 the list by LX Gardens - drawn up by the garden's management and subsequently provided for the project - was used. This list includes 186 tree species.

Table 3 shows the comparison of species tree diversity over the years and includes the five surveys. It is possible to see the impact on tree diversity caused by the change in location of the garden between 1911 and 1912. These two years had 96 species in common; this figure increased in 1911 to 103 and in 1912 there were 205, i.e. six tree species were lost, but the number increased in the new location. The period between 1911 and 2015 is the one that has less species in common, only 15. However, if this year is not included in the calculations, there is a period of poorer diversity between 1912 and 2015, with 34 species overall, and a period of greater diversity between 1994 and 2015, marked by 123 tree species in common. A significant decrease in the number of trees occurred between 1912 and 1943, possibly due to the cyclone that hit Lisbon in 1941, destroying several trees in the gardens of the city.

RESULTS AND DISCUSSION

Following the individual analysis of each case study, a table was drawn up where the several surveys of the gardens can be compared. The surveys are arranged chronologically, in order to understand how the diversity of tree species developed in the botanic gardens in Lisbon and analyse which species occurred repeatedly in the gardens over the years. This table also points out

(pertaining to the last surveys, 2014) the species with one of the following conservation status: threatened (CR – critically endangered, EN – endangered, VU – vulnerable) or those facing an extremely high risk of extinction (EX – extinct) in the wild. The species that occurred repeatedly at least eight times in all the surveys of were selected from the table and were used in Table 4.

This table 4 shows that *Dracaena draco* (L.) L. is the species that can be found in more surveys. It is only absent in the Botanic Garden of Ajuda in 1815 and in the Tropical Botanic Garden in 1943. This is followed by two species that are repeated ten times: *Psidium cattleianum* Afzel. ex Saline - which is absent in the Botanic Garden of Ajuda in 1771 and 1815 and in the Botanic Garden of Lisbon in 1873 but is then found in the remaining ones - and *Catalpa bignonioides* Walter, which is absent in the Tropical Botanic Garden in 1911 and 1912, as well as in the Botanic Garden of Ajuda in 1997, but is present in the remaining ones.

CONCLUSIONS

After comparing the three gardens, three species stand out over the years in the studied gardens. The first one is the *Dracaena draco* (L.) L. (dragon tree), found in eleven of the thirteen surveys. The other two are found in ten of the thirteen surveys: the *Psidium cattleianum* Afzel. ex Saline (strawberry guava) and the *Catalpa bignonioides* Walter (Indian bean tree).

In the last surveys of the gardens, 233 different tree species were identified. Among these species, 26 are common to the three gardens, 49 were found only in two of the gardens, and the remaining 158 are just located in one of them. This turns each of these specimens into typical elements of each of the gardens in question.

This paper is also aimed at stressing the importance of the lists and databases of plants in gardens,

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especially in botanic gardens. The lists and databases - where historic lists should also be included – make it possible to review the historical evolution of species and provide an important tool for the study of the history of gardens and a basis for future restorations of botanic gardens. We think that making available online historic plant lists from botanic gardens around the world at Botanic Gardens Conservation International (BGCI) site would be an essential step in future research.

Another aim is to make botanic gardens meet their goal of species preservation and conservation, making it possible to find species that may be already extinct in their habitat, but preserved in a botanic garden. In addition to the planted species, there are also seeds that are kept in seed banks, which enable the exchange of seeds with other gardens and increase the chances of survival of the species (BGCI, 2012).

This paper is a contribution to the understanding of tree diversity in the Lisbon gardens over three centuries, as well as an important tool to the restoration of the botanic collection of historical gardens. The tree maintenance is crucial, and this inventory is also a useful tool for entities with responsibilities in management and helpful to scheduling future interventions.

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TABLES

Table 1

Current Scientific Name	Vandelli, 1771	Brotero, 1815	Inventory of 1997	LX Gardens, 2014
<i>Celtis australis</i> L.	•	•	•	•
<i>Cercis siliquastrum</i> L.	•	•	•	•
<i>Cupressus lusitanica</i> Mill.		•	•	•
<i>Eugenia uniflora</i> L.		•	•	•
<i>Ficus benjamina</i> L.		•	•	•
<i>Hibiscus mutabilis</i> L.	•	•	•	•
<i>Lagerstroemia indica</i> L.		•	•	•
<i>Laurus nobilis</i> L.		•	•	•
<i>Magnolia grandiflora</i> L.	•	•	•	•
<i>Phoenix dactylifera</i> L.	•	•	•	•
<i>Phytolacca dioica</i> L.		•	•	•
<i>Pinus pinea</i> L.		•	•	•
<i>Platycladus orientalis</i> (L.)Franco	•	•	•	•
<i>Punica granatum</i> L.		•	•	•
<i>Robinia pseudoacacia</i> L.	•	•	•	•
<i>Schotia afra</i> (L.)Thunb		•	•	•
<i>Taxus baccata</i> L.		•	•	•
Total number of trees	107	103	81	163

Table 2 (part 1)

Current Scientific Name	Conde Ficalho, 1878	Resende, 1951	Tavares, 1967	LX Gardens, 2014
<i>Acca sellowiana</i> (O.Berg.) Burret		•	•	•
<i>Acer negundo</i> L.		•	•	•
<i>Acer palmatum</i> Thunb.		•	•	•
<i>Acer pseudoplatanus</i> L.		•	•	•
<i>Aesculus hippocastanum</i> L.		•	•	•
<i>Agonis flexuosa</i> (Muhl ex Willd.) Sweet		•	•	•
<i>Ailanthus altissima</i> (Mill.) Swingle	•	•	•	•
<i>Apollonias barbujana</i> (Cav.) Bornm.		•	•	•
<i>Araucaria bidwilli</i> Hook.		•	•	•
<i>Brachychiton acerifolium</i> (A. Cunn.) F. v. Muell.		•	•	•
<i>Casuarina cunninghamiana</i> Miq.		•	•	•
<i>Catalpa bignonioides</i> Walt.	•	•	•	•
<i>Celtis australis</i> L.		•	•	•
<i>Celtis occidentalis</i> L.		•	•	•
<i>Ceratonia siliqua</i> L.		•	•	•
<i>Cercis siliquastrum</i> L.		•	•	•
<i>Chamaerops humilis</i> L.	•	•	•	•
<i>Crataegus monogyna</i> Jacq.		•	•	•
<i>Cupressus sempervirens</i> L.	•	•	•	•
<i>Ginkgo biloba</i> L.		•	•	•
<i>Gleditsia triacanthos</i> L.		•	•	•
<i>Halleria lucida</i> L.		•	•	•
<i>Hovenia dulcis</i> Thunb.		•	•	•
<i>Howea forsteriana</i> (F.Muell.) Becc.		•	•	•
<i>Jacaranda mimosifolia</i> D. Don		•	•	•
<i>Juglans nigra</i> L.		•	•	•
<i>Juglans regia</i> L.		•	•	•
<i>Lagunaria patersonia</i> (Andrews) G. Don		•	•	•
<i>Ligustrum lucidum</i> W.T. Aiton	•	•	•	•
<i>Livistona australis</i> (R.Br.) Mart.		•	•	•
<i>Magnolia grandiflora</i> L.		•	•	•
<i>Melia azedarach</i> L.	•	•	•	•
<i>Ocotea foetens</i> (Aiton) Baill.		•	•	•
<i>Parkinsonia aculeata</i> L.		•	•	•
<i>Paulownia tomentosa</i> Steud.	•	•	•	•
<i>Phoenix reclinata</i> Jacq.		•	•	•
<i>Pinus halepensis</i> Mill.	•	•	•	•
<i>Pomaderris apetala</i> Labill.		•	•	•
<i>Psidium cattleianum</i> Afzel. ex Saline		•	•	•
<i>Quillaja brasiliensis</i> (A.St.-Hil. & Tul.) Mart.		•	•	•
<i>Rhopalostylis baueri</i> (Hook.f.) H. Wendl. & Drude		•	•	•
<i>Robinia pseudoacacia</i> L.		•	•	•

Table 2 (part 2)

<i>Sequoia sempervirens</i> (D.Don) Endl.		•	•	•
<i>Taxodium distichum</i> (L.) Rich.		•	•	•
<i>Taxus baccata</i> L.		•	•	•
<i>Tipuana tipu</i> (Benth.) Kuntze		•	•	•
<i>Trachycarpus fortunei</i> (Hook.) H.Wendl.	•	•	•	•
<i>Washingtonia robusta</i> H.Wendl.		•	•	•
<i>Ziziphus jujuba</i> Mill.	•	•	•	•
Total number of trees	63	174	198	353

Table 3

Current Scientific Name	1911	1912	1943	1994	2015
<i>Afrocarpus mannii</i> (Hook.f.) C.N.Page	•	•	•	•	•
<i>Brachychiton populneus</i> (Schott & Endl.) R.Br.		•	•	•	•
<i>Casimiroa edulis</i> La Llave		•	•	•	•
<i>Ceiba pentandra</i> (L.) Gaertn.	•	•	•	•	•
<i>Cinnamomum burmanni</i> (Nees & T.Nees) Blume		•	•	•	•
<i>Eriobotrya japonica</i> (Thunb.) Lindl.		•	•	•	•
<i>Ficus elastica</i> Roxb. ex Hornem.	•	•	•	•	•
<i>Ficus lyrata</i> Warb.		•	•	•	•
<i>Phytolacca dioica</i> L.		•	•	•	•
<i>Psidium cattleianum</i> Afzel. ex Saline	•	•	•	•	•
<i>Psidium guajava</i> L.	•	•	•	•	•
<i>Psidium guineense</i>	•	•	•	•	•
<i>Rhapis excelsa</i> (Thunb.) Henry	•	•	•	•	•
<i>Tamarindus indica</i>	•	•	•	•	•
<i>Tipuana tipu</i> (Benth.) Kuntze	•	•	•	•	•
<i>Ziziphus jujuba</i> Mill.	•	•	•	•	•
Total number of trees	103	205	66	191	186

Table 4

Current scientific name	Vandeli, JBA 1771 ⁱ	Brotero, JBA 1815 ⁱ	Ficalho, JBL 1878 ⁱⁱ	Fragateiro, JBT 1911 ⁱⁱⁱ	Fragateiro, JBT 1912 ⁱⁱⁱ	Fragateiro, JBT 1943 ⁱⁱⁱ	Resende, JBL 1951 ⁱⁱⁱ	Tavares, JBL 1967 ⁱⁱⁱ	Liberato, JBT 1994 ^{iv}	Inventário, JBA 1997 ^v	LX Gardens, JBL 2014 ^{vi}	LX Gardens, JBA 2014 ^{vi}	LX Gardens, JBT 2014 ^{vi}	Estado de conservação o das
<i>Afrocarpus mannii</i> (Hook.f.)				•	•	•	•		•		•	•	•	VU
<i>Brachychiton populneus</i> (Schott &					•	•	•		•	•	•	•	•	
<i>Catalpa bignonioides</i> Walter	•	•	•			•	•	•	•		•	•	•	
<i>Celtis australis</i> L.	•	•					•	•	•	•	•	•	•	
<i>Ceratania siliqua</i> L.		•				•	•	•	•	•	•	•		
<i>Cercis siliquastrum</i> L.	•	•					•	•	•	•	•	•	•	
<i>Cupressus sempervirens</i> L.	•	•	•				•	•	•		•	•	•	
<i>Dracaena draco</i> (L.) L.	•		•	•	•		•	•	•	•	•	•	•	
<i>Eriobotrya japonica</i> (Thunb.)			•		•	•	•	•	•	•		•	•	
<i>Gleditsia triacanthos</i> L.	•	•				•	•	•	•	•	•	•	•	
<i>Magnolia grandiflora</i> L.	•	•					•	•	•	•	•	•		
<i>Melia azedarach</i> L.	•	•	•				•	•	•		•	•	•	
<i>Persea indica</i> (L.) Spreng.	•		•					•	•	•	•	•	•	
<i>Phytolacca dioica</i> L.		•			•	•	•		•	•	•	•	•	
<i>Pinus pinea</i> L.		•	•				•		•	•	•	•	•	
<i>Platycladus orientalis</i> (L.) Franco	•	•				•	•		•	•	•	•	•	
<i>Psidium cattleianum</i> Afzel. ex				•	•	•	•	•	•	•	•	•	•	
<i>Punica granatum</i> L.		•				•		•	•	•	•	•	•	
<i>Robinia pseudoacacia</i> L.	•	•					•	•	•	•	•	•	•	
<i>Taxus baccata</i> L.		•					•	•	•	•	•	•	•	
<i>Tipuana tipu</i> (Benth.) Kuntze				•	•	•	•	•	•		•		•	
<i>Ziziphus jujuba</i> Mill.			•	•	•	•	•	•	•				•	

A Peri-Urban Combat Zone Where Urban Edge Meets Rural Periphery Across an International Boundary

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ABSTRACT

Peri-urban landscapes are a neglected category of the European Landscape Convention, yet they in Europe cover at least as much area as urban landscapes and are growing at a much faster rate. In fact the much publicised growth in the world's urban population will in fact result in the further expansion of peri-urban areas rather than the increase of urban ones.

Peri-urbanisation is a recognisable phase in the development of urban form, as memorably summarised by the 'egg diagram' of the architect Cedric Price. The idea of the 'scrambled city' was further elaborated upon and operationalised within the context of the EU's PLUREL project, which itself was a response to the 2006 report of 'Urban Sprawl' by the European Environment Agency.

PLUREL looked at the phenomenon of peri-urbanisation at the European scale, but to understand it better concrete examples are useful, especially those which exhibit unusual conditions that distort the normal processes. One such example occurs at the border between Austria and Slovakia, where the capital city of Bratislava borders on a rural settlement Kittsee on the Austrian side, with its apricot orchards and where traditional strip fields form an atypical peri-urban landscape.

INTRODUCTION: PROBLEMS OF THE PERI-URBAN ZONE

Peri-urban landscapes might with some justification, be called the 'Cinderellas' - the most neglected - of Europe's landscape types. Although the European Landscape Convention (Council of Europe, 2000) assures us that they are just as important as urban, rural and natural landscapes, they tend to be overlooked and ignored in favour of the landscapes of urban areas or rural regions.

This paper attempts to challenge this trend by considering three ways into understanding the mysteries of the peri-urban landscape in the hope and expectation that it can be given more of the recognition that it deserves and to help counter the 'bad press' from which it suffers. These three approaches can be described respectively as ... playful and diagrammatic, systematic and analytical and finally concrete and specific.

Firstly, though, it is useful to question why it is that the importance of the landscape of peri-urban areas is apparently so neglected in the current discourse, as compared for example to urban landscapes. The widely quoted United Nations' statistic, predicting that over two thirds of the world's people will live in cities by 2050 is well known. Similarly familiar is the fact that in Europe this figure has already been surpassed, where nearly three quarters of the population are urban dwellers. What is less appreciated is that in fact this data applies at least as much, if not more, to peri-urban areas as it does to urban ones: the result of this growth in the 'urban' population is in practice a massive expansion of peri-urban rather than urban areas. So perhaps it is a problem of definitions or terminology rather than a fundamental lack of awareness of the issues. Peri-urban landscapes are therefore clearly worthy of far more attention than they currently receive. Associated with this is the question of how, where and indeed when to draw the boundaries between the urban and the peri-urban. In the

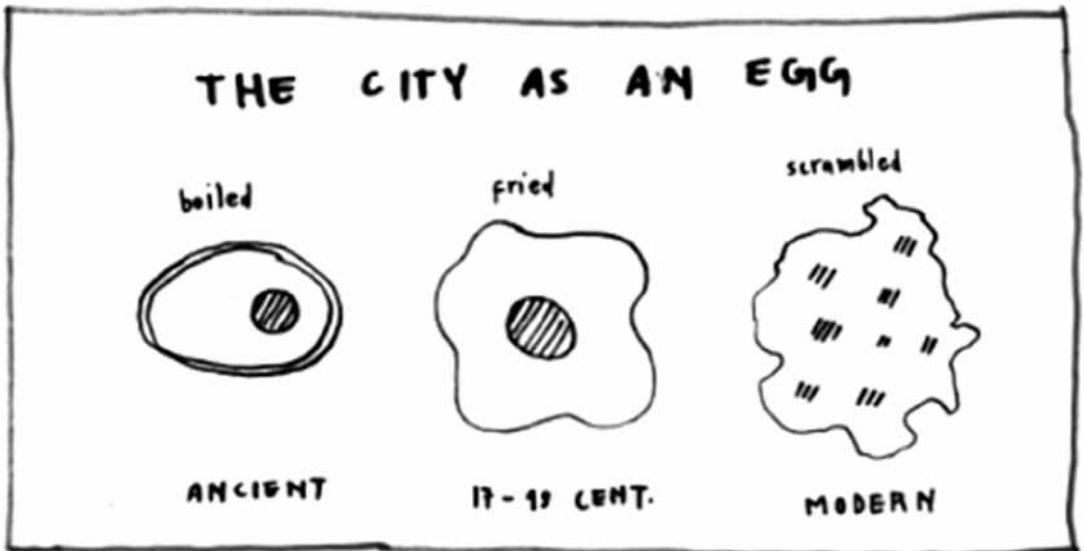


Figure 1: Cedric Price's brilliantly simple illustration of the 'city in history'
 Source: <http://www.imaginingcities.com/image/88442914756> - Accessed 25.07.2018

search for some general enlightenment, here we can bring in the first of our approaches to unlocking the mysteries of the peri-urban landscape.

HOW DO YOU LIKE YOUR EGGS FOR BREAKFAST?

The English architect Cedric Price once famously explained the history and development of urban form, and thus indirectly the rise of the peri-urban zone, through the brilliantly simple medium of the breakfast egg. In this simple 'back on an envelope' sketch (Fig. 1) he also provided us with an initial way in to the topic of the peri-urban landscape.

First on the menu was the boiled egg, with its hard shell - the city wall - enclosing and protecting its contents. The Mediaeval city was clearly separated from its rural hinterland with the city walls forming an unmistakable boundary, a clean break between the urban and the rural. There was no peri-urban landscape: beyond the city wall you would only find agricultural fields. The most urban feature likely to be encountered here was the occasional encampment of a besieging army, which at best might perhaps be described in today's terminology as a

kind of 'pop-up' peri-urban zone. This model of the 'compact European city' is still the one that influences much urban design thinking today.

The breaking down of the city walls transformed the mediaeval city and, while the urban core remained largely unchanged, the residential 'egg-white' began to spread out into the surrounding landscape as the threat of besieging armies receded. The definition of the urban edge became distinctly less clear and the beginnings of a peri-urban landscape can be surmised as it also became possible to move some of the less attractive uses out of the core city.

From the industrial revolution onwards the impacts of local transportation systems - first railways and then the private car - meant that both residential uses but also some core functions such as employment and shopping could migrate to the periphery, thus creating the scrambled cities with which we are now familiar. With the seemingly unstoppable rise of peri-urbanity and the dilution - if not complete disappearance - of the rural landscape around urban centres, today's urban form was born. Indeed many of the new industrially driven

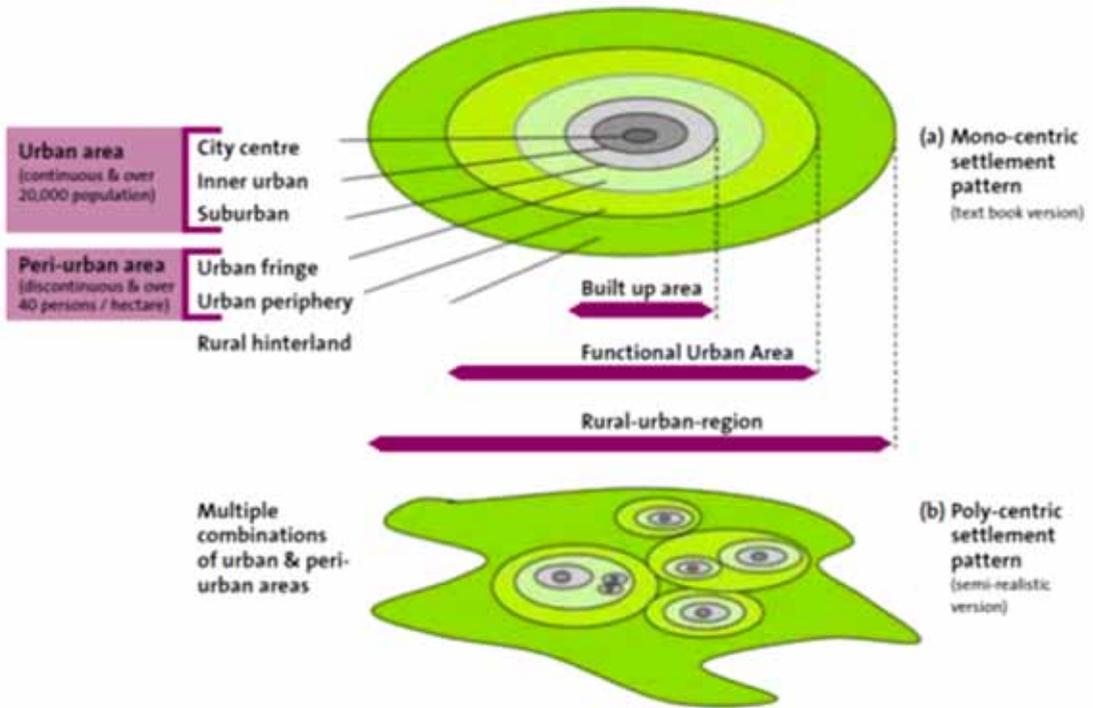


Figure 2: Model of peri-urban areas as defined by the PLUREL Project - the egg acquires some extra layers Source: PLUREL Project, Synthesis Report p. 25 Fig. 2: Peri-urban areas & the 'rural-urban-region' Accessible from: www.plurel.org

agglomerations established in the coal fields of the nineteenth century, such as the Ruhr District in Germany or the Black Country in England, consisted almost entirely of 'scrambled' peri-urban landscape.

SPRAWL AND THE CONSEQUENCES

One important reason for the bad press which peri-urban landscapes receive is the fact that they are inextricably associated with the phenomenon of urban sprawl. The Europe-wide dimensions of this threat were brought to public attention through a study conducted by the European Environment Agency (EEA, 2006). This documented the spread of low density and apparently unplanned urbanisation across the whole of Europe using consistent data, and drew the conclusion that there was an urgent need for action to respond to the challenge. Between the publication of the EEA study and the response from

the European Union, a detailed research review of the topic was published by two Belgian researchers (Meus and Gulinck, 2008) in which they introduced a new term: 'semi-urban landscapes'. By way of an answer, the European Union sponsored a large-scale research effort under the auspices of the 6th Framework Programme, the result of which was the PLUREL Project. PLUREL (Piorr, Ravetz and Tosics, 2011), investigated the phenomenon of peri-urbanisation in Europe, pointing out that "Areas classified as peri-urban are growing four times faster than urban areas."

The PLUREL Project extended and refined Cedric Price's egg model to develop a more differentiated view of today's scrambled egg cities. Peri-urban areas were defined as comprising: 'discontinuous built development, containing settlements of less than 20,000, with an average density of at least 40 persons per km² (averaged over 1km² cells)'. This definition of peri-urban land also placed it within a



Figure 3: The Austrian-Slovak border to the south-west of Bratislava-Petržalka

Source: Google Maps. <https://www.google.co.uk/maps/place/Bratislava,+Slovakia/@48.1112916,17.0728255,9517m/data=!3m1!1e3!4m5!3m4!1s0x476c89360aca6197:0x631f9b82fd884368!8m2!3d48.1485965!4d17.1077478>
 Accessed 25.07.2018



Figure 4: Bratislava, Kittsee and the unregulated Danube in the late 18th century

Source: Source: Mapire The Historical Map Portal. <https://mapire.eu/en/>

wider view of the urban-regional system as a whole (Piorr, Ravetz and Tosics 2011:25).

The overall urban-regional system included the following categories:

- Urban core – which includes the Central Business District and other civic functions;
- Inner urban area – generally higher density built development (built-up areas);
- Suburban area – generally lower density contiguous built-up areas attached to inner urban areas and where houses are typically not more than 200 metres apart;
- Urban fringe – a zone along the edges of the built-up area, consisting of a scattered pattern of lower density settlement areas, urban concentrations at transport hubs and large green open spaces;
- Urban periphery – a zone surrounding the main built-up areas with a lower population density, but belonging to the Functional Urban Area. This can include smaller settlements, industrial areas and other urban land uses;
- Rural hinterland – rural areas surrounding the peri-urban area, but within the rural-urban region.

This model was clearly defined from a morphological point of view, in terms of built density and continuity of development as well as taking population density into account, and was applied across the whole of the EU 27 European Union (not yet including Croatia), such that the study area was defined as comprising a mosaic of 903 contiguous urban-regional systems. Peri-urban areas were defined as the combination of the urban fringe and the urban periphery.

The study concluded that the extent of peri-urban areas across Europe was equal to that of urban

areas, but that their population density was only half as great. Peri-urban areas were characterised as having an inefficient and fragmented pattern of land use with consequent effects on wildlife habitats and 'amenity values' as well as negative social impacts. Those regions with the greatest proportion of peri-urban land were generally those with the highest levels of economic growth, and particular problems were seen to exist where high areas of peri-urban land came into contact with strong agricultural sectors. PLUREL's recommendations included the need for a strategic approach to land use planning at the rural-urban-regional scale as well as local policies to coordinate the efforts of all parties concerned in the direction of an integrated approach to development. In this context the governance issues are both particularly important but also particularly difficult. In many, if not most cases within the rural urban regions there are many, sometimes overlapping authorities with different and often competing interests and concerns. Furthermore administrative boundaries rarely coincide with the land use categories defined in Fig. 2, and across Europe the situation can be very different from country to country, although even these differences pale into insignificance when international borders run through peri-urban landscapes, as we will see below.

In order to go further, and to look at the peri-urban landscape as addressed in the European Landscape Convention, it is necessary to move from the general European viewpoint to look at the specific local context. This leads us into the third approach in our investigation: the need to consider a specific peri-urban landscape situation.

**BRATISLAVA - KITTSEE: A
PERI-URBAN LANDSCAPE
WHERE RURAL VILLAGE
MEETS CAPITAL CITY
ACROSS AN INTERNATIONAL**

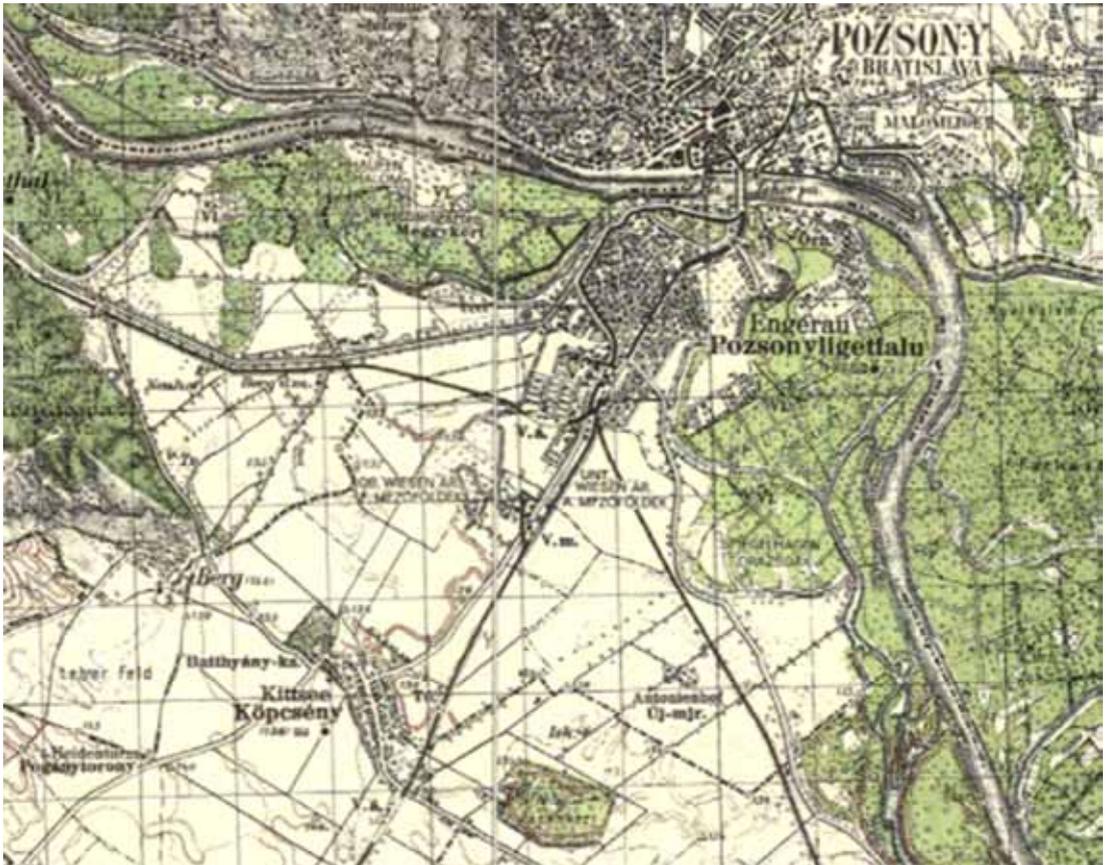


Figure 5: The territory between Bratislava and Kittsee according to a 1941 military map
 Source: Source: *Mapire The Historical Map Portal*. <https://mapire.eu/en/>

BOUNDARY

When studying a particular phenomenon, it makes sense to look at a concrete example of a particular situation in order to judge how well the schematic models stand up in practice. It can be even more instructive, however, if one can find a particular example where the situation deviates from the norm, such that some at least of the influencing factors are de-coupled from one another and perhaps their action can be seen more clearly.

The situation in question involves two adjacent administrative districts between which an international boundary runs, one which was previously part of the so-called 'iron curtain' dividing Europe into two ideological halves. Although a generation has now passed since this

geo-political divide was dismantled, the international boundary remains and creates a situation in which the peri-urban landscape takes on a unique dimension.

The two administrative districts concerned are Bratislava, the capital city of Slovakia with a population of some 430,000 and the Austria village of Kittsee, population 3,073 (2017 data quoted from Wikipedia). The main square of Kittsee is less than one kilometre from the border on the Austria side, while Bratislava's post-war district of Petržalka comes to an abrupt end less than 500 metres from the border on the Slovak side. Between them are a motorway squeezed in on the Slovak side and arable strip fields on the Austrian side. Only the change in field patterns marks the boundary on the ground, as does the absence



Figure 6: Kittsee and Bratislava – a peri-urban combat zone where rural meets the edge of urban. Source: Google Maps.

of the otherwise common features of peri-urban landscape sprawl (Fig. 3).

In many other disciplines such unusual or exceptional situations are exploited in order to throw light on how the 'normal' system functions - be they mutations in the field of genetics or stroke patients in neurology. Perhaps the exceptional coincidence of national borders and urban edges in this case can help to throw light on the genesis and dynamics of peri-urban landscapes. To what extent can this unusual situation provide a unique opportunity to study the dynamics of landscapes on the edges of large and growing cities?

Looking at today's plan of the Bratislava it can be seen that where the Austrian border meets the city, a large slice of what would otherwise be a roughly circular form appears to be missing to the south-west, thereby limiting both the further expansion of the city in this direction as well as the development of urban fringe uses. As a result, the peri-urban landscape in this segment is entirely rural with arable strip-fields reaching right to the border, but on the Austrian side (Fig. 3). This is the not the only direction in

which further urban development is restricted. To the north and west the Lesser Carpathians border the city, while a large chemical plant limits further urban growth to the south. The main area of urban expansion is thus in the north-easterly direction, along the foothills of the Lesser Carpathians. Thus - in the terminology of PLUREL - to the south-west of the city the 'rural hinterland' (of Austria) abuts directly on to suburban zone of Bratislava, although all the zones appear to be present to the north-east. Or to express things in the terms of Cedric Price: the eggshell is still in place in the southwest of the city, while to the north east it has become thoroughly scrambled, especially since the fall of the Iron Curtain.

The relationship between the city of Bratislava and village Kittsee has changed over time, as both the landscape and the geopolitics of the region have evolved. At the time of the first military survey (1763-1787) undertaken within the Austro-Hungarian empire in the late 18th century under Joseph II, it can be seen from the map in Figure 4 that Kittsee (here shown under its Hungarian name of

Köpcsény as it then belonged to the Hungarian part of the dual monarchy) was linked to Bratislava (then known by its German name as Pressburg) by a tree-lined avenue. The area to the south of the unregulated Danube, in the bend in the river became the location of the post-war urban expansion of the city, resulting in the district of Petržalka which now stretches up to the Austrian-Slovak border. While the location of the (inter)national boundary, shown in red to the east of Kittsee in Figure 4, indicates that both it and Bratislava were at the time on the same (Hungarian) side of the border.

A military map dating from 1941 (Figure 5) shows the important railway connections within this area, only parts of which still exist. What it does not show, is the fact that in the 1919 Treaty of Versailles, the eastern part of the territory of the village of Kittsee was ceded to Bratislava and now forms a part of Petržalka.

With the establishment of the 'Iron Curtain' at the end of the Second World War, and the subsequent construction of the district of Petržalka to the south of Danube, the village of Kittsee lost any connection with Bratislava. It became an isolated and largely neglected settlement on the very edge of Western Europe and its population gradually declined from a peak in 1910 of 3,123 to only 1,873 in 2006 (data quoted from Wikipedia). Kittsee is now one of the fastest growing districts in the province, and the main reason for this is that, despite the border - or perhaps because of it - many young Slovak families have moved there as the land prices in Bratislava have risen beyond those across the border.

During the Communist era (1950-1989) the process of urbanisation was dominant in Bratislava, after 1989, however, the process of suburbanisation began to manifest itself. Beginning in 1989-1996, and accelerating from 1996-2002 this was characterised by construction

of family houses on the outskirts of villages around Bratislava. Later, the period 2002-2009 was characterised by the commercial construction of apartment buildings, and since 2009 it has taken the form of cross-border suburbanisation (Slavík et al., 2011, Šveda, Madajová and Podolák et al., 2016). According to Zubrický (2010) migrants from Bratislava to several municipalities in Austria (Berg, Kittsee, Wolfsthal) were attracted by lower property prices and good transport accessibility. As noted by Halás (2018), the current stage of cross-border suburbanisation of Bratislava in Austria is poorly documented, particularly due to difficulties with obtaining relevant data. The perceptions of cross-border region by residents have been investigated for example by Kollár (2001), or by Láštiová, Petrjánošová and Bianchi (2007).

The dynamics of Bratislava development affects the surrounding rural municipalities in the both states. A co-ordinated cross-border territorial development of this area therefore requires in addition to the intensive harmonisation of local needs a structured framework for mutual development planning. For example, the project BAUM funded by European Regional Development Fund focused on the harmonisation of land-use and spatial development activities in the cross-border region and the elaboration of a common strategy for efficient management of the peri-urban cross-border landscape involving an international collaboration between Bratislava and surrounding municipalities, regional authorities, provincial governments and the residents (BAUM, 2011).

In one sense the peri-urban landscape of Bratislava has begun to spread across the border, but only as far as single family houses are concerned. Otherwise, this section of the edge of the city has seemingly been protected from peri-urbanisation by the

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international border. One beneficiary of this process is perhaps the local speciality: the Kittsee Apricot (<http://www.kittseer-marille.at/>). The district boasts some 35,000 fruit trees and a large number of farmers are dependent on its cultivation for their livelihood. Whether this important landscape feature and rural industry could have survived in the peri-urban landscape of a fast-growing capital city such as Bratislava is questionable, were it not for the presence of the border. Such an interesting urban – rural contrast can be considered as a very unique landscape situation and perhaps a strong potential for sustainable development. One of the strategic scenarios could perhaps build upon this quality and use (urban and peri-urban) agricultural landscapes as a shared green centre of Bratislava and Kittsee in a similar way like Aachen (Germany), Maastricht (the Netherlands) and Liège (Belgium) did with their Three Countries Park, which forms the green heart of the Euregio Maas-Rhein (<http://www.drielandenpark.eu>).

While the PLUREL project mentions landscape, its main perspective is an economic and land use one coupled with a concern for efficient governance. The question of landscape tends to be addressed generically from within the overall 'environment' category and from the point of view of conserving existing resources, even if mention is made of the promotion of green-blue infrastructure and measures for climate change mitigation and adaptation. In the Bratislava case, there is otherwise little evidence of a successful 'green belt policy', but across the border the intact Austrian rural landscape reaches to the edge of its southern suburb and seems to have been effective in establishing an international truce within the peri-urban conflict zone. It would seem to offer an interesting potential for further cross-border research into the nature of the peri-urban landscape.

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5.4. PARTICIPATION AND CO- PRODUCTION

GROUP F

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Waiting Spaces as Spaces of Negotiation in the SWOT-Mobile Design Studio

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Keywords:

temporary use, houselessness, Solidary Mobile Housing, Living Lab, co-creation

ABSTRACT

This article discusses the topic of temporary use of Waiting Spaces in the framework of the Solidary Mobile Housing Design Studio, organised as part of the Innoviris Co-create project 'SWOT-Mobile'. We claim that this project is an illustration of how safeguarding the solidary character of temporary use of Waiting Spaces with citizens in need can help establishing landscape democracy. First we elaborate on the methods we developed and tested to empower houseless people, who usually don't have a say in their housing situation, and how we put them at the heart of the project. Then we illustrate how fostering a dialogue about urban Waiting Spaces with different stakeholders (students, houseless, NGOs, experts and authorities) in the design studio, created opportunities for spatial and community development. We describe how the Solidary Mobile Housing Design Studio turned urban Waiting Spaces into 'spaces of negotiation' where questions on the city were raised and experimentation and innovation took place.

INTRODUCTION

The Innoviris Co-create project 'SWOT-Mobile', is an ongoing Living Lab intending to increase social and urban resilience by developing and testing a model for the co-creation of solidary living in mobile homes for houseless on Waiting Spaces in the Brussels-Capital Region (BCR).

The stakeholders included in the SWOT-Mobile Living Lab are:

- eight future inhabitants: houseless people who have lost their grip on their housing track,
- employees from the NPO Centrum voor Algemeen Welzijnswerk (CAW), an association providing personal support on general wellbeing,
- employees of the NPO Samenlevingsopbouw Brussel (SLO), an association focussing on community building,
- lecturers and students from the Faculty of Architecture at KU Leuven, campus Sint-Lucas Brussel,
- employees from the NPO Atelier Groot Eiland, an association focussing on training and social employment,
- the surrounding inhabitants and neighbourhood organisations,
- the local and sub-local authorities (the local council, social services, the Housing and Urban Planning departments of the BCR, social housing associations, ...).

Together, these partners are co-creating eight affordable mobile housing units and one or more collective spaces, enabling interactions between the inhabitants and with the neighbourhood. Throughout the project, the SWOT-Mobile Living Lab is taking on different forms with the aim of co-creating a learning environment with all the partners - including the houseless, a group that is usually not involved in this and that generally doesn't have much to say on their housing track.

By taking part in every step of the conceptualisation and the construction of their own houses, the future inhabitants of the SWOT-Mobile project are not only co-designing and co-building their individual housing units, but they are also gradually co-creating a solidary living community, in interaction with the surrounding neighbourhood. Through this, besides

regaining a grip on their own housing track, they will regain a grip on their whole life. As such, in this project, with the aim of increasing social resilience, experimental forms of empowerment and inclusion, with a focus on interaction and solidarity, are being explored.



Figure 1. An example of a Waiting Space in the BCR (Photograph: Aurelie De Smet)

By locating (temporarily) on Waiting Spaces, the project also aims to address the emergent urban issues. With 44.332 residents on the waiting list for social housing and an increase in the number of house- and homeless people by 33% since 2010, the BCR is clearly facing an affordable housing crisis (Romainville, 2015). The SWOT-Mobile project is an exploration of alternative forms of housing, that would take advantage of the abundant amount of derelict and/or un(der)used spaces that can be found in the BRC (Fig. 1).

As vacant lots and leftover spaces are often 'spaces of conflict', associated with speculation and possible dangers and thus creating a negative atmosphere, in recent years many cities started to experiment with temporary use as a way to upgrade the city and increase social and spatial resilience. Research has shown that practices of temporary use of Waiting Spaces (Faraone & Sarti, 2008; Studio Urban Catalyst, 2012; De Smet, 2013) can indeed play an important role in the (re)development of the city (Overmeyer,

2007; Bishop & Williams, 2012; De Smet, 2013; Oswalt et al., 2013) and offer an alternative approach to the creation of collective spaces (Ferguson, 2014).

However, as practices of temporary use of Waiting Spaces are becoming more and more common, questions are rising on which users are entitled to claiming these spaces, previously neglected by the mainstream urban actors and therefore pre-eminently available to alternative, more fragile actors. In this paper we are investigating how the solidary character of temporary use of Waiting Spaces can be safeguarded. More precisely, we are illustrating which methods were used, in the SWOT-Mobile project, to put the future inhabitants at the heart of the Solidary Mobile Housing (SMH) Design Studio and we are demonstrating how this enabled them to have a shaping power over the way in which their city is made and remade (Harvey, 2013). For only when all citizens are able to execute that power, Landscape Democracy can truly be realised.

MATERIAL AND METHODS

The Living Lab methodology employed in the SWOT-Mobile project involves three big action research cycles (Kemmis & McTaggart, 2005), each with particular goals, to be realised through smaller steps (Fig. 2). The action research approach provides us with an open framework enabling the use of different tools adapted to the particular goals of each cycle (e.g. focus group meetings, semi-structured discussions, surveys, participatory mapping).

In this paper we are focussing specifically on the smaller action research cycle C2b: the preliminary design of the housing units and collective space(s) in the Solidary Mobile Housing (SMH) Design Studio.

The topic of the SMH Design Studio, organised at the KU Leuven Faculty of Architecture, was the

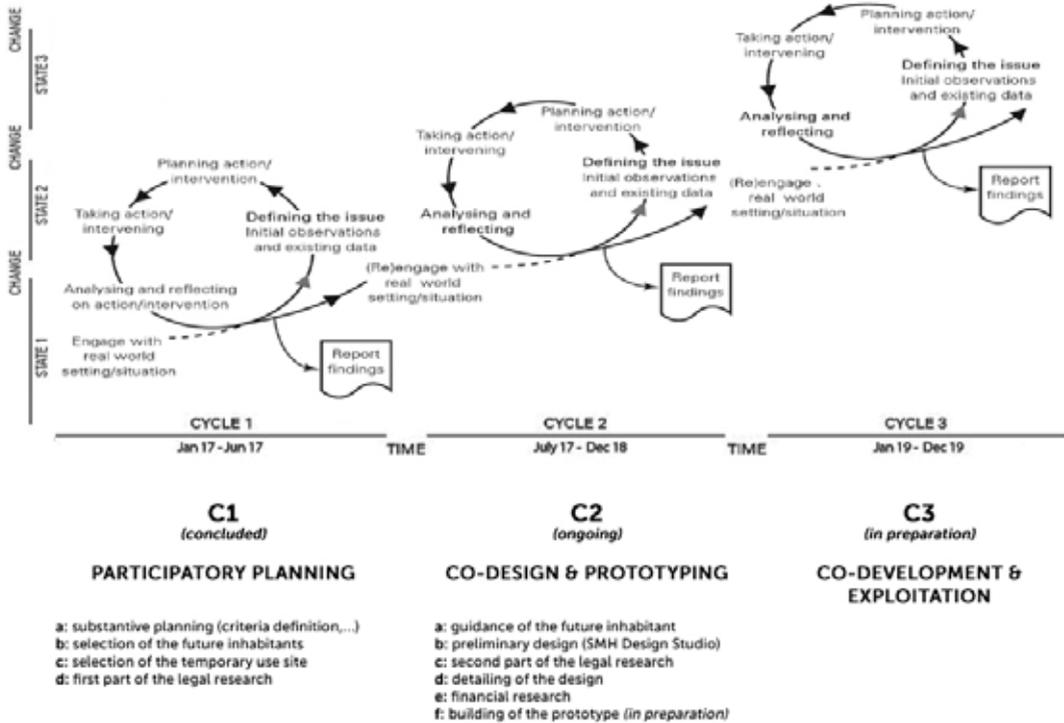


Figure 2. Schematic Representation of the Three Big Action Research Cycles of the SWOT-Mobile Project (Image: Action research cycles by Kemmis & McTaggart (2005), adapted by Burak Pak)

(preliminary) design of the individual housing units and collective space(s), according to the criteria collectively defined in the Co-Planning cycle (C1). During 14 weeks, the studio coordinators Burak Pak and Ken De Cooman, interacted with the students on a weekly basis. Aurelie De Smet took part in this as a participating observer, focusing on co-organizing, observing and documenting the overall process. The CAW-guided future inhabitants were invited to participate in the studio whenever they liked. Every week, Geraldine Bruyneel and/or Tineke Van Heesvelde from SOB and/or Dieter Vanden Broeck from CAW were also 'butterflying' in the studio to consult with the students and give them feedback. On a very regular basis internal and external experts were invited in the studio to give presentations on specific aspects related to the project (first half of the semester) and/or to give consultation on specific questions

(second half of the semester). As a location for the studio we wanted a less institutional, more low-threshold workspace, where we could collaborate freely with the students and future inhabitants. From this perspective we joined the temporary use of the WTC tower 1, organized by the KU Leuven Faculty of Architecture. To accommodate the involvement of the future inhabitants and of the SLO and CAW representatives in the SMH Design Studio three main methods were used.

Firstly, during the second studio session, the six sites, selected for the design studio in the participatory project planning and site selection cycles (C1a&C1b), were visited together with the project team, the future inhabitants and the students. The aims of these **Participatory Site Visits (C2b1)** were to explore the sites and organize a first encounter between the future inhabitants and the project team, including the students.



Figure 3: Review & evaluation moments with the future inhabitants and representatives of CAW and SLO in the SMH Design Studio at the KU Leuven Faculty of Architecture (Photographs: Burak Pak & Aurelie De Smet)

To facilitate the travel we rented a bus and to enable eating together as a convivial activity, we organised a picnic on one of the terrains during lunchtime. On beforehand the groups of students were asked to prepare leaflets, covering their first analysis of the sites using comprehensible communication techniques. We provided these leaflets to the future inhabitants, as a tangible memory of the trip.

Secondly, in the middle of the semester, a week-long workshop was organised. For the students the aim of this **Participatory Hands-on Workshop**

lectures, workshops and visits for them addressing the topics of materiality and buildability. For the future inhabitants the aim was to think and talk about the notions public and private on the level of the units and the neighbourhood and to communicate ideas and needs to the students. Together with SLO and CAW they got involved in group conversations on this topic and they also used cardboard and tape to test out different spatial configurations for the interior of a small scale housing unit on 1/1. Also, a number of joint activities has been organized with

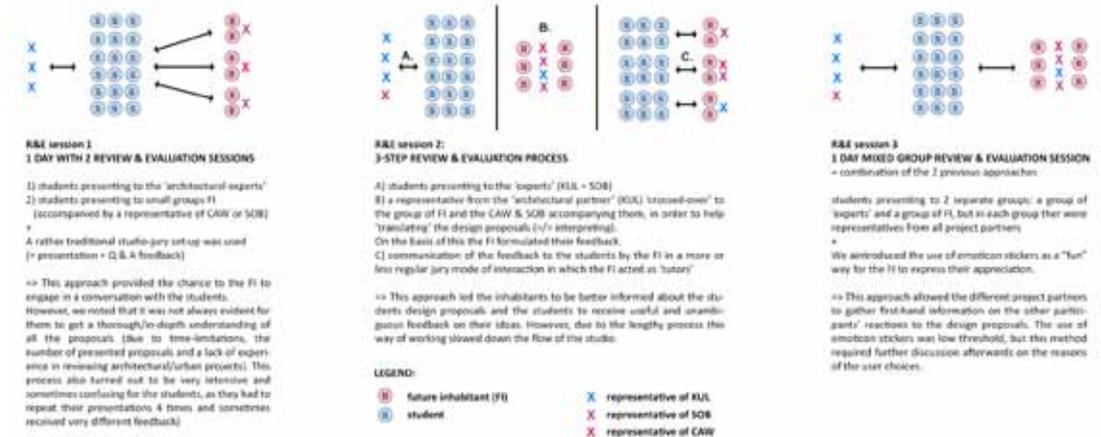


Figure 4: Schematic representation of the three different approaches used to organise the knowledge exchange between the participants of the SMH Design Studio (Image: Aurelie De Smet)

(C2b2) was to work intensively on the design studio project and become aware of the 'buildability' of their designs and the need for 'conscious use of materials'. They were given the assignment to design and realise a building detail on scale 1/1, 1/2 or 1/5. We also organised a number of

students and future inhabitants. Among these were visits to other temporary housing projects such as Home for Less (Brussels) and Labland (Ghent). On the last day of the week, the broader network of project partners and stakeholders were invited to come and see the results of the workshop-week in

a final exhibition.

Thirdly, monthly **Participatory Review and Evaluation Moments** (C2b3) were organised to encourage the future inhabitants and the representatives of SLO and CAW to reflect on the work in progress (Fig. 3).

For these review and evaluation (R&E) sessions, we tried out three different approaches to organise the knowledge exchange between the participants. As illustrated in figure 4, the involvement and role of the 'experts', the grouping of the participants and the interaction modes varied in each case.

EXPERIMENTAL RESULTS AND DISCUSSION

During the Participatory Site Visits (C2b1) the participants were able to visit the sites and discuss about them together. This enabled students to see the sites from the eyes of the inhabitants and vice versa. As a result of this process, one of the initially selected sites was rejected and, for or the purpose of the studio, replaced by one of the 'backup-sites'.

In the Participatory Hands-on Workshop (C2b2), the students and future inhabitants at certain moments participated in design conversations together and collectively searched for creative and innovative solutions. Through the hands-on 'making' activities, both the students and the future inhabitants started to consider the 'buildability' of their ideas. In their search for 'conscious use of materials', the students tested out the possibilities and constrains of different traditional and non-traditional building materials and they became more aware of the (natural) conditions of the site and its surroundings and of potential usable elements already present there. The future inhabitants' 1/1 mock-up-exercise led to the collection and selection of possible design solutions for the interior design of small scale housing units and in the drawing of their own interior

plan. The group conversations lead to more clarity on their wishes concerning the notions of 'private', 'collective' and 'public', which were made explicit in a list of requirements for the collective space(s). The results of the week were presented and discussed together on the last day. The final exhibition allowed also the broader network of partner stakeholders to get informed about and give feedback on these more detailed and practical aspects of the project.

During Participatory Review and Evaluation Moments (C2b3) the students received feedback both from 'experts' from different fields (architecture, building techniques, community building, social welfare) and from the future inhabitants themselves. However, one of the biggest and very clear barriers between future inhabitants and the students was the language (French vs English + the technical jargon). Moreover, we noted that time-limitations, the quality of the provided materials and a lack of experience in reviewing architectural / urban projects can sometimes inhibited a thorough understanding of and in-depth knowledge exchange on the design proposals. Therefore, on one hand, we worked on providing good quality, comparable communication and illustration materials; besides clear floorplans and sections, we asked the students to provide scale models, axonometries, perspective drawings and/or renders and reference images. We saw that this indeed facilitated the understanding of the different architectural proposals. On the other hand we are also gradually developing a 'common language', by exchanging a lot among the project partners. Going along, we learned that providing accompaniment by 'professionals' from each field during important review and evaluation moments greatly facilitated the knowledge exchange between the students and the future inhabitants, as they could (literally but also figuratively) help translating the conversations.



Figure 5: Student design illustrating how, even on a site initially perceived as 'vast and inhospitable' can be rethought as a hospitable, inviting and inclusive space (Image: Char Chau)

Moreover, this also allowed the different project partners to gather first-hand information on the other participants' reactions to the different proposals.

CONCLUSION

In the SMH Design Studio it became clear several times that Waiting Spaces can turn from 'spaces of conflict' to 'spaces of negotiation', where questions on the city can be raised and experimentation and innovation can take place.

Firstly, from professionals point of view Waiting Spaces are often seen as the residual spatial products of contemporary urban planning or useless leftovers (Tonnelat, 2018). For ordinary users they can seem intimidating and potentially dangerous. Although one of the initially selected sites was rejected at the start of the design studio, there were more sites the project partners were not all feeling very enthusiastic about. This brought up discussions as to why these future inhabitants should be assigned these sites no one else wants. However,

during the design studio, the students' research-by-design helped to illustrate the affordances of each of these places. This helped to overcome the initial prejudice towards Waiting Spaces and helped to see the potential of Brussels' un(der)used spaces for citizens in need (Fig. 5).

Secondly, as a result of the challenge of locating the project temporarily on Waiting Spaces, during the SMH Design Studio some of the 'traditional values and characteristics' of architectural and landscape design were put into question. The temporality of the design invoked a dynamic understanding of space and use, and brought to the front other values and characteristics like mobility / demountability, reversibility, incrementalism / adaptability / flexibility and openness / informality. Design thinking about temporary use also helped the students to establish a novel link between space and time, overcoming the past conception of programmatic stasis by reframing the project as a 'process of change' (Boeri & Pak, 2017) in which (a) understanding space and everyday activities through



Figure 6: Student design illustrating a new aesthetics resulting of questioning the 'traditional values and characteristics' of architectural and landscape design (Image: Melissa Jin)

time, (b) creating space-time scenarios for an urban project and (c) and solid strategies and architectural solutions for time-based use are central. The liminality and envisioned performative nature of design in Waiting Spaces, the extensive appropriation of readily available, light and reversible materials combined with a respectful attitude towards the natural elements already present on-site brought in a new aesthetics (Fig. 6).

Thirdly, focusing on Waiting Spaces also evoked questions on how to share these spaces with others and turn these into (temporary/alternative) public spaces. Designing for temporary use thus also questions the traditional notions of 'private' and 'public' and brings about a different approach to landscape. Reimagining the surroundings of the housing units as part of a dynamic collective space enabling interactions between the inhabitants and the neighbourhood resulted in experiments with what we call 'non-invasive design'. The temporality of the planned interventions and limitations of the appropriation below the ground triggered innovative design explorations. Rethinking the design of the landscape as an ephemeral, low cost collective space the students

explored the potentials of soft and dynamic interventions and avoided static element difficult to remove or adapt (Fig. 7).

Finally, we noticed that participation does not always and everywhere mean the same thing for all participants. In this context the studio itself served as a 'space for negotiation', through which the partners learned how to communicate with each other. Co-creation as a participatory design practice does not mean leaving your own field but joining knowledge (both professional and experience-based) from different fields together. As a result of this negotiation which took place during designing, teaching, learning, facilitating and participating in temporary use, we noticed that our roles as designers have shifted. The role of the architect and landscape designer has expanded towards transdisciplinarity and social practices with a stress on particular engagement strategies such as networking. This also resulted in truly welcoming and valuing the ideas of users and NPOs in the design process, which was in a way a transfer of authority.

In conclusion we can say that Waiting Spaces prove eminently suitable to allow for negotiating the

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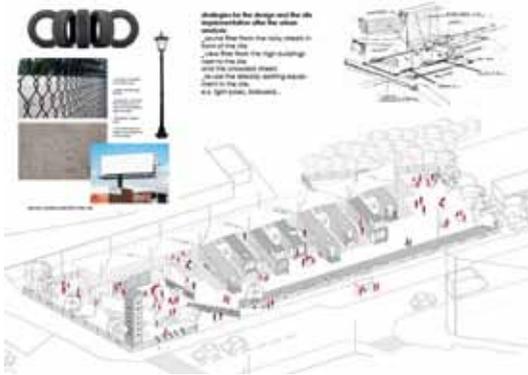


Figure 7: Student design illustrating the design of the surrounding landscape as part of the dynamic collective space(s) (Image: Ioanna Dimaki)

right on the city. The SMH Design Studio illustrates how putting citizens in need at the heart of projects for urban Waiting Spaces, can help contribute to establishing landscape democracy by safeguarding the solidary character of temporary use. In the studio the future inhabitants were facilitated to participate equally in the design of the landscape surrounding them. As such, these houseless, a group that is usually not involved in this and that generally doesn't have much to say on their housing track, gained a shaping power over the way in which their city is made and remade. As illustrated above, the studio created opportunities for spatial and community development by fostering a dialogue about urban Waiting Spaces with the different stakeholders (students, houseless, NGOs, experts and authorities). This was achieved through using adaptive methods and techniques, providing collaborative accompaniment and allowing for an open & informal process. The knowledge gained throughout this process, combined with the knowledge we are gaining from the other action research cycles is currently contributing to the development of a model for the co-creation of solidary living in mobile homes for houseless on Waiting Spaces.

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The father of Seattle's Community Gardens turns 45: Lessons Learned at Picardo Farm P-Patch

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urban agriculture, participation, community building, p-patch program, urban growth

ABSTRACT

Relocation, dismantling, substitution; in a word: impermanence. Community gardens have often struggle against this condition. The risk of dismantling or relocation is growing alongside with the value of land for development purposes in dense urban environments, such as Seattle, WA. Against all odds, the community garden of Picardo Farm, located in north Seattle, is ready to celebrate 45 years from its establishment in 1973 and is still thriving.

A research project started in November 2017, with the aim of understanding the many reasons behind this success and through fieldwork, interviews, a press review and the analysis of a questionnaire submitted to the gardeners at the beginning of 2018. The lessons learned at Picardo Farm offer some useful insights regarding the level of resident's engagement in the whole project, the importance of Land status as well as social activities and animation offered to the gardeners. These could help other community gardens to overcome some of the difficulties they are facing on a daily and long-term basis, to preserve a pivotal element for the development of healthy cities.

INTRODUCTION

“Urban agriculture provides fresh food, generates employment, recycles

urban wastes, creates greenbelts, and strengthens cities' resilience to climate change.” according to the Food and Agriculture Organization of the United Nations (FAO) website. On a similar note, Glatron and Granchamp state: “the presence of gardened space [...] is increasingly perceived as a marker of the quality of life in the city” (Glatron and Granchamp, 2018). Nowadays Europe hosts the considerable number of around 3 millions of allotment gardens¹ (Barthel, Folke and Colding, 2010). Nevertheless, community gardens all over the world are often struggling with the risk of being relocated and dismantled (Lawson, 2004; Francis, 2009; Hou, Johnson and Lawson, 2009; Mare and Peña, 2010; Guitart, Pickering and Byrne, 2012; Spilková and Vágner, 2016).

The main reason behind this risk is the increasing land value in rapidly densifying urban environments (Francis, Cashdan and Paxon, 1984; Haaland and Konijnendijk van den Bosch, 2015).

This impermanence is much stronger in the modern community gardens, those that can be considered a response to the economic crisis of the 70's (Lawson, 2005), than for the more established ones which originated at the end of the XIX century (Nilsen, 2014), in their various articulations, across the world (in Germany, England, and France in particular).

Mainly the expression of a world that was slowing down its pace after the second post-war period boom, modern urban agriculture developed from its early stages in those areas that later Gilles Clément would call “*third landscape*”: unused agricultural land, un-built urban blocks, scattered slivers (Clément, 2005; Drake and Lawson, 2014; Sanches and Mesquita Pellegrino, 2016).

With the profound transformations urban contexts have faced in the last fifty years, many of these establishments and their respective communities are finding themselves in

a completely different framework and are confronted with new and complex challenges.

It is therefore very interesting to study projects that were able to adapt themselves to the mutated social, economic, and environmental conditions in order to understand if there may be any useful lessons for other similar projects in terms of organization, activities and community building approaches.

THE CASE STUDY

The city of Seattle has established the municipal P-Patch Community Gardening program within the Department of Neighborhoods that coordinates the planning, development, and management of community gardens. The staff of the P-Patch program coordinates with different city agencies whose properties are used for garden sites and produced a regulatory framework. In addition to the P-Patch program, several non-profit organizations contribute significantly to various related aspects such as land-banking, promotion of edible planting, and food banking (Hou and Grohmann, 2018).



Figure 1. Picardo Farm general view

Our case study focuses on Picardo farm P-Patch (fig. 1), which symbolize the beginnings of the gardening movement in Seattle. In the early 1970s, a group of students

and citizens began to farm a small community garden on a former farm, which was cultivated since the 1920s by the Picardo Family (Hucka, 2018; Hou, Johnson and Lawson, 2009). Since then, the name “P-Patch” indicates a community garden part of the City Program; “P” stand for “Picardo” after the family who owned the land (Murakami, 2005). (fig. 2).



Figure 2. Picardo Farm entrance sign

Following this first experiment, more than 80 other P-Patch were created over the past 45 years. Today, with its 281 plots used for gardening over around 1.2 hectares, the Picardo Farm P-Patch was chosen to explore and question the factors behind its long-lasting success in the context of a rapid urban growth.

Indeed, with the city expansion, many agricultural areas were developed as urban residential zones and therefore agricultural activities were moved away from the city. In 1975, the area occupied by Picardo Farm was bought by the Dept. of Parks and Recreation of City of Seattle (Hou, Johnson and Lawson, 2009) in order to secure the permanence of the garden, which appears today as a key factor for its longevity.

An array of methods was used for this research, from on-site observations conducted during the 2017 fall season, to interviews of institutional actors of the Seattle Department of Neighborhoods P-Patch Program and coordinators

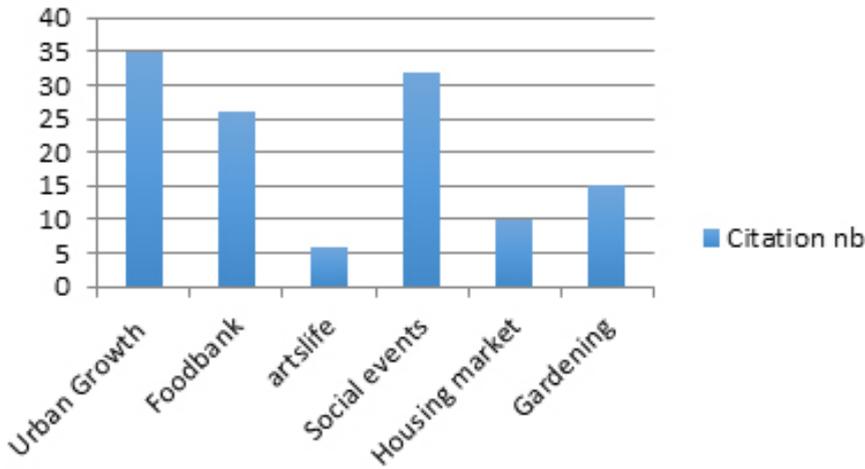


Figure 3. Major topics

from local management team at the farm itself. A survey of 28 questions, including 7 open questions, was also sent via emails to all the gardeners via the P-Patch Program on December the 13th, 2017 and March the 12th, 2018. The survey has had a total of 102 respondents, recurrence of keywords were analyzed for open questions.

In parallel, a press review based on articles from the Seattle Times has been conducted over a 15 years period (2003- 2017), reviewing any articles mentioning at least one time the term P-Patch, via the Seattle Times Online Research System. Thus 146 articles were identified and analyzed (quantitative and qualitative methods) to measure occurrences of themes and recurrence of keywords. Among these 146 articles, 41 are having a P-Patch as the direct subject of the paper whereas 103 are mentioning a P-Patch as a reference location for social, artistic event or as an amenity for urban development/housing project.

Through this press analysis, 6 major occurrences were identified (See fig. 3). The main one relates people's concerns about the rapidity of "urban growth" and its side effects: the risk of relocation or disappearance of some parks and Community Gardens (like P-Patch). It also relates city announcements for the vote and

creation of new P-Patches and parks or the efforts to conserve existing ones. Closely related is the next category on "Housing market", where the P-Patches are presented as amenities for the view, the proximity, and the possibility to access a green area and grow your own food. Another important category is on "social events", related to "Arts life" since P-Patch locations are proposing an amazing list of activities – either organized by them or hosted by them. Topics like "food bank" or food security are also central to the discussion: there are many programs related to the P-Patch to help and volunteer to grow vegetables for underserved families / communities and it is an important activity of many P-Patch across the City. Last but not least, gardening advices about how to plant what and when are part on an ongoing conversation among the gardeners.

At the Community Garden level, analysis of survey responses from the Picardo Gardeners shows that they have identified several success factors for the Picardo Farm, from the volunteer team involvement to the engagement of the gardener's community and the strong level of leadership programming, among the most important. (See figure 4, gardeners answering the question "As a gardener, what factors do you believe have contributed to the 45 years run of

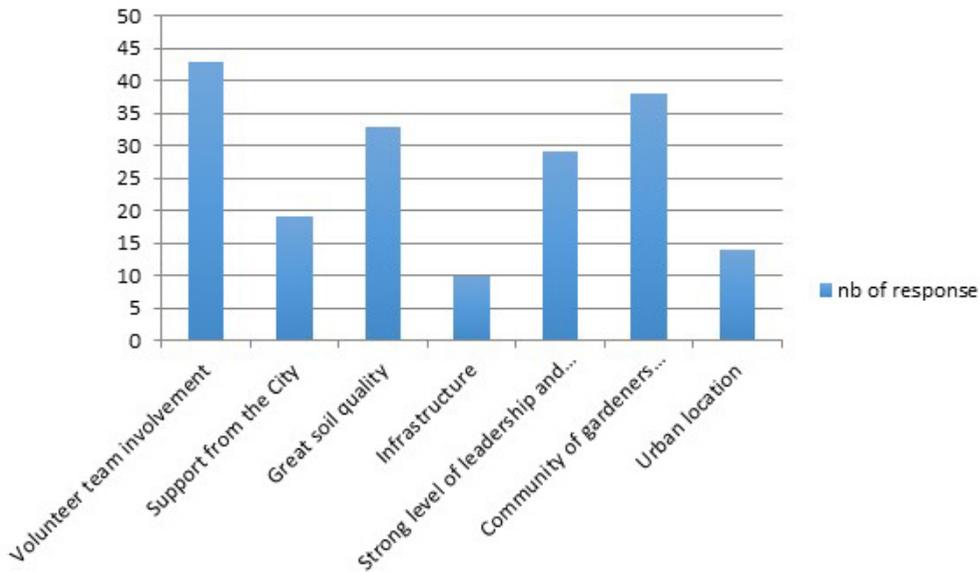


Figure 4. Factors of success

the Picardo Farm?”).

They also mentioned concerns, answering the question “What do you like least about coming to Picardo Farm”. On top of the usual gardening-related issues such as weeding invasive, fighting rats and working under bad weather (35% of the responses) we identified two other main challenges for gardeners: Equipment and regulatory framework of the garden, which include water access rules, gardening equipment, volunteer hours and the organization of work parties (18%) and the relationship with other gardeners, being sometimes “unfriendly” to “inconsiderate” (15%). These two challenges are shared among gardeners from other P-Patch as well.

RESULTS AND DISCUSSION

Regarding the Picardo Farm P-Patch, our central question is to understand the factors that stand behind the long-lasting success of this P-Patch, its longevity, as well as the challenges that had to be overcome through time. Our main hypothesis is that 3 categories of challenges had to be overcome through time in order for the Picardo Farm to be successful today.

The first challenge relates to land status, in the context of rapidly growing cities and increasing urban pressure. The fact that urban growth is the major topic, which came out of the press review and interviews, seems symbolic of the importance of land property considerations. As the first P-Patch in Seattle, Picardo Farm benefited of land acquired by the municipality which helped securing the location but this isn’t the case for all P-Patch and this has proven to play a big part in today struggle, as confirmed by the opinion expressed in the interviews carried out with both city staff and non-profit board member. Some P-Patch had to struggle due to unfavorable or fragile land status, as it was the case, among others, for the Hillman P-Patch. Only the intervention of the mayor has finally saved the P-Patch from developers (Seattle Times, Local News, June 22nd, 2005).

Another interesting aspect regarding property management is that the Picardo area later included also small portion of land belonging to other city agencies. Instead of introducing a further difficulty in an already potentially complex framework, due to the need to coordinate the permits and requirements required by the various

agencies, this fact supplied a certain degree of flexibility, being able, for example, to locate the various assets of the garden (toolshed, etc.) in the areas with the more approachable regulatory framework, that can change from an agency to another (Interview with a former garden coordinator, October 22, 2017). Other P-Patch found the opportunity, to solve the property issue, to integrate the community garden into already established urban parks (Middle et al. 2014; Hou and Grohmann, 2018).

The second challenge lies on the relationship between the gardeners and the leadership team, regarding the regulatory framework and the type and diversity of activities proposed to engage the gardeners. The regulatory framework both within the garden, common to all the P-Patches of the city, and between the garden and the occasional visitors, is an essential component in a place that balances itself between public and private use (interview with P-Patch program staff member, October 3, 2017). However the Picardo Gardeners, despite struggles on water access rules or work parties (18% of the responses), are mostly considering the involvement of their volunteers as the main factor of success (42%). Furthermore, it would be interesting to investigate the potential relationship between the complaints from gardeners about people stealing vegetables, with the also regular mentions of the lack of P-Patch and the waiting list to access a P-Patch getting longer with time.

The third challenge address the relationships between the gardeners themselves, with their potential conflicts and the creative ways used to solve them. As stated by one gardener answering the survey question “What do you like least about coming to Picardo Farm”:

“Same things about anything that involves a large group of people: other people can be irritating”.

However, in Picardo farm, the

vast array of activities and assets is able to engage a variety of citizens’ groups each one capable of bringing new energies, new points of view, new skill sets, and time, which participate in the creative problem-solving process. This explains why only 15% of survey responses mention “unfriendly” other gardeners, whereas 37% plebiscite the engagement of the gardeners and a strong level of leadership and activities programming (29%), though underlying the importance of a strong and motivated garden leadership group. In particular, the Children’s farm (fig. 5) is proving to be an interesting way to involve in the garden’s works younger families that could be crucial considering the issue of the aging of many urban gardeners’ groups.

“They (leadership team) always do a great job of engaging children and their families” (survey answer to “what do you like most” question”.



Figure 5. Picardo Farm: the children’s farm

CONCLUSIONS

Local social, economic, and environmental conditions can strongly influence the strategies that a community garden has to put at play in order to thrive despite the strong request for new areas for city development in dense urban contexts around the world. Moreover, urban agriculture can play a multiplicity of roles, some of which may predominate in specific territorial contexts. These considerations imply a certain degree of caution when considering solutions

that have proved to be valid in some projects as applicable to a different context.

Nevertheless, when a project like Picardo Farm thrives for several decades in a fast-growing city, finding always-new ways to approach the various issues that inevitably will have to be faced, there should be enough material for some lessons to be learned for other community gardens around the world.

Securing the land upon which the community garden will be developed has proven to be one important challenge.

A strong, even if lean, central administrative coordination is essential to provide the much-needed support to the local garden leaderships. Another essential role that public administration have to play is the one devoted to the building of such leaderships, helping to relieve some of the burden that these citizens are carrying, acknowledging the importance of their role and of the numerous positive outcomes for the local communities that are related to the presence of an active and well-cared community garden.

A multiplicity of activities carried out in the community garden can help in engaging various groups of people with and heterogeneity of ages, background and skill sets that can be crucial to always re-generate the local community instilling new energies.

Despite the importance of public administrations' involvement, a community garden goes as far as its leadership group is able to bring it. Therefore, the developing of a dependable, active and motivated local leadership group is pivotal to the durability of any project.

Conflicts tend to arise when people are worn out trying to face alone many issues that in some cases may overwhelm volunteers with no backup from the public administrations.

Providing a hub to refer to for many issues ranging from the

management of the waiting lists, to the removal of gardeners who do not conform to the common rules of behavior, to the delicate process of designing and developing new gardens or expansions or retrofitting of existing ones, seems to be a wise choice that can turn out, as in the case of Picardo farm, as an excellent investment by the city for the community of its present and future citizens.

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NOTES

¹ The term “Allotment” (A plot of land made available for individual, non-commercial gardening) is not used in the United States, where these garden plots are referred to as “Community Garden”, according to the Cambridge American English Dictionary. We will use this denomination for this paper.

Landscape Perception and Construction in Social Media - An Analysis of User-Generated Content

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ABSTRACT

Using social media data to analyse and classify the perception of landscape could become a way of integrating public landscape design and perception into planning practice. For example, social media data could be used to rate a landscape in a particular area. The main question posed in this paper deals with whether the analyses of photographs combined with geographic and textual information from social networks provides an insight into the perception of the landscape in relation to a given space. This also means analysing how “landscape” is visually communicated on social media through images and complementary materials like text elements. This contribution discusses the methodology required for this purpose.

INTRODUCTION

As there is general consensus that the public participation has the potential to enhance planning outcomes (TU Dresden, 2014), nowadays the question arises how much participation is reasonable for public without being overwhelmed (Stemmer and Kaußen, 2017). In landscape planning, social media is often seen as a platform for informing the public about planning activities but not activating people for participation. From another point of view there is a mass of data generated by user voluntary in social media, which are not explicitly disseminated to participation processes but could be used as a resource especially with

regard to landscape assessment in planning processes and decision making. These data could then serve indirectly as a public contribution and prevent overburdening of public in participatory processes. What is needed to make use of the data is a methodological and technical framework for a systematic analysis of available data.

The purpose of the presented doctoral thesis is to generate intersubjective statements about the perception of the landscape in relation to a particular space from social media data. Therefore user-generated photographs and related texts as well as spatial information harvested on social networks will be used. It is necessary to use qualitative and quantitative methods for evaluating the photographs (visual methods) with textual (content analysis) and geographical (spatial analysis using GIS) data from social media. Only in this way user-generated data can be used to gain knowledge about the motives, backgrounds and opinions of the respective users compared to a purely quantitative and spatial evaluation (Dunkel, 2016). Qualitative approaches are considered to be particularly suitable due to the subjectivity of the individual landscape experiences.

It can be assumed that explicit knowledge about the perception of the landscape by the public in relation to a concrete space can be obtained. As a result, important characteristics of the landscape can be identified and grouped by subject. Finally, within the studied spaces, landscapes should be identified, which are delimited from one another by a different perception (Council of Europe, 2012). The approach has the potential to make use of user-generated content in planning processes possible so that planners gain information about the perception of the landscape at an early stage without extensive participation processes. The amount of existing data from user profiles and the abundance

of evaluation possibilities against the usual participatory processes (survey, information event, etc.) form the main advantages of the developed approach.

SUBAREAS OF RESEARCH

Social Media as part of modern planning

Unlike traditional mass media such as newspapers or television, social media are not limited to one or a few forms of communication. Information can be transmitted over the Internet via video, text, audio and more. In addition to global coverage, it can also expand the target audience. The general exchange and dissemination of information by user of social media is one aspect. An unavoidable other aspect is the use of opinion forming and opinion enhancement, which can not only be positively affected by the simplified accessibility of social media and their reach. Interpersonal communication and opinion forming are subject to change. Social media have an immense impact on communication change. They have gained a large user base in a very short time and it enables the public to network and exchange with each other. (Machill et al., 2014) attributes to the social media “potentials for a fundamental change in the dissemination of information and opinions as well as the formation of opinions” (Machill et al., 2014, p. 72). Nine out of ten people in Germany using the Internet. More than three quarters of them were already users of one or more social networks in 2017 (Projektgruppe ARD/ZDF-Multimedia, 2017a) which reflects the immense breadth of participants in social media networks. The use of social media in Germany is also increasing (Projektgruppe ARD/ZDF-Multimedia, 2017b). Although the use of social media in current landscape planning is new, social media data and its use in the context of landscape planning research are becoming increasingly important.

Social media data includes a breadth of information that can be queried with little effort. This in the past had to be carried out through elaborate surveys.

Research on the analysis of landscape perception in landscape planning based on social media data still is at an early stage. There is some research on social media, that describes the methodical and technical framework for the evaluation of data from FlickrR (Dunkel, 2016)(Dunkel, 2016; Frias-Martinez et al., 2012; Montaña, 2018). (Frias-Martinez et al., 2012) did a research on how Twitter messages can be used to analyse a utilization of the city and landscapes at e.g. working hours, at leisure or at night. In particular, the biggest potential for landscape planning lies in the enormous amount of photographs, geographic information and textual elements such as descriptions and commentary available in content communities such as FlickrR, Instagram, etc. (Kaplan and Haenlein, 2010).

Landscape perception

The assumption that the perception of landscape by an individual is subjective is the basis for thinking about using social media data in processes of landscape assessment. This is now considered a scientific consensus (e.g. (Bromme, R. & Kienhues, D., 2014, 2014; Gobster et al., 2007; Ipsen, 2006; Kühne, 2013; Stemmer, 2016). In addition, the association of cultural and cross-cultural preferences of landscape characteristics is known (Bruns et al., 2015; Gobster et al., 2007). The construction of a landscape in relation to a space is formed by each individual through the arrangement of his objectives and the influences as a symbolic place. While experts try to describe the perception of landscape on the cognitive level, the perception of individuals to the society on the emotional-aesthetic level (Ipsen, 2006). The constructivist approaches to landscape show that this step cannot

be done by the valuations of individuals. The deviations of reality through emotional-aesthetic impressions weigh too high. In the case of issues of landscape image assessment or the rating of a landscape, it is more important to depict the reality of the affected system. In this case, the population that operates with the affected landscape as such. Regardless of its value preservation, the planner must understand the perception of the population and integrate it into their own actions.

Participation in landscape planning

From the perspective of experts, public participation is often understood as unidirectional communication. According to (Arnstein, 1969) the ideas and the opinion of the experts are “only” transmitted to the public, but a mutual exchange is missing. In 1978 Burckhardt describes planning as a communication tool to convey the relationships between politics, the environment and humans (1978). This communication process creates the engaged listener’s understanding and processing of arguments (Healey, 2003). Thus, the experts form the opinion of the public, whereas participation processes should actually reflect the opinion and perception of the public. Direct participation as a subset of participatory processes remains rare in practice, as there is a concern that participation in planning processes by the public overwhelms them and hampers planning. Investments can be very time-consuming, cost-intensive and thus have a deterrent effect on the planner. A demand for the participation of the public is interpreted differently and creates a large discrepancy between civic engagements, hunger for knowledge and actual participation offers in planning processes (Bock and Selle, 2013).

It can be summarized that Social-Media offers the opportunity to avoid overstrain by the public

unconsciously taking part in planning processes through the publicly provided data on social networks. Ideally, an opinion should be made available to the public as a basis for planning processes.

HYPOTHESIS

Within this essay some hypotheses with subordinate questions are set up that should be answered throughout the analysis.

1. New insights into the perception of the public in a given space can be gained and approaches for indirect public participation in planning processes can be found. The term “public” is understood to mean a “broad public” according to the public types of Arbter and Trattnigg (2005).
 - a. How can the analysis of photographs and text elements from social networks be divided into positive or negative assessed characteristics?
 - b. What prerequisites must data meet in order to gain insights into the perception of the landscape by the public in relation to a particular space?
 - c. What kind of additional knowledge can be gained?

Following on from the first research question, it is important to point out ways in which the analysis can be used methodically for planning practice.

2. Do the findings gain insight in order to meet the requirements of the European-Landscape-Convention (Council of Europe, 2012) and what can be learned about regional beauty, variety and the recreational value of a landscape, which are protected in the German “Act on Nature Conservation and Landscape Management” (Federal Nature Conservation Act -

BNatSchG)?

- a. What added value does the analysis offer compared to other landscape planning methods?
- b. Is the approach transferable to other regions?

METHODS AND WORKFLOW

Social Media Harvesting

As described the enormous potential of social media data is based on a huge amount of photographs, geographic information and text elements, such as descriptions and comments that are voluntarily generated by social media users every day. Taking advantage of this data has not yet established itself in landscape planning and landscape research, in contrast to other scientific disciplines. Decisive for the availability of this data are the general terms and conditions (GTC) and the respective social media. In most cases, user-generated content is free and publicly available.

For this elaboration, important data are photographs including metadata, geographical data and text contributions from the social network FlickrR (Yahoo!, 2017). This social network offers the possibility to sort photography by categories or tags and find images on a particular topic. Another advantage is the freely accessible application programming interface (API) to get direct access to the available data. In this purpose, the respective application programming interface (API) can be addressed on the software side in order to gain access to the internal database. The data available there can then be fed into a separate database. In order to keep an overview of the diversity and mass of the data, they have to be pre-selected for scientific questions and analysis.

In order to prepare the data for different analysis, it is necessary to store them in a database. For this purpose, a tool for geographic-information-systems is developed. This tool can filter

and harvest the desired data and stores it in a database automatically. The tool searches within a spatial extent for all available data of the social network FlickrR (it is conceivable that this also works for other networks with open accessible API). The spatial extent is variably adjustable in the form of a rectangle so that it can be adapted to different locations and individual needs. In order to concretise the query of data keywords (tags) are used. Each image published on FlickrR contains keywords such as “nature” or “landscape” to categorise the images. This feature will be used to get access to particular data. The keywords have a very important function and must therefore be carefully defined and selected.

Data Analysis

Which analytical methods can be used depends primarily on the quality and extent of the data obtained. Ideally, various aspects can be examined. The analysis can be divided into quantitative and qualitative analysis. The quantitative analysis deals above all with the distribution of the photographs within the given space. It is quite meaningful in which period at which place a certain number of photographs were shot. It can be assumed that different places are frequented at certain seasons. Based on the distribution, statements can be made about point of interest (POIs) and also distinctive locations can be identified (Montaño, 2018).

In addition to the quantitative analysis, the data can also be qualitatively evaluated on the basis of numbers of photographs in certain locations. For this purpose the triangulation for the evaluation of the photographs as well as the textual and geographical data is necessary (qualitative methods). Only in this way user-generated data can be used to gain more knowledge about the motives, backgrounds and opinions of the respective users.

EXPECTED RESULTS

Through the analysis of the data a characterization of the respective landscapes, highlighting the positive and character-forming elements of a landscape that correspond to the perceptions of the public seems possible. The analysis should gain insight into public landscape perception within a certain space. In order to meet the requirements of the European-Landscape-Convention (Council of Europe, 2012) on how to analyse and protect the characteristic features of a landscape and how to “enhance, restore or create landscapes” in planning processes the data must be used. Particular characteristics might also be exhibited. The added value of insights allows an intersubjective assessment of the landscape. We can also learn more about regional beauty, variety and the recreational value of a landscape, which are protected in the German “Act on Nature Conservation and Landscape Management” (Federal Nature Conservation Act - BNatSchG). The quantity of data might vary from region to region as well as the quality of written contributions. In combination, the analysis of photographs and geographic or textual information from social networks provides insight into the perception of the landscape in relation to a given space.

CONCLUSION

The analysis and classification of perception of landscapes through social media data has the potential to become a method to integrate public landscape construction and perception in planning practice. The evaluation of the landscape in a given area will then be supported by the use of social media data. To introduce a method for planning practice further research is needed. Especially it is necessary to identify quality standards for the data

sets in order to carry out continuous and comparable analysis in different regions under similar conditions. Also the development of landscape perception over time should be included in further investigation.

At the current state of the ongoing research only assumptions about the quality of the available data can be made, thus it is not yet possible to give detailed information on the qualitative methods to be used. First insights into landscape perception in social media of the investigated space are expected this year. Details on the methodology of the approach will be presented at the ECLAS 2018.

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Unlocking Interstices: Multiple Lenses Enriching the Participatory Design of Urban Leftover Spaces

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Leftover space, interstice, site specific, design transformation, participation design

ABSTRACT

Opening leftover spaces for the participation of local initiatives is prevalent in current urban design practice. While these cases reanimate the vacant land for diverse public appropriation, little attention is paid to the inherent qualities of each site. As terrain vague in the urban territory and as ‘intervals’ of urban transformation, leftover spaces can be valued for their indeterminacy that allows co-existence and open interpretation. From this perspective we might question if a design that simply transforms a leftover space according to a single social perspective, is truly responding to the space’s potential. In this article we plea for understanding multiple qualities of leftover spaces in their interstitialness, before the entering of the design. It is from such a mindset that the design could engage the continuity of the place, and initiate a transformation that accommodates, orchestrates and encourages what is embedded in the existing. Specifically, we propose four lenses: the morphological, social, ecological and material lens. The four lenses will be illustrated by a temporary urban vegetable garden PROEFTuin (Delft, NL), implying what might be overlooked in its design transformation. In the end we will discuss how this approach could open up for the participation of leftover spaces: by juxtaposing different lenses, the design invites the potential use while simultaneously triggers the perception and imagination of the place. It is because of this a bond with the place is nurtured and the continuous appropriation of the site could take place.

INTRODUCTION AND STUDY APPROACH

Funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the German Nature Conservation Agency (Bundesamt für Naturschutz BfN) contracted a research consortium¹ to conduct a study with two objectives; first to design scenarios for the development of renewable energies and, second, to learn more about landscape effects of renewable energy projects. Findings of the project would become part of discussions on future national policy as well as future legislation. This paper reports on findings from the landscape effect study. The majority of renewable energy production is and will continue to be from wind- power. People take note of environmental and landscape effects of wind turbines. Interests includes fauna, such as the conservation of wild birds and bats, and landscape, such as the protection of local character and scenery.

The study of landscape effects takes scenarios as starting points. Scenarios for placing wind turbines include all of Germany. Scenarios consider economic aspects and optimize, among other issues, the best locations for generating energy by wind turbines, according to average wind speed and strength, and the proximity to places of energy demand. Scenario design is based on the national network development plan called *Netzentwicklungsplan* (Bundesnetzagentur 2017).

TRANSFORMING VACANT SITES ‘TOGETHER’

Involving citizens to co-create public spaces has become a popular phenomenon in contemporary urban design. Particularly in leftover spaces—because of their temporary ‘emptiness’—these participatory projects are likely to take place. The temporary vegetable garden



Figure 1. PROEFTuin, before and after the design transformation. Picture by Rutger Spoelstra.

PROEFTuin in Delft is such an example (Fig.1). The users like the garden; it is a green space that sticks out in the surrounding environment of industrial warehouses and apartment buildings. However, upon entering the garden one can hardly find it is an intriguing place, as it is similar to other urban agricultural gardens: a collection of cluttered planting beds, boxes and agricultural facilities. The functional approach to the design subordinates the spatial qualities, resulting in casually placed different programmatic components. Visitors who enter the garden as ‘outsiders’, may hardly be able to orient themselves or attach to the place, nor would they stay in the garden since it doesn’t cater for other forms of activities. Two years after its opening, the garden was removed for a future housing project. Although the fate of the garden was largely decided by the development authorities, it might also relate to the design: the design merely considers itself a temporarily fill in the short break of the site’s transformation, without any intention to project itself into its long-term trajectory. In other words, there were not much efforts to include the design in the future planning of the site. Looking back at its ‘leftover status’, as a space with a thin layer of grass open to various way of using, the design transformation animates the social practice of the space, but simultaneously closes it into a new

form of fixation of a limited social group (who cultivate here) as well as a limited temporality (in its leftover period).

The case of PROEFTuin is a common example for current participatory design practices such as urban catalyst (Oswalt, Overmeyer and Misselwitz, 2013) and urban acupuncture (Casagrande, 2014). Besides the merit of such designs that tests out the site’s social potential, the story of the PROEFTuin also exposes the conflict between the design’s definition and the openness of leftover spaces. This paradox leads us to reflect whether some design thinking is unaddressed.

SPACES OF OPENNESS

In order to explore the missing design qualities, it is essential to first understand what are leftover spaces and why they might be valuable for the city. Ignasi de Solà-Morales’ conception of ‘terrain vague’ serves as a portal that guides us to the particular conditions of leftover spaces: as in-between spaces on the urban territory but outside the urban functional system, ‘foreign to the urban system, mentally exterior in the physical interior of the city’ (1995: 119).

Leftover spaces can be abandoned sites, undefined margins or empty plots. They emerge as their original function is lost or when different urban developments leave

them in-between, as spatial and temporal interstices of the city. In their neglect the traces of former urban occupation slowly fade away, which further constitutes an ambiguity that opens up to spontaneous natural processes and human practices. They are spaces for mixed urban (human and non-human) dwellers to coexist, offering room for diverse, informal public or non-public activities (Cupers and Miessen, 2002), enabling ‘forms of inhabitation that disrupt the logic of urban development and provide social and ecological prospects otherwise unavailable in cities’ (Foster 2014: 125). Likewise, there is an ambiguity in the interpretation of the place, for the established linkage between signifier and signified is blurred by the unfamiliarity of the site. As Tim Edensor pointed out: ‘The sensations and objects that haunt are signs denoting nothing that can be pinned down’ (2005: 836); and Luc Levesque noted: ‘the interstitial condition to the phenomena often undecidable [...] as for the perception of form and the general decoding of the environment’ (2002a: 24). Because of the programmatic and interpretational openness, the future trajectory of the site is unknown. Such a string of present and future indeterminacy, beyond one’s expectation, un-planned and unpredicted, offers valuable alternatives complementing our existing cities controlled by a well-designed functional system.

DESIGN FROM MULTIPLE LENSES

According to Christophe Girod, the design process starts with four steps: ‘landing, grounding, finding, founding’, exposing the designer to various specificities of the site (2009). If a situated reading of the place is fundamental for landscape design, then leftover spaces should never be read from a single perspective,

since that would erase other qualities nurtured in such interstitial conditions. For example, foregrounding a social group’s requirement while overlooking other potential uses as well as other spatial and material characteristics of the space. In order to allow design to engage with the indeterminacy of leftover spaces, we propose the design reading of leftover spaces from multiple perspectives and especially emphasize those qualities particular in the interstitial conditions. To enhance this multiple reading of interstitial qualities, we explicitly elaborate four lenses, addressing the social appropriation, the spontaneous ecology, the residual form and the unfamiliar materiality of the existing leftover space. These social, ecological, morphological and material angles are embedded, and frequently applied in our field of profession. They provide the initial channels that guide a designer understanding a leftover space, but never validate themselves as the only possible way of reading.

To further illustrate the concept of multiple reading, we will re-examine the PROEFTuin through these four lenses. Thus exposing potentials and design possibilities of leftover spaces, the discussion intends to indicate missing angles in its design and open up the notion of design through multiple perspectives.

RE-READING PROEFTUIN

Reading the social appropriation

The social lens is derived from praxeology, which studies human action and conduct, focusing on how people interact with the space – the way they inhabit and use the space, as well as the changes they further deliver framing and re-constructing the space (Riesto, Braae and Avermaete, 2018). Geographically and socially interstitial areas give a sense of hiddenness and freedom, free to be used by any citizen, also those who live in the margin (M. Thrasher, 1927:22). They open to



Figure 2. Current activities taking place inside the garden—the majority is setting under the agricultural theme, leaving little spaces for other practices. Draw by author.

various uses, as alternative spaces for those everyday informalities that are not met in designed public spaces with their specific behaviour codes. This temporal, marginal and informal dimension of space embodies the 'lived space' constructed by everyday practices, resisting the dominant image of the city that is determined by programmatic requirements (Lefebvre 1991:39).

The PROEFTuin belongs to the railway project 'Spoorzone Delft', since 2012 waiting for housing construction that is supposed to start in 2019. In 2014, the social initiative group Groenkracht proposed to use the site temporarily as allotment gardens. In order to involve the surrounding stakeholders and residents the design team (architect Rutger Spoelstra and permaculture consultant Taco Blom) organised several meetings to deliver input that was then translated in the plan of the garden (Stichting Groenkracht, 2016). In 2015, the garden was opened to the public. People who made subscriptions of a plot and gardening volunteers can work in the garden while also allowing other visitors. The transformation of PROEFTuin opened the site for users, but then framed it in the form of gardening practices. Related activities such as educational tours, festival gatherings and out-door yoga took place occasionally. Although designed with a participatory process,

it is not equally inclusive for different social groups. For example, a proposal from the Turkish community to add a play area in the garden was not incorporated in the design but resulted in a simple and small playing area outside (Fig.2).

Reading the spontaneous ecology

A second lens which studies the agency is the ecological lens. Ecology addresses the interrelationship of organisms and their environments. Specifically, it identifies habitat conditions, biotic communities and ecological processes of the site (Riesto, Braae and Avermaete, 2018). Reading leftover spaces through an ecological lens is to discover spontaneous ecologies that evolve without intentional human interference. A further consideration may be given to what network might be completed because of the small spots that substantiate certain potential connections (Müller, 2013). A site might be seen as the habitation for species losing their habitat in the city, but also as a migration passage for wild fauna from the city to surrounding rural area (Foster 2014:127). Maintaining such shelters for wildlife not only means to enhance biodiversity, but their presence reflects mankind's management of urban nature. As argued by Steve Hinchliffe,



Figure 3. Inside the garden there are traces of wildness, but its dynamic still contrasts with the unbounded wildness growing on the adjacent leftover earth pile. Draw by author.

the current ecosystem is manipulated by human-centred relationships, however the presence of non-human forms of life is equally crucial for urban livability: ‘urban livability involves civic associations and attachments forged in and through more-than-human relations’ (Hinchliffe and Whatmore 2006: 137).

In the design of the PROEFTuin, the original thin layer of grass was removed from the site and new soil was added to make the garden. The design was made according to permaculture principles that have a potential to incorporate wild life. The PROEFTuin, in some ways, initiates the growth of a natural ecology but also limits its evolution in the long term. What this ecology could be is illustrated in the leftover space next to the garden (also as a part of the railway project) where the wild vegetation now fully flourishes after two years of spontaneous growing. (Fig.3)

Reading the residual form

The lens of morphology concerns the form and structure of the site’s geography, the cultural landscape and the urban composition (Riesto, Braae and Avermaete, 2018). Reading leftover spaces from this lens is to identify the residual geometrical and spatial characteristics of the site. What are they and where do they come from? The form of

leftover spaces is not self-defined but a consequence of their surroundings, the by-product of the city’s transformation. As Stephen Bann writes ‘disjointed and freed from the conventional and utilitarian constraints of the compact city but at the same time integral to their spatial and visual structure, derived from its very form (2003: 110). Further it is to ask what is the topographical context of the site? How do geometry and spatial form refer to the site’s abandonment? And how does the single leftover space relate to other interstitial spaces, possibly forming an internal logic of openness? Art and architecture avant-garde group Stalker saw in the network of leftover spaces a new mental image of the city, like an ‘archipelago’ that consists of floating islands with the empty spaces in-between (Francesco, 2003). Besides the meaning of these residual forms, these interstices are also physically the empty containers that open up to all inhabitants of the city, as the alternatives of the regulated spaces where ‘the foreign matters tend to collect and cake’, to ‘reinvent the city by inhabiting it differently’ (Lévesque 2002b:29).

The geometry of the PROEFTuin has been decided by an industrial 19th-century tramline. The enclosure by the tramline and the main road determined the irregular form of the site. The design only partly follows this

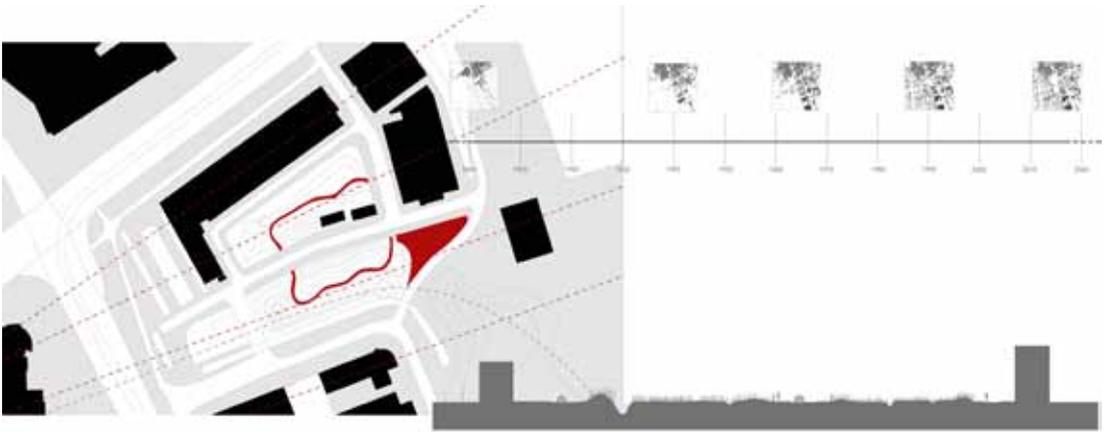


Figure 4. The layout of the garden follows the standard of agricultural production while the logic of the surrounding urban composition is rather unaddressed. Draw by author.



Figure 5. The dense vegetation inside the garden recalls a sensation of being in a secrete oasis. However the perception of the place is later limited to an ordinary vegetable garden, recognizing little uniqueness of the site. Draw by author.

compositional framework of the site. The agricultural plots are located in the centre, surrounded by affiliated functions and leaving the margins unkempt and gradually occupied by wilderness. The design intended to make a circular route to connect the two parts of the garden that are divided by the urban road running in-between. However, only part of the route follows the compositional logic of the surrounding buildings, where the other is shifted from the axis offered by the buildings. Loose wood poles connected by a thin string of wires roughly define the boundary of the garden to the road in-between, while other boundaries are made by earth piles, hardly related to each other or elaborating the relationship between inside and outside. (Fig.4)

Reading the unfamiliar materiality

The material lens interprets the characters and meanings of the material world. It relates to the study of perceptual experience in its purely subjective aspect, and the signs and symbols, revealing the interpretations triggered by specific objects (Riesto, Braae and Avermaete, 2018). Looking into leftover spaces, the material lens focuses on the physical world that is characterised by their unfamiliarity. Being outside the urban system, no longer belonging to the organization of the city and maintained by their functionality, the material world of leftover spaces presents an unkempt, wild, and ruined image. The things in leftover spaces are detached from their familiar context, creating confusion in



Figure 6. Dalston Curve Garden, London. After the design transformation, the previous linear interstitial space opens to wider social groups and practices. Picture by Chelsea Jade.

the established epistemology and thus forcing the visitors to encounter the site with the perceptions from their body. As Edensor pointed out: ‘the things are always enmeshed within specific cultural contexts and embody particular histories’. Leftover spaces are where people can unlearn the conventional meanings of things, releasing new interpretations beyond their assigned cultural and historical background (2005: 99).

The materiality of the PROEFTuin is dominated by the green of crops and wild vegetation. Some pieces of garden furniture could also be found in the site, such as a working table, compost and nursery boxes. The green space is detached from its surrounding, however, one can hardly experience it because of its image similar to any other guerrilla garden, non-specific to the location of the site. Entering the site from the surrounding industry, office buildings, housing and railway construction site hardly offers an experience that expresses the specificity of garden in this urban context. (Fig.5)

A CASE PLAYING WITH MULTIPLE PERSPECTIVES

As we start to imagine the missing perspectives in the PROEFTuin, another community garden—Dalston Curve Garden—could enrich our design thinking because it reads and designs with the leftover site through more than one lens. In 2009 this linear interstitial space was opened to the public by the research-experiment project ‘making space for Dalston’ (Muf Architecture and J&L Gibbons, 2013). The design process involved multiple stakeholders and communities and residents in its process, which ‘never stop with satisfying a single social group’. The garden, designed by J&L Gibbons, was built with elements of an open pavilion, planting boxes, and native species trees and shrubs (Fig.6).

Compared with the PROEFTuin, Dalston Curve Garden invites a broader range of visitors: the garden is a communal garden but open to everyone. In 2012, due to the end of funding, a café was opened by the garden committee. The small catering



Figure 7. The changes took place in the garden until 2018, after three years of use. Draw by author.

programme further attracted more local people to visit the site, doubling the number of its visitors. It is now regarded as a gathering place and a green oasis hidden in the bustling Dalston district.

Linear elements encourage people to move through the place, echoing the linear shape of the site. The trees provide a 'roof', but won't hinder its transparency. Here the agriculture activities do not serve as a goal of practices, but provide occasion for interaction and working collectively. To the end of the site, the design creates an opening as a mini theatre or for playing, filtering the lively social atmosphere in the previous areas and emphasizing a hidden and tranquil character. The central image of the garden is made by green vegetation, similar to the PROEFTuin, but elaborates on its arrangement, offering the experience of lushness and refreshment. Different signs, such as 'keep cities wild', and different domestic materials are placed in the garden, adding it an extra layer of local culture and everyday.

ARTICULATING THE SITE, NURTURING OPENNESS

For both gardens, the design focus was on social practices while certain spaces are intentionally left or created for wild flora and fauna. However, the

composition of Dalston Curve Garden adds more expression to the multiple context of the site, transforming the previously neglected plot into a place open to local people and to be experienced and interpreted by its visitors. Its formal articulation—emphasising the linearity of the space, adding a new enclosure and creating a spatial sequence that gives expression to the historical rail line—encourages the visitors to imagine the uniqueness of this place and the narratives that reside here. The design opens up for interpretations of the site where the individual can formulate their own understanding of the place, which makes it easier to feel connected with it. This is not different for the prescribed users of the garden, and those who are 'outsiders', casually visiting the site. In line with this we might imagine the articulation of spatial, formal design as a tool that permeates the 'enclosure' of the design, opening the space for wider public, and as a trigger and a frame for unexpected future transformations, meanings and uses.

Further tracing the process of PROEFTuin after the projection of design, we might find some interesting emergences. The everyday use of the vegetable garden gradually loosened the design scheme, some objects were brought to the site by individual users, and the inadequate growing needs let many area to be re-occupied by wild plants (Fig.7).



Figure 8. Jardins du Tiers-Paysage (gardens of the third landscape), Saint-Nazaire. The design keeps the site's indeterminacy through magnifying nature process. Picture by Shuki.

Although the richness of this wild nature might be appreciated, it can hardly be related to the story of the garden (as a public agricultural site) or in other words, seeing them as meaningful part of the place. The initial formal design is too weak to frame what might happen and how they relate to the site. From this perspective, Jardins du Tiers-Paysage (gardens of the third landscape) in Saint-Nazaire's submarine base of Saint-Nazaire (Gilles Clément, 2009) provides a comparison (Fig. 8). The design intentionally keeps spaces for a spontaneous evolution of local ecology, but the form of the space is elaborated according to the character of the submarine base. The emerged landscape tells the story of the site; a link between visitors and the site is enhanced by this newly growing wildness.

TOWARDS AN OPEN-ENDED TRANSFORMATION

Multiple lenses provide an initial framework for designers to read the site, exposing the specific qualities of a leftover space. The essential value of such a reading frame is not about which lens is brought into play, but diverging the attention of design to emphasise different perspectives, from where the indeterminacy of leftover spaces can be understood and nurtured. The quality of leftover spaces is not only about what is there now, but what its possible becoming.

However, reading through multiple lenses only serves as a first step to engage with the indeterminacy of leftover spaces. With understanding multiple site-specific qualities, and identifying the future potential, specific design transformations that enable the appropriation of human as well

as non-human agencies are still required, to make the site-specific qualities explicit while at the same time responding to and enhancing the indeterminacy of leftover spaces.

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Public Participation in the Road Landscape Planning

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ABSTRACT

The road landscape is becoming a topical question in Latvia. The road landscape has many owners; design and planning influences various stakeholders and the general public and can be addressed at different planning levels. It is important to find ways to communicate and present ideas which are easy to understand by all involved parties. Three dimensional (3D) visualisations offer a possibility which can be used in the communication process with stakeholders. The aim of the paper is to demonstrate the use of 3D modelling as a tool for raising awareness as part of stakeholder involvement and public participation in road landscape planning. The project consisted of 3D modelling of road landscape design options for a one km long section of a major road in Latvia and interviews with two reference groups. We produced a 3D model of the current situation and two design options, from which three animations were developed. Results of reference group discussions showed that the animations are realistic, landscape changes are presented in an understandable way for both landscape architects and people from other specialties unconnected to landscape architecture and that they have potential to be used for wider public consultation in order to present road landscape changes.

INTRODUCTION

Road landscapes often present the first impression of a country to tourists and are important resources for place

development according to the Latvian Landscape Policy Guidelines (Ainavu politikas..., 2013). There is interest among certain parts of society and among landscape architects and planners in the road landscape issues in Latvia but there is no clear methodology or approach on how to deal with road landscape problems and the loss of landscape aesthetic quality. Previous research has shown that views from the Latvian roads form chaotically; objects with historical and cultural value, long distance scenes and open landscapes are disappearing from the view, mainly as a result of the growth of road side scrub and afforestation or forest colonization of roadside fields. This has led to a decrease in the road landscape quality in Latvia (Vugule, 2013).

Design and planning of the road landscape – or lack thereof - influences various stakeholders and the general public and can be addressed at different planning levels. The actual road landscape we see when travelling depends on decisions and plans made by many parties.

The main recent influence on the road landscape outside urban areas comes from road reconstruction work which has increased in recent years due to the need for upgrading roads, improving road safety and accommodating increasing traffic intensity. Very few new major roads are being built. Road reconstruction projects generally include a road protection zone extending up to 100m distance from the centre of the road on each side depending on the road significance (Aizsargjoslu likums, 1997).

The road landscape corridor, including objects visible from the foreground to background, is considered to extend to between 1 and 2 km from the road axis depending on the topography, degree of cut and fill and other factors (Slēde and Vikmanis, 1980). Its appearance depends not only on road infrastructure and actions right at the edge of the road within



Fig1: Adazi municipality, Gauja street visualisation (Dienas bizness, 2017)

the zone owned by the highways authority, but also on the wider territory beyond, owned by many land owners. In cases of road reconstruction, land owners have the possibility to evaluate the foreseen changes when an Environment Impact Assessment of the project is carried out or when the local municipality has anticipated a public discussion of a project due to important aspects. According to Latvian legislation all involved parties can examine the Environmental impact assessment report and take part in the public discussion (Ministru kabineta..., 2015). The global practice of involving the public in planning has long history generally but is currently far less well-developed as a practice in Latvia.

In Latvia the practice of public participation in planning started to develop after 1991 when the state regained independence. From discussions with road planners we find that levels of public participation in Latvia are low. Public discussions about road development projects only take place in cases when the route of the road is expected to change or when cutting of large trees close to the road is foreseen. Public discussion is obligatory only in cases when Environment Impact Assessment of the project is carried out. If it is necessary, then a local municipality can anticipate a public discussion of a project due

to important aspects. Information which is prepared for such public discussions usually includes layout plans, technical drawings, including detailed technical plans for construction, sections and other materials not very easily understood by non-experts. Visualisations of the planned changes are rarely presented. Research shows that obstacles to effective public participation in Latvia include the inertia of society; there is a lack of belief within society that participation can actually change something. Citizens only show interest in cases which directly affect their own interests (related to their ownership or the neighbourhood itself). The other reason often mentioned is a lack of skills and knowledge by many organizers of the public participation process itself (Litvins et al., 2008). The success of the procedure depends on activity by municipalities responsible for the implementation of public participation and the way in which new projects are presented. In this paper we address the issue of presentation materials.

Specialist like road engineers and landscape architects are trained to understand two dimensional project plans. Other people frequently have difficulties in reading such plans and understanding how proposed changes – views, trees, road infrastructure elements etc. - would look and how it



Fig2: Model of the first scenario



Fig3: Model of the second scenario

would change the landscape. Studies confirm that people perceive visual information about landscape design and planning in three dimensional (3D) visualisations better than text and regular maps and that 3D visualizations are especially useful for collaboration involving untrained people in community decision making (Bishop,

2005; Hassan et al., 2014; Kwartler, 2005).

As improvements in planning can only be achieved through discussions and cooperation, it is important to find ways of communication and idea presentation, which are easy to understand for all involved parties.

In Latvia it is reasonably common

to use 3D visualisations for design projects for smaller projects: cityscapes, gardens and squares. There are very few cases when a model of a road landscape has been presented. The best known recent example is Gauja Street in the town of Adaži, where visualisations were developed in order to demonstrate the proposed road design project to local citizens (Figure 1). This is not, however, presented as it would be seen by drivers – it is not the roadside landscape which is featured but how the road would generally appear.

Visualisations of large nature areas with the aim of showing the changes to the landscape are not common. The aim of the project reported here was to demonstrate the use of three dimensional (3D) modelling as a tool with potential for improved stakeholder involvement and public participation in road landscape planning.

MATERIALS AND METHODS

A section of the major road A7 in Latvia was used for the field study. This road is an important tourism route connecting the three Baltic States with Europe.

There are three main landscape character types based on land use/cover found in the Latvian countryside – the landscape dominated by agriculture (which maybe on flat, undulating or hilly landform), another dominated by large-scale forest (also on the three landform types) and the most diverse, a mosaic landscape of forest and farmland, most frequently found on the hilly landforms. The pilot project was carried out along the section of open, mostly flat agricultural landscape (Bel and Nikodemus, 2000). The field work and model development took place between September 2017 and February 2018. Depending on the success of this pilot testing, it is planned to develop 3D models for examples of the remaining two landscape character types. The

road landscape corridor to be analysed and modelled was considered to extend out to 1 km on each side of the central axis of the road according to the practice of road planning (Si de and Vikmanis, 1980). The chosen section is thus 1 km long and covers 2 km² in total area.

Three road landscape design scenarios were developed, based on the current topography, agricultural land use and development possibilities, the differences between each being a variation of the intensity of the use, management and application of road landscape design principles.

- The first scenario shows the current situation of an agricultural landscape consisting of cereal fields crossed by drainage ditches filled with overgrown shrubs and trees, the current road infrastructure with information signs, a bus stop, electricity lines and existing dwellings with their surrounding yards and trees.
- The second scenario shows a more open, well-managed landscape with intensive agriculture, with no shrubs in the ditches and providing wide and distant views. The current road infrastructure with information signs, the bus stop, electricity lines, the same dwellings with their surrounding yards and old trees are present in the model. There are minimal, regularly cut edges along the fields. A row of willows along the road next to a farmstead has been removed on the basis of the current practice of tree row cutting along major roads.
- The third scenario represents a well-managed agriculture landscape with more tree groups present, placed according to road landscape design methods at T-junctions for traffic guidance



Fig4: Model of the third scenario

(Дзенис и Рейнфелд, 1968). Edges along the fields are 20m wide according to EU greening regulations. The current road infrastructure with information signs, the bus stop, the dwellings with their surrounding yards and old trees are also present in the model, while electricity lines have been placed underground. The row of willows along the road next to the farmstead has also been removed as in the second model.

Sketchup software with several programme extensions was used to build the 3D road models from the new topographic map. Lumion 8 was used to add trees and to render the landscape. The program was chosen because of the realistic model presentation, the possibility to work with large number of plants on an extensive area and a fast rendering time when compared to similar programmes. There were limitations in the plant species available for the models – this may or may not affect how people perceive them depending on how easy it is to recognise them while passing through the landscape at speed.

As speed and movement through the landscape are important factors in road landscape perception (Bell, 2008), models were developed as animations, where the viewer travels along the road at a speed of 90 km/hour (the legal maximum speed limit in Latvia) and observes the landscape from 1.1 m above ground level (which is the average eye level of a person travelling by car). We believe that it allows an evaluation of the perception of landscape changes more precisely and accurately.

Animations of the three models were presented to two reference groups. One group consisted of six landscape architects and four landscape architecture students. Eight of them are frequent drivers and two are more often passengers. The landscape architect group met together and the interview took place in a form of a group discussion. The other reference group was of eight people from other fields unconnected to landscape architecture. All of them are regular drivers. Discussions and observations were recorded, noted down and analysed later.

RESULTS AND DISCUSSION

The results of the reference group discussions can be divided into three aspects: reflections on the landscape quality and perception; on technical details and problems of the modelled animations and on road landscape design suggestions. While it was not specifically requested, the landscape architects could not help but express their ideas on how to improve the landscape design. These last two points are not discussed further, as they are not relevant for the public participation issue.

Both respondent groups agreed that the animation of the current situation represents a typical agricultural landscape in a realistic way. They could recognize plants and trees as being typical of an agricultural landscape. One person who frequently drives along this road recognized the section in the model.

Respondents described the landscape as open, ordinary and not very interesting. One scene from the model of the current situation and two modelled situations are shown in Figures 2,3,4. Differences in the animation are better noticeable than in images. Road landscape can influence driving safety and a boring landscape can be dangerous over long distances (Дзенис и Реинфелд, 1968). This is one important reason why landscape design should be applied in rural areas.

From the discussions and observations of the reference groups it was clear that viewers generally look straight ahead and notice elements adjacent to the road and in front of them. Respondents did not notice changes in the landscape at the sides of the screen. It confirms the principles of viewer perception along roads developed in Appleyard's early studies of road landscape perception from as far back as 1964 (Appleyard, 1964). This is a potentially limiting aspect in the use of animations shown on a flat screen.

In the case of a real time model, where a person can move through the model and turn in any direction, it would be possible to see the designed changes in the landscape much better – but also to experience the fast parallax movement which makes looking sideways at a roadside at speed difficult and uncomfortable. Elements of the model which were further away from the road axis - at 800 m to 1 km distant - tended to remain unnoticed by respondents. A demonstration of a real time model for use in public discussions would be more time and resource consuming to create, but for projects with complicated problems could be more suitable.

The discussions showed that drivers tend to notice objects on the right side of the road better and they look at the right side more intensively (is this a feature of the side of the road driven on in Europe – it may be the opposite in eg the UK?). One of respondents stressed that she cannot manage to read the road signs properly – not due to her eyesight but due to the relatively small size of text used on Latvian road signs (there are text size standards used in other countries for different roads with different normal speeds or speed limits), and also because of the light – backlit signs are difficult to read in bright conditions. This situation appeared due to the modelled light conditions on the road.

Almost all respondents preferred the third model as the most interesting landscape due to the wide edges of the fields with meadow flowers, which made the landscape more attractive aesthetically. Two of respondents were concerned about safety, suggesting that flowers can attract attention away from the road. One of the landscape architects raised the question of seasonality in the road landscape and it was discussed how the public should be made aware of proposed landscape changes in other seasons besides summer.

Removing the willow trees in

the second and third model was perceived negatively. Respondents from both groups considered them as positive elements which help to denote the space and make the road more interesting. Society in Latvia is very sensitive to cutting down roadside trees and there have been heated debates and protests in cases when it is removing old alleés and rows of mature trees is proposed. Trees, especially old oaks, have a historical value in the Latvian countryside. Modelling of possible solutions could help the institutions involved in the decision process to understand the visual changes and to present them in public discussion.

Several respondents noticed the disappearance of the electricity line. In the discussions they admitted that they noticed the electricity line in the first two models, but did not notice that it had disappeared in the last one! It seems that positive changes are sometimes accepted without noticing them.

From the reference group discussion we may conclude that the Lumion computer program is suitable for modelling rural conditions, even if we had problems with a limited wild plant library – no one criticised the models for this fact. It is possible to achieve realistic results and to work on large areas using thousands of plants (as claimed by the program producers) and to communicate the project to a client or audience (Lumion 8..., 2018).

Modelling and visualisations of road landscape in rural areas has the same importance as visualisations of the city environment but has different challenges – especially the scale involved. It is time consuming and might not be necessary for all road projects, but it is possible and valuable in more important or sensitive situations. Results of the project show that it is possible to present changes to a road landscape in a rural area to the public in a way that people can understand and recognize possible changes and to express

their opinions. This can be a way to improve the public participation and help to communicate possible plans to all parties involved in road landscape planning.

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Conflict as a Driving Force in a Bottom-up Creation of Public Spaces within Urban Cultural Landscape in Europe

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ABSTRACT

The creation of the surrounding landscape is a complex process of different forms, functions and meanings. While creating the landscape, humans develop different values, such as place attachment or community spirit. However, the bottom-up creation meets many obstacles from the side of decision makers. This creates tensions and conflicts. Some of them occur at the beginning of the process, appear as a reaction on a negligence on the part of the authorities – lack of space to act, decaying of historical spaces, lack of maintenance and development of an “urban gaps”. Obstacles may also appear after a bottom-up development of the place, as a reaction to the abolishment of the space, which previously abandoned has been developed by citizens from bottom-up way. On the example of 17 European case studies, the authors look closer to the role of the conflict in bottom-up landscape creation, the sources of conflict and its impact.

INTRODUCTION

Everyday creation of the surrounding landscape is a natural behaviour of humans, which build it according to their needs and preferences. This inseparable connection and relationship between culture, man and the landscape is reflected in the concept of the “cultural landscape” (Bernat 2011),

which is indwelled and built by people (Heidegger 1997) to adapt it to their needs and preferences and express their values (Tuan 1987, Gawryszewska 2013). It is demonstrated by the theory of three dimensions of places, namely: form, function and meaning (Rylke 2011) or structure, action and image (Van den Brink et al. 2017, Kuhlmann and Prominsky 2007). Following this logic, it is not only about tangible elements and functions but also image (meaning), which is “about perception, symbolism and the communication of content of the landscape” (Van den Brink et al. 2017: 15). A similar situation can be observed in the urban landscape, where “the gardener” may be a person or a local community of active inhabitants, and “the garden” - an open space in the city. However, because of mostly top-down and vertical type of decision making processes, this was almost impossible. “Big” ideas of architects, urban planners, politicians and developers were defining urban landscape. However, as an example, or maybe even a beginning of changes, one of the most influential and ground-breaking conflicts between Jane Jacobs and Robert Moses may be recalled. Following that, many bottom-up initiatives have been created. Additionally, new ideologies such as direct democracy and new liberalism together with recognized problems of poor quality public spaces, lack of finance, poor management, lack of community input, social injustice and lack of access to cultural outlets have inspired inhabitants to start looking for alternatives. The alternative could be a piece of land, where people can gather together and create it according to their needs and believes. Consequently, different types of public spaces: community gardens, plazas or even parks have been created. For the purpose of this research we call them “new urban autonomies” or “bottom-up created public spaces”.

In the present paper the authors

focus on chosen case studies from Europe. The aim is to look closer into aspects of conflict in a process of creation of these places, and to answer the following questions:

- Is the conflict a “motor for changes” in the bottom-up development of a public space?
- What are the motivations of inhabitants to stand for the land and develop it?
- What kind of impact does the conflict have (on the space and its users)? How does the conflict influence bottom-up creation and functioning of public spaces?

MATERIALS AND METHODS

The present paper uses an interdisciplinary approach. Two disciplines come together: landscape architecture and urban-sociology. As the theoretical base for the study we took Bruno Latour's (Latour 2010) idea of the complex of the surrounding landscape, which consists from different actors: human and non-human (environment, architecture, ideas, etc.)¹. Our approach is an answer on Henri Lefebvre's “Right to the city” paradigm, which calls to describe urban landscape as a complex system, consisted from different layers (Lefebvre 2012).

The starting point and at the same time the basis for the research has been the case of Osiedle Jazdow in Warsaw. This is a wooden houses settlement located in the centre of the city. Houses were originally constructed in Finland, then given to the USSR as a war repatriation and after that were sent to Poland. The concept of their architecture is based on easy transportation and construction of modular parts. Therefore, they were a good (quick and cheap) solution for inhabitants coming back to the city after the war (Augustyn et al. 2018). Within the following years, due to the construction of roads and embassies, the area of the settlement

was progressively reduced. Some of the houses have remained inhabited, while the empty ones were taken over by different NGOs. When in 2011 the municipality of central district of Warsaw decided to abolish Jazdów, the group of inhabitants and activists started to protest. Nowadays, fifteen houses are managed by NGOs, seven are communal houses, one is a public institution (culture house) and four are empty. However, as the future is still unclear, this situation is changing from week to week. On one side as researchers, on the other as active members and users of the settlement, we have an opportunity to follow this changes “from inside”.

Jazdow Settlement was a kind of lens which allowed us to understand how bottom-up created public spaces work. Within the grant „Creating a community management model for Jazdów Settlement” founded by European Cultural Foundation, in the interdisciplinary team of activists we have collected 100 similar case studies from around the World. Initially, we have defined these places as “areas located within the administrative border of the city, having the name and being managed by a group of active people, who share a conviction that this area has a value for them”.

For the present research we chose the final case studies (16 out of 100, table 1), according to the following criteria: 1. Spaces located in Europe, in the administrative borders of cities; 2. Spaces which most of the year works outside (not in the buildings) ; 3. Spaces of public use – not for the private purposes of one person or one closed group of people; 4. places of which the main function was not commercial, religious or political (as a servitude to the mainstream political parties); 5. Spaces where users take an active part in bottom-up processes of establishment and building. We have studied:

RESULTS

1. Location within the context of the city
2. Through a systematic review of various sources of information (grey literature such as: websites, articles in newspapers etc., scientific literature and available pictures and maps) we have studied the process of creation of the place, the existence and character of the conflict (who, when and why was in conflict, motivations to create and protect the space), values (based on the

A key aspect for the development of the selected case studies is their location. All the chosen initiatives are located in semi-abandoned or abandoned spaces mainly in the city centre (only 3 - in the outskirts). In each of the initiatives there was some kind of conflict occurring in the process of development. Because we focus on a public land, almost all initiatives had a conflict with municipalities of the city. However two exceptions were found: Case number

	PLACE	COUNTRY	FORMER FUNCTION	LOCATION
1	Jazdow Settlement	Poland	Neighborhood with some abandoned houses	City center
2	Ada Puławska	Poland	Abandoned building	City center
3	The Incredible Edible	UK	Parking	City center
4	Transition Heathrow	UK	Green wasteland	City outskirts
5	Prazelenina	Czech	Post-industrial area	City center
6	Drakopoulos Park	Greece	Abandoned park and historical building	City center
7	El Pumarejo	Spain	Decaying historical building	City center
8	Can Batllo	Spain	Post-industrial area	City center
9	L'espai Germanetes	Spain	Green Wasteland	City center
10	El Campo de Cebada	Spain	Abandoned construction	City center
11	Can Masdeu	Spain	Abandoned park and historical building	City outskirts
12	Hortet Del Forat	Spain	Green wasteland	City center
13	Holzmarkt	Germany	Green wasteland	City center
14	Tempelhof Freiheit	Germany	Former airport field	City center
15	Gezi Park Hamburg	Germany	Plaza	City center
16	Emajõe aed	Estonia	Meadow	City outskirts

Table 1. 16 chosen case studies

3. In the last step, we have compared results from Jazdow Settlement with the study of 15 cases from Europe to look for patterns, similarities and differences.

4 has been located in a private plot, which has a big economical value for the owner. Incredible Edible initiative (number 3) had a conflict with other NGO.

The presented sources of conflict show two different models (table 2). Conflict may appear as a reaction on a negligence from the authorities' side – lack of space to act, decaying of

historical spaces, lack of maintenance and development of “urban gaps”. On the other hand, sources of conflict also appear after a bottom-up development of the place, as a reaction of the initiative on the attempts of abolishment of the space. The reason is usually that inhabitants who took care of the land which was abandoned, put their time, strength and developed something valuable for them. In the particular case of the Incredible Edible initiative, the conflict appeared because of the same field of interest of two initiatives, but different perspectives (called as “more traditional” and “modern”, Morley et. al 2017).

The form of conflict does not always look the same. Different forms of protest were visible: protesting in form of gathering people (1,6,8,9,11,14,15), an occupation of the place and parallel planning or just informal bottom-up development process (1,3,4,6,8,11,12,15). Other forms of protest may be petitions and discussions with municipalities and owners of the areas, or lobbying by talking about the situation and values of the space by e.g. social media, flyers, meetings and workshops (in all cases). Worth to notice is a new form of protest and space reclamation: the use of existing participatory tools, such as consultations (1,9,10,14,15). In one case, the solution was to cooperate with influential companies that could invest and buy the space (13).

The reasons for creation of most of the spaces are also similar: to protect and develop an existing piece of land, or to produce food, as well as to gather and work together. However, as the time passes and initiatives grow, many more reasons appear. Users develop more functions for the space (cultural, educational, social) as well as values (place attachment, feeling of belonging and more). Consequently, the impact of the abovementioned processes may be even broader, namely: change of development plans, networks creation

(Incredible edible) or replicable solutions for cross-sectorial cooperation creation (1,3, 10, 13,15).

When it comes to the image of the space, there are some similarities. In all cases recycled elements, or at least DIY (“do it yourself”) aesthetic is used. In historical spaces, such as Jazdow, Drakopolus park and El Pumarejo, the preservation of historical buildings and existing spirit of the place plays an important role. Sometimes patches of informal, ruderal greenery next to flower and vegetable beds are visible. In addition, art like murals and graffiti, or sculptures and installations appear.

DISCUSSION & CONCLUSIONS

Conflict according to Alfred Coser (2009) concerns not only individuals but also social groups. In social relations, conflict comes from different opinions or disagreements. Despite the negative connotations, it may have also a positive function - may lead to social changes and strengthen the existence of the group (ibidem). In the present paper we study the role of the conflict in the bottom-up public spaces creation.

Is it a conflict the way for an urban revolution? It seems that conflict plays the role of a “safety valve”. This helps to release tensions and emotions and fulfil the needs of a group. However, conflict leads mostly to local changes and some governance solutions, or inspiration for others (such as Incredible edible and their network). However, in order to change the system, cross-sectoral cooperation is needed. There are cities (the most prominent example may be Bologna) where special regulations (Regulation on Collaboration Between Citizens and the City for the Care and Regeneration of Urban Commons) are created. Through this program, Bologna municipality is giving out the empty land for use for different initiatives, which directly manage it. Bologna municipality supports this in technical

	Conflict -Who?	Conflict - Why?	MOTIVATIONS FOR INITIATIVE DEVELOPMENT							
			Protect history and memory	Protect nature and greenery	Community protection	Lack of open spaces and specific cultural offer	Space rehabilitation	Replicable solutions	Community building & social inclusiveness	Gardening
1	Municipality	Abolishment of the space, lack of support, decaying of historical building	x	x	x	x	x	x	x	x
2	Municipality	Lack of space to act			x	x			x	
3	Other NGO	Misunderstanding of values	x			x	x	x	x	x
4	Private	Abolishment of the space		x	x		x	x	x	x
5	Municipality	Lack of space to act				x			x	x
6	Private	Abolishment of the space	x	x	x	x	x			
7	Municipality	Decaying of historical building	x		x		x		x	
8	Municipality	Lack of development	x			x	x		x	
9	Municipality	Lack of development				x	x		x	x
10	Municipality	Lack of development			x	x	x	x	x	x
11	Municipality	Decaying of historical building and nature		x			x		x	x
12	Municipality	Lack of development		x	x	x	x		x	x
13	Municipality	Lack of space to act	x			x	x	x		
14	Municipality	Abolishment of the space	x	x	x	x	x		x	x
15	Municipality	Abolishment of the space		x	x	x	x	x	x	
16	Municipality	Abolishment of the space, lack of space to act		x		x			x	x

Table 2. Conflict character and motivations for place development based on description and manifesto of initiatives

and monetary terms. Consequently, more than 180 collaboration pacts have been signed since the approval of the regulation (LabGov 2018). In the present paper, although there is no example of Bologna, similar initiatives which reached similar agreements with municipalities are discussed. In Barcelona, “L’espai Germanetes” has used a similar program for the development of the space. The municipality of Barcelona decided to choose projects that will take care of vacant urban spaces. Therefore, it is important to note that not only the free rent of space is a solution and “governance” for inhabitants’ initiatives. Broader and more complex help, trust and real support is needed. In Tempelhof field, the municipality of Berlin has decided to involve into temporary action “Pioneer Initiatives” which were supposed to develop this former airport. This influenced so

much the identity of the space (e.g. the creation of community gardens) that, later this initiative has created the movement called 100% Tempelhof in order to continue an open way of bottom up design of the space (Fahey 2015).

The visible impact of a conflict into the landscape may be measured in real changes: revitalization of abandoned spaces, activation of people, social inclusion or community creation – measured in amount of involved people or even tourist attraction creation (like in the case of Incredible Edible).

While working with Jazdow Settlement, the initiatives presented in this paper were taken under consideration as an inspiration. Despite of success, without full trust and support of local authorities the battle for Jazdow will still continue. Activists struggle everyday with not so visible, but constant obstacles. However, maybe thanks to increasingly popular trend of city reclamation and more open demand of rights to the city, the

non-monetary values of the landscape will become important also for decision makers.

LIMITATIONS

This work was a pilot research for a study of bottom-up cultural landscape development in Europe. These results set the basis for an in-depth study, which will use a larger number of cases and a research on of form, function and meaning of the spaces, based not only on literature review and inventory but also interviews and questionnaires on subjective perspective of active inhabitants.

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NOTES

¹ However, we don't apply directly ANT analyses (actor-network theory analyses).

5.5. TEACHING AND LEARNING

GROUP G

Common Training Framework in
Landscape Architecture: A Dream or
real Opportunity?
Jeroen de Vries

Pedagogical and Academic Reflections
from the iWater Summer Schools: Storm
Water Management in Urban and
Landscape Planning
Juanjo Galan

Teaching Landscape Design Through
Role-Playing: Students as Consultants
and as Landscape Designers
Pinar Koylu
PECHA KUCHA PAPER

Learning to Make Space for Demolition
Hans Leinfelder

Landscape Architecture: The (un)certain
Choice in Uncertain Times
Isabel Martinho da Silva
PECHA KUCHA PAPER

Approaching Landscapes: the Act of Seeing
Rosalea Monacella & Bridget Keane
PECHA KUCHA PAPER

Learning Landscape Design by Facing a
Real Professional Talk
Stanko Stergaršek, Iva Rechner Dika
PECHA KUCHA PAPER

Fieldwork in Landscape Architectural
Education: Some Personal Experiences
in Teaching and Backgrounds
Martin van den Toorn

Common Training Framework in Landscape Architecture: A Dream or Real Opportunity?

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Keywords:

landscape architecture; teaching methods; common training framework

ABSTRACT

Over 130 schools are delivering Landscape Architecture education across the European continent, which are encountering and solving different and sometimes common issues. The effects of demographic megatrends, economic constraints and labour market pressures have created a fragmented map of landscape architecture education in Europe. At the same time, there are examples of successful collaboration between schools from different regions. The paper presents a concept of a European Common Training Framework in Landscape Architecture CTF-LA. Building on the experience and the outputs of the EU-LAND21 consortium a vision has been developed for a comparable education network providing high quality teaching in landscape architecture that complies with the ECLAS Guidance and IFLA requirements for education in landscape architecture. The EU foresees creating CTF for different professions within the framework of the Professional Qualification Directive, so this project also helps to prepare for this possibility. The CTF-LA model offers the means to upgrade existing landscape architecture study programmes at partners' schools following a self-assessment phase performed using the "EBANELAS tool". The partners further developed the concept of learning lines in an Erasmus+ Strategic Partnership project. The expected benefits include introducing the

new Learning Line concept into the teaching process that would empower a shift to a student-centred and problem-based continuous learning model. After joining the landscape architecture programme in one of the partner's universities the student will be able to draft a personal professional development plan that will include selection of special study modules at the partner's institution. The issue of a double diploma will be possible upon the acquisition of adequate number of ECTS. We also expect to achieve faster and more efficient exchange of new teaching experiences, share of academic resources at the same time the strong emphasis will be on the traditional profile of each school. Based on a real example of five European universities the paper demonstrates the practical model how to start implementing the open and flexible CTF model in Landscape Architecture teaching.

INTRODUCTION

There are over 130 schools offering Landscape Architecture education across the continent of Europe, according to the European Foundation of Landscape Architecture (EFLA - now IFLA Europe) survey of 2008 (EFLA, 2008) of which some 80 are members of the European Council of Landscape Architecture Schools (ECLAS). Each is delivering a programme which aims to satisfy a national and/or international labour market, to meet national or federal legal requirements and also, frequently, to achieve accreditation or recognition by (inter)national professional bodies (Birli, 2016; EULand-21, Bell, 2017). Schools have to deal with the effect of demographic megatrends, economic constraints and labour market pressures. This has created a fragmented map of landscape architecture education in Europe.

There are some inspiring examples of collaboration to develop capacity, to strengthen teaching quality and to achieve synergies instead of duplication and unnecessary competition. The Dutch School of Landscape Architecture (DSL) and the



Figure 1: The initiative of launching the CTF-LA network of five EU universities.

Eastern Baltic Network of Landscape Architecture Schools (EBANELAS) benefit from their collaboration. IFLA World and IFLA Europe have produced documents outlining the key elements to be included in landscape architecture education (IFLA, 2008 and 2012) while ECLAS has spent a lot of energy through a participatory process with the school producing the ECLAS Guidance on Landscape Architecture Education (ECLAS, 2010) and this is well-used by many schools when building new programmes or revising existing ones.

For several years, ECLAS and IFLA Europe have had the ambition of

working closely together to achieve greater harmonisation between the various forms of guidance issued by both organisations and IFLA World. Taking the inspiration of the Dutch School and EBANELAS, the EULand21 project, funded under Erasmus+ between 2016 and 2018 was conceived as a means for schools across Europe to develop stronger programmes better fitted to the demands of current society. A partnership between IFLA Europe, the DSL, and partners from the Estonian University of Life Sciences and Vilnius Gediminas University (Lithuania) plus Szent Istvan University in Budapest and

the University of Agriculture in Krakow was formed with the aim of building materials suitable for assisting in the development of landscape architecture programmes fit for the next decade or more. The ECLAS Guidance document (with its subject-specific competences, Table 1) and the analysis tool developed by EBANELAS were important resources.

Aim of the project: CTF-LA vision

The work presented here aims to investigate whether and how it would be possible to launch a common training framework in landscape architecture in Europe. This challenging question can be framed in the context of the ongoing initiative to homogenise (without losing the diversity which is also valued) the education of landscape architects on a trans-national scale. The possibilities of such a European framework is analysed by using both top-down and bottom-up approaches.

The European Professional Qualifications Directive (European Union, 2005) that foresees the establishment of common training frameworks in certain professional fields facilitates the approach from the top but is not yet developed for landscape architecture nor can it be until certain requirements are fulfilled. The professional associations, like IFLA Europe are supposed to lead the process. Associations of Higher Education are the next important players in this field. ECLAS has taken the lead by developing a comprehensive guidance for LA studies in Europe (ECLAS, 2010). In addition, national landscape architecture associations (for instance in Latvia, Lithuania and Germany) have jointly developed Continuous Professional Development CPD programmes by which professionals can keep their knowledge and skills current so that they can deliver the high quality of service expected by clients and the requirements of their profession.

The CTF concept rests on the innovative methodologic learning approach that underlines the importance of collaborative learning in practice-based disciplines as landscape architecture (Vygotski, 1986; Fetzer, 2014). By sharing the analysis, conceptualising and project development experience the students develop their own “zone of proximal development” that is mainly the space in between the actual development level which is determined by the independent problem solving and the level of potential development that is determined by the teacher-guided or a group-work on a problem solving. Several studies have underlined the crucial role of collaborative learning (Fetzer, 2014; Chan, 2013), and this method is widely exploited in the present study for developing the CTF-LA model.

Schools providing landscape architecture education are generally in favour of a Common Training Framework (CTF) in LA and can organise a bottom-up approach. The partner schools of EULAND-21 (VHL, SZIE, URK, EMU and VGTU¹) have started the process of mutual coordination of LA studies by assessing their study programmes against the ECLAS Guidance document requirements (ECLAS, 2012) using the jointly developed EBANELAS tool and generated proposals for the necessary improvements. Most of these improvements address the generic competences that students have to develop through the study process and are common to several schools; for instance, the ability to communicate with the experts in other fields, the ability to work in interdisciplinary teams and entrepreneurial skills.

By implementing necessary improvements to the teaching process, the involved schools aim to meet the European Guidance requirements, also to deliver teaching programmes that are comparable, compatible and transferable. More, achieving that

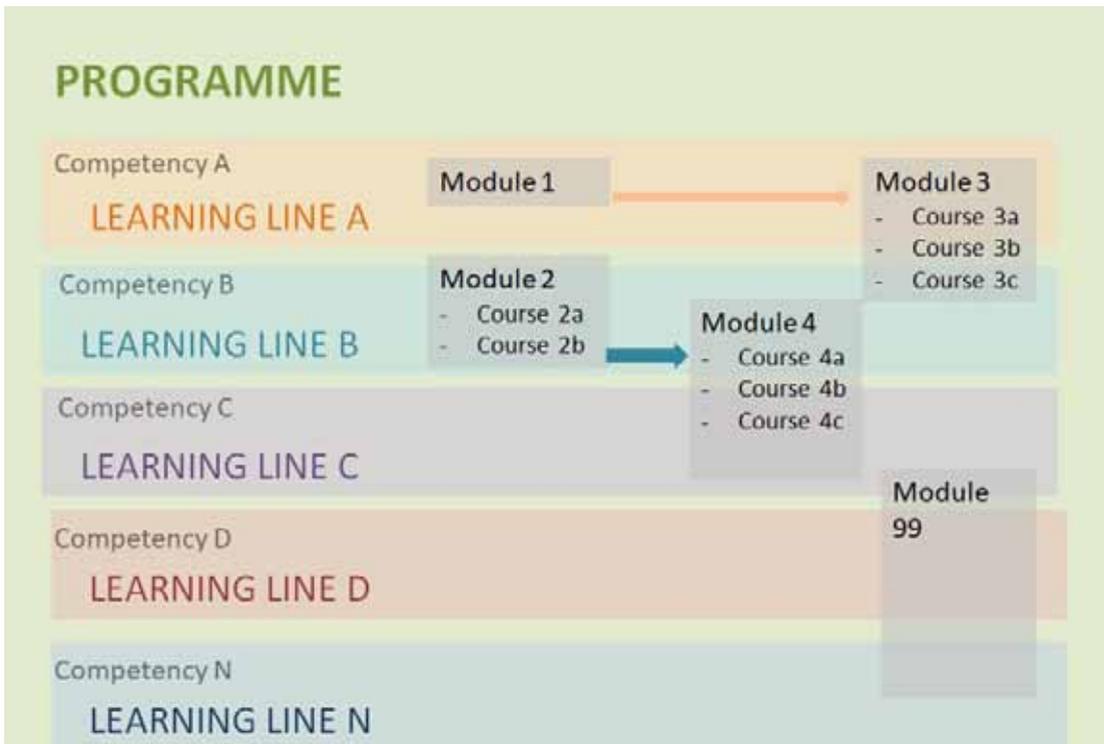


Figure 2: The relation between the study programmes, blocks of competences (learning lines), modules, and teaching courses.

would allow the network partners to launch a wide-range student and staff mobility and to provide smooth and reliable access to partners' studies for local students. All this work prepares the way for examining the question of establishing an open network of five European universities providing education in landscape architecture (Fig. 1). The advantages and disadvantages of such a transformative initiative are analysed from the point of the involved and interested stakeholders – see Table 2 below.

Planning concepts have different degrees of imperative: from strictly “deterministic” (should be like this) to “possibilistic” (can be like this) and to “probabilistic” (it is probable that this may happen). Our standing position is possibilistic realisation of this concept. Many factors may influence the progress of the drafted CTF-LA concept. The objective factors comprise the flexibility of a legal framework, as the proposed model does not fall into any of the currently legalised partnership

schemes; availability of resources that would be needed to implement the infrastructural, mobility and other aspects of the change. Subjective factors are even more important, and they cover the interest of the potential students in the proposed new kind of collaborative study network, motivation of the staff members to adapt to the changed flows and profile of exchange students. It also includes the will of the universities to administer changes and to accept and send the students and teachers, to install the didactic changes in the running LA study programmes or to build new ones. The flexibility of national education and accreditation authorities to accept the new model of university education offered by several different universities or a study network will also play a crucial role.

METHOD AND EXAMPLES OF RESULTS

The Common Training Framework consists of a set of properties of

programmes: the most important are the core, subject-specific and generic competences, the teaching modes and ways of assessment.

The programmes of the partner schools were analysed making use of the EBANELAS-tool. It showed that there is a need to pay more attention to the interpretation and management of cultural landscapes, the management of parks and gardens, information and communication technologies. Regarding the generic competences, we found a need to improve knowledge of a second language, the ability to work in an interdisciplinary team, leadership, understanding of cultures and customs of other countries, and initiative to succeed & entrepreneurial skills. For some schools it is required to raise the amount of studio work to meet the required 50% of study time.

To the ECLAS 2010 competences, we added one that relates to 'Landscape architecture foundation, background and supporting competences'. This covers subjects such as the foundations of geoscience and ecology (hydrology, ecology, soil science, geology, etc.) which a student needs but which is not specifically related to landscape architecture. For theory and methodology, the research competence has been elaborated further and to professional practice the competence of entrepreneurship has been added. For each subject-specific competence four levels have been defined: basic, intermediate, advanced (at bachelor level) and master, arranged in so called learning lines.

The network further elaborated the concept of learning lines for structuring teaching and learning. These form a continuous trajectory that shows from basic to the advanced level how students acquire a subject specific competence through various modules and courses. The learning lines specify what is covered for each competence level and what needs to be mastered before a student can take the next step

in his or her learning process. The levels are differentiated in role, products, actions, context, complexity, support, orientation towards the profession and their relation to other subject-specific competences. Programmes (or courses) can use the learning lines to develop the content of the courses (or modules/units). Figure 2 shows how programmes, learning lines and modules relate to each other.

EXPECTED IMPACT

Existing and new LA study programmes will cover the needs in professional practice of landscape architects in Europe through the content of the competences at all education levels (basic, intermediate, advanced). The CTF-LA initiative helps schools to develop a more harmonized professional content for bachelor and master programmes in landscape architecture. The CTF-LA network should also facilitate better student mobility and staff cooperation and improved recognition of the ECTS obtained by students in their study-abroad semesters. The CTF-LA is expected to respond to the need of high-level academic landscape architecture training in Europe and increase the quality of education in partner countries by offering the tools for continuous upgrading and modernization of the LA study process. As a result, international landscape architecture training should encourage trans-national mobility and better employability of the graduates

An additional benefit should also be the convergence of the network's landscape architecture schools in the five countries in order to develop the potential to launch a new type of double-multiple degree study programme in landscape architecture. The CTF-LA initiative should also strengthen the European network of landscape architecture experts, cooperation among whom should open more

opportunities for sharing and enhancing their experience. The project results will be integrated into the existing education guidelines at the European level and are expected to influence the activities of the IFLA Europe School Recognition Panel and landscape architecture education in Europe in the years to come. Landscape architecture training will be more coherent across the continent, and graduates should have their professional qualification recognized EU-wide.

CONCLUSIONS

To conclude, there are a large number of European universities providing education in landscape architecture but the lack of a single harmonised teaching approach (but not identical programme) results in graduates with different levels of knowledge. That is why five universities in Europe decided to embark on a new type of academic network CTF-LA, the aim of which is to create and implement a more standardised approach to teaching landscape architecture at HEIs Europe-wide.

Students will benefit from the network, as it will allow them to study at other European universities while keeping the same content and quality standards and to transfer their learning from one institution to another more effectively. In addition, we expect to facilitate the exchange of experience between students who could start their studies at the national school and then draft their individual professional development plan to include studies at partner institutions. When the student has acquired a certain number of ECTS at the host institution, he or she will be able obtain a second diploma from another European university. The CTF-LA model will exploit the existing academic resources sustainably and enable students to benefit from the other universities' teaching, practice and infrastructure resources.

The Common Training Framework in landscape architecture should be consistently updated to reflect the challenges and issues as they emerge, not only domestically, but also on the European level and beyond. Long-lasting research on cultural landscape has already demonstrated that landscape architecture should be comprehended in this particular way, meaning the comprehension on the European level and across challenges (Hernik, 2009).

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NOTES

1 VGTU is the coordinator of the Erasmus+ co-funded project Trans-European Education for Landscape Architects EULAND-21.

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TABLES

Table 1: Subject specific competences in landscape architecture (ECLAS, 2010)

Type of competence	Blocks of Competences / Learning line	
Theory	A1	Theory and Methodology in Landscape Architecture
Process of Planning, Design & Management	B1	Landscape Design
	B2	Landscape Planning
	B3	Landscape Management
Categories of projects	C1	Urban Open Space Planning (and Policy)
	C2	Interpretation and Conservation/Management of Cultural Landscapes
	C3	Conservation/Management of Parks and Gardens
	C4	Planning/Design for Infrastructure Projects (and Landscape Impacts)
Vegetation & Materials	D1	Materials and Construction Techniques
	D2	Vegetation Establishment and Plant Materials
Tools	E1	Information Technology in Landscape Architecture
Practice	F1	Professional Practice of Landscape Architecture
Fig 1. The 12 subject-specific competences for landscape architecture (ECLAS 2010)		

Table 2:

Advantages and disadvantages of implementing the CTF-LA on the different stakeholders

No.	Stakeholder	Advantage	Disadvantage
1	Students	<p>Increased mobility opportunities</p> <p>Personal education plan</p> <p>Improving generic skills</p> <p>Gaining a broader experience</p>	<p>Additional travel and accommodation costs</p> <p>Decrease in the quality of education due to classes run in a foreign language – English comprehension problem</p>
2	Graduates	<p>Multicultural professional experience</p> <p>Better international employability</p>	<p>Increased local job market competition in landscape architecture</p>
3	Schools	<p>Internationalisation of education</p> <p>Improving quality by exchange of expertise and sharing specialist knowledge</p> <p>Higher competitiveness of LA education</p> <p>Achieve automatic recognition by international LA profession</p>	<p>Coordination of curricula</p> <p>Higher requirements for the teaching staff (language etc.)</p> <p>Difficulty in the accreditation of curriculum</p>
4	Employers	<p>Multi-culturally and internationally experienced employees</p>	<p>Skipping local architectural landscape challenges; instead, thinking merely globally</p>
5	EU authorities	<p>Automatically recognised LA profession</p>	<p>Raised budget of European subsidies for Landscape Architecture studies</p>
	National authorities	<p>Higher quality of LA education</p>	<p>Need to register the CTF as well as the national systems</p>
6	Society	<p>Global perspective on Architecture Landscape, which will trigger solutions never considered before</p>	<p>None</p>

Pedagogical and Academic Reflections from the iWater Summer Schools: Storm Water Management in Urban and Landscape Planning

INTRODUCTION: ASSESSING INTENSIVE, STUDIO-BASED PLANNING COURSES

1. Aim and Rationale

Stormwater management is a crucial and strategic issue to increment the environmental, social and economic sustainability of cities and to improve wellbeing and urban resilience. In addition, the relevance of water in national, regional and urban agendas has increased following rapid urbanization, climate change, socio-environmental awareness and a deeper understanding of the opportunities, risks and potentials linked to water.

In this new scenario, the sustainable and multidimensional handling of stormwater has become a central element in research, planning and design, fostering the definition of symbiotic green-blue infrastructures, the generation of a wider range of ecosystem services and nature based solutions, as well as the emergence of new ways of urban management.

In the framework of the iWater Project (Interreg Central Baltic), Aalto University, in collaboration with seven Baltic cities, organized a set of three intensive Summer Schools in 2016. The schools were attended by students, tutors, city representatives and professionals who worked together in seven pilot sites including consolidated urban fabrics, planned urban growths and peri-urban areas.

This paper discusses the methods and results of the iWater Summer Schools (iWSS) from two different perspectives. On the one hand, and from a pedagogical point of view, it explores the potentials and limitations that intensive multidisciplinary planning studios might have as a teaching method in Landscape and Urban Planning education (Figure 1). On the other hand, it presents some of the challenges and opportunities provided by stormwater management in Urban and Landscape Planning.

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Keywords:

Intensive Studios in Landscape Planning, Pedagogy in Landscape Planning, Green-Blue infrastructures, Stormwater Management, Sustainable Landscape Planning

ABSTRACT

The importance of blue-green infrastructure and sustainable stormwater management in planning has increased during the last decades. However, due to the systemic, multiscalar and multidimensional character of water, the use of multi-inter-transdisciplinary knowledge has become a precondition, generating at the same time new curricular and pedagogical challenges. On the other hand, Studio courses are solidly positioned at the core of many design and planning disciplines but have witnessed the increasing use of intensive formats that might affect the way in which the learning process is developed. This paper analyses - from a critical perspective and through a particular Case Study (iWater Summer Schools) - some of the potentials and challenges affecting the intersection between Studio-teaching, intensive learning processes and landscape planning in highly multidisciplinary conditions. In particular, and after conducting a literature review on studio-based and intensive courses, the paper proposes a set of strategic points to design and assess intensive landscape planning Studios. These points are used to critically discuss the methods, results and especially the learning processes that took place in the iWater Summer Schools and to propose some future pedagogical lines of research.

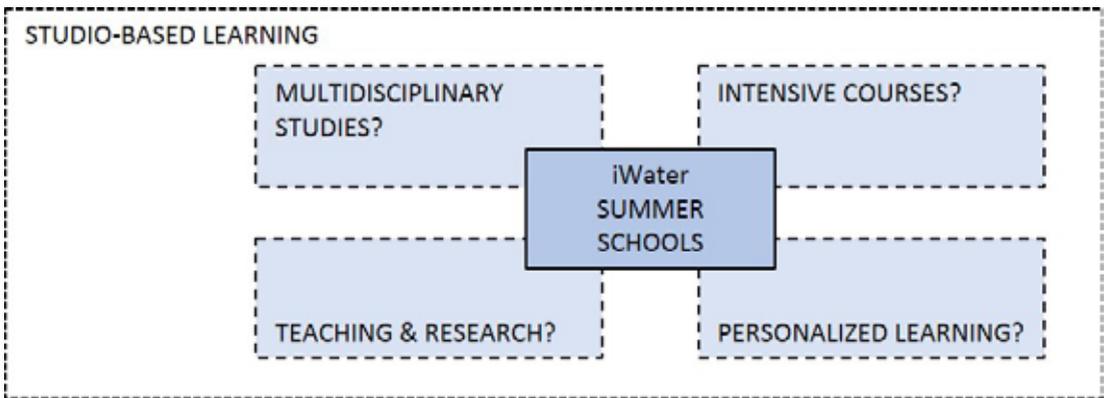


Figure 1: iWSS: A studio-based, multidisciplinary, intensive, research-oriented and personalized course?

2. PLANNING STUDIOS in Landscape Architecture: Concepts and Challenges

Studio courses are at the core of design, planning, architecture and landscape architecture teaching. The conventional planning studio model can be described as a workshop course where students develop solutions to a particular challenge in a classroom or real setting, often with some sort of contact with a real or hypothetical client or group (Aitken-Rose, 2001; Higgins, 2005, IN Higgins, 2009, p 10). In most cases, studios are student-centered courses where the participants have a major role in the co-definition of topics and project outputs (Shepherd and Cosgriff, 1998; Kumar and Kogut, 2006 IN Higgins, 2009) and where the teacher facilitates the navigation through the design or planning process. Therefore, planning studio-based learning is to a great extent connected with active learning, intense interaction between students and teachers, problem-based and experimental learning in a flexible environment, integration of theory and practice, emphasis on both process and outcome, and formative and summative assessment (Higgins, 2009). Moreover, the main characteristics of a planning studio course can be systematized according to different pedagogical terms: learning outcomes, pedagogical approach, learning and teaching methods, assessment methods and main skills provided (Higgins, 2009).

Due to increasing digitalization,

the appearance of new ways of social interaction, new economic and logistic conditions affecting the availability of resources for education, and the need of reinforcing the research and publishing activity in the academic world, the studio-based learning model is under revision.

2.1. Studio-based learning in MULTIDISCIPLINARY environments

The benefits of studio-based learning in landscape architecture, planning and design education have been recognized by scholars and docents as well as by the academic practice (Armstrong, 1999; Francis, 2001, Lamunu, 2008, Higgins et al., 2009). Studios can be developed in multiple ways but most commonly are linked to case studies. Therefore, the *Studio-Case Study* pair is particularly relevant if studio teaching is to be studied from a pedagogical perspective.

Studio-based learning in landscape architecture should assume the transversal character of the landscape, its different temporal and spatial scales and its multiple dimensions (cultural, environmental, economic, perceptual and spatial). Therefore, the challenge is double; on the one hand, it is necessary to define studio topics and methods that promote multifaceted approaches and multidisciplinary collaborations. On the other hand, studios should facilitate the acquisition of “specific and deep

Key characteristics of Planning Studios (Higgins et al, 2009)					Additional considerations for multidisciplinary, research-connected, personalized and intensive Planning Studios			
1.1. Learning outcomes	1.2. Pedagogical approach	1.3. Learning and teaching methods	1.4. Assessment methods	1.5. Skills commonly developed	2. Multidisciplinary courses for transdisciplinary topics	3. Potential links to Research	4. Learning Styles and Personality Types	4. Implications of running the studio with an intensive format
<ul style="list-style-type: none"> • Application of theory and knowledge to a practical problem • Development of professional skills emulating practice • Emphasis on both the process and product and in inter-relationship between the two 	<ul style="list-style-type: none"> • Experimental learning • Problem-based learning • Student centered, active engagement • Reflective learning 	<ul style="list-style-type: none"> • Project-based, often in groups • Informal and flexible, not lecture based; may include tutorials, workshops, field work, interaction with practitioners and communities 	<ul style="list-style-type: none"> • Individual or group or a combination • Formative assessment; feedback informs final outcome • May include oral presentation • Not exam-based 	<ul style="list-style-type: none"> • Urban design • Plan and policy making • Teamwork • Negotiation • Management: time, self, others • Public engagement • Oral and graphic presentation, including IT • Critical analysis • Creative thinking 	<ul style="list-style-type: none"> • Possibilities to apply the specific disciplinary knowledge • Possibilities to be influenced by the knowledge provided by other disciplines • Possibilities to generate new concepts and knowledge by interacting with other disciplines 	<ul style="list-style-type: none"> • Research orientation and use of research methods. • Mechanisms to validate the outcomes as new knowledge • Development of scholarly publications and exhibitions 	<ul style="list-style-type: none"> • Responsive to the characteristics of the whole class • Responsive to individual students • Responsive to individual teachers • Teams created according to students' learning styles 	<ul style="list-style-type: none"> • Motivation • Retention • Focus • Diversity of teaching methods • Stimulation • Discussion • Relations amongst students • Procrastination • Flexibility • Achievement of learning outcomes • Workload • Fatigue • Depth • Convenience

Figure 2: Table with factors affecting the design of studio-based, multidisciplinary, research-oriented, individual responsive and intensive planning studios

skills” connected to the particular competences of landscape architects and to the added value that they can provide in multidisciplinary projects.

2.2. Studio-based learning in INTENSIVE courses

Intensive courses have become quite common in colleges and universities (Daniel, 2000; Wlodkowski, 2003; Davis, 2006; Kucsera & Zimmaro, 2010) that have favored this type of courses for different reasons. Firstly, they offer a flexible model that fits adult and part-time education. Secondly, they are particularly adequate to concentrate intensively and exclusively on a particular topic or subject (Daniel, 2000). Intensive teaching can be conducted in different formats and has been applied in many different disciplines, with particular effectiveness in those where skill acquisition is more relevant than discursive and conceptual learning (Davies, 2006). Due to its intrinsic character, planning and design studios tend to have an intensive character but the related pedagogic literature is still scarce.

The main benefits of intensive courses are increased motivation, retention, stamina and focus, diversity of teaching methods, stimulation and enthusiasm, stronger relations amongst students, decrease in procrastinating behaviors and flexibility (Scott, 2003,

Davies, 2006; Kucsera & Zimmaro, 2010). According to Daniel (2000), teachers tend to explore new teaching techniques in intensive courses and keep more time for experiential learning and discussion whereas students are more prone to modify their learning techniques.

Nevertheless, although intensive courses are perceived as a supplementary and flexible tool to respond to changing demands, there is serious concern about the learning outcomes they provide and the level of workload and fatigue they impose on participants (Davies, 2006, Kucsera & Zimmaro, 2010).

2.3. Studio-based learning and RESEARCH

Regarding their potential contribution to academic research and due to the explorative and co-participated creation of knowledge that characterizes many studio-courses, they can become the first step towards more advanced research, especially if they are properly planned and integrated in the “research chain”.

Difficulties to incorporate research in design and planning disciplines have been stated by multiple researchers. Interestingly, Armstrong also identified the potentials and limitations of studios in terms of research. Thus, “*using the design studio as part of the exploration*



Figure 3: Structure of one iWater Summer School.

of a wider research-problem has interesting research potential. It is nevertheless contentious in terms of positivist research because the form of rigor required for positivist research data is unlikely to be produced within the studio without compromising pedagogical requirements for design development” (Armstrong, 1999, p. 9).

Therefore, one of the key issues if studio courses are expected to be more than research-activators is to provide academic rigor to the qualitative, or even quantitative, research that usually takes place in Landscape Design or Planning Studios. This suggests the need of advancing in the refereed assessment of studios (Armstrong, 1999) as well as in the use of different methods to critically contrast the generation of ideas and solutions, e.g. triangulation (Patton, 1990 IN Armstrong, 1999) or crystallization (Richardson, 1994 IN Armstrong 1999).

2.4. Studio courses, LEARNING STYLES AND PERSONALITY TYPES

Studio-based learning implies a high level of student empowerment and a strong level of peer interaction. Subsequently, studio courses offer plenty of space for individual personalization. According to Brown et al. (1994), everyone has a preferred style of learning and these preferences can inform the design and development of courses in order to promote a more effective learning process. The same principles lie behind the report

developed by Carey and Barthelmech (2016), where the individual dimension of the learning process is analyzed for landscape architecture design studios.

Ultimately, although the “taxonomic” classification of individuals according to learning styles might be contentious, the purpose of aligning teaching methods and learning/teaching styles still sounds promising, especially in highly vocational and heterogeneous disciplines like landscape architecture.

2.5. Designing and assessing intensive, multidisciplinary and research oriented planning studios

Following the review above, a set of strategic factors affecting the design of planning studios was defined (Figure 2). These factors were used to critically evaluate the structure, implementation and results of the iWSS.

3. iWSS: intensive, international, studio-based, multi-inter-transdisciplinary studios

3.1. Objectives, learning outcomes and participants

The iWSS were an academic project designed and coordinated by Aalto University in close collaboration with the iWater cities of Riga, Jelgava, Gävle, Söderhamn, Tartu, Turku and Helsinki as well as with a wide range of Latvian, Swedish, Estonian and Finnish Universities.

After completing the course, students were expected to be able to work with the following concepts



Figure 4: Students working during the second iWater Summer School (Gävle, Sweden, 2016).

and issues: (1) Principles, tools and techniques for integrated Stormwater Management (SWM), (2) integration of sustainable SWM in urban planning and design, and (3) integration of SWM in landscape planning and design, with a particular emphasis on green infrastructure and ecosystem services.

Key objectives of the iWSS included: (1) dissemination of academic knowledge on integrated Urban Stormwater Management, (2) facilitated contact between academics, professionals and local administration, and (3), production of new strategic visions for seven qualitatively different pilot sites in the iWater cities.

All pilot sites were affected by severe stormwater management challenges and displayed contrasting conditions. For instance, the pilot sites in Helsinki and Gävle included consolidated urban areas with predominant residential and industrial land uses respectively. Sites in Riga, Turku and Tartu consisted of recently planned urban areas in which the iWSS were expected to offer new and more water sensitive alternatives. Finally, sites in Söderhamn and Jelgava were located in floodable and strategic peri-urban sites.

The iWater Summer Schools were attended by 61 students from 17 countries, 16 universities and different academic backgrounds (40% landscape architecture, 18% architecture, 13% environmental engineering, 10% sustainability sciences, 5% urban and

regional planning, 5% environmental sciences, 3% civil and transport engineering, 6% other degrees).

3.2. Methodologies

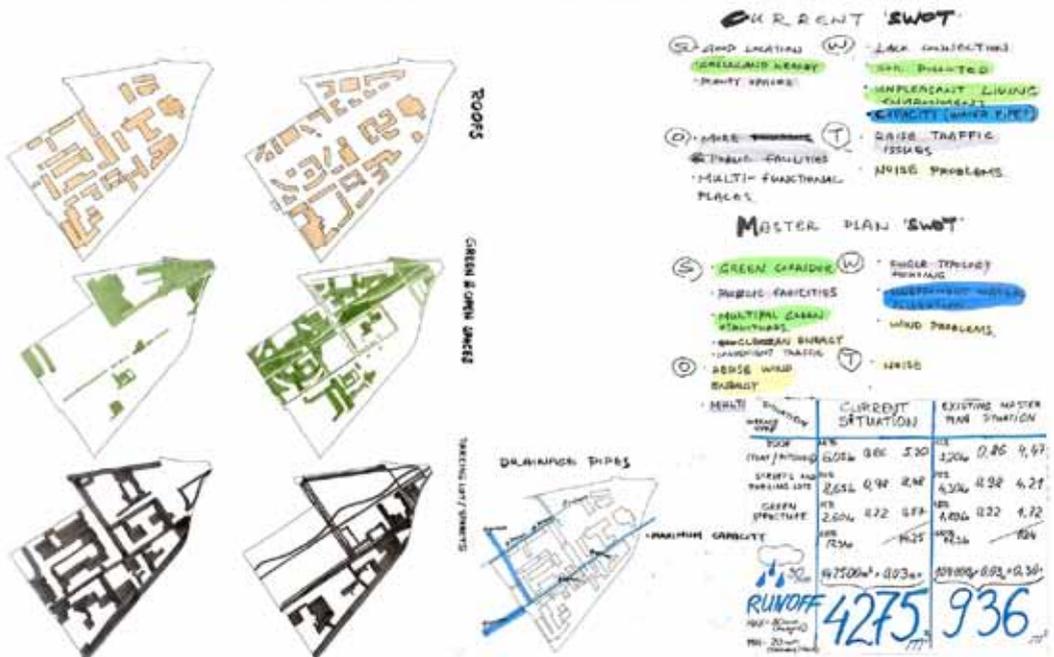
Each iWSS was conducted as a 5 days intensive and highly practical studio worth 3 ECTS. During each school, students worked in multidisciplinary teams and were assisted by academic and local experts. Due to time limitations, all the iWSS followed a linear sequence including a contextual and site analysis, the development of urban and storm water strategies and the definition of specific and multiscalar solutions. Each of these phases started with a set of preparatory lectures and concluded with an open review. During each summer school, 20% of the time was devoted to lectures, 60% to teamwork and 20% to reviews (Figure 3).

In order to facilitate the interaction between students and teachers, most of the work was developed using manual techniques and qualitative methods. In addition, the students were also provided with a rough quantitative system to calculate the volume of run-off for a standard rainfall event. This simple method helped them to evaluate different alternatives and make decisions accordingly (Figure 4).

3.3. Academic results

From a substance level, the iWSS dealt with the most common challenges affecting integrated urban

KIRSTINPUISTO (Turku, Finland): Current situation and the existing Masterplan



KIRSTINPUISTO (Turku, Finland): Proposals: Using the water as a design factor

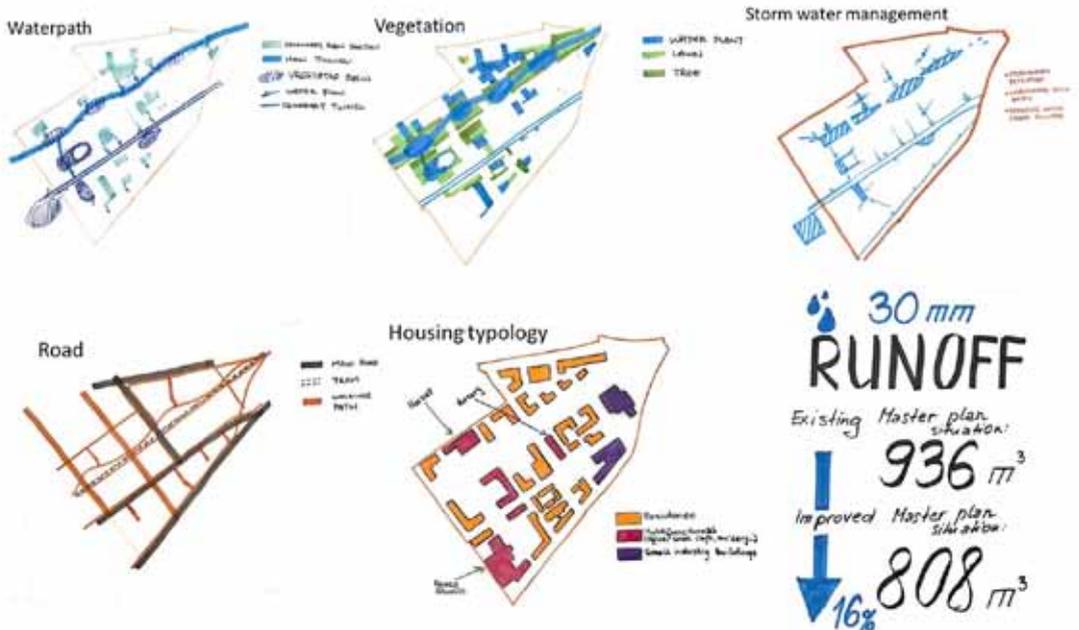


Figure 5: Analysis and Proposals for the iWater Pilot Site located in Turku (Finland) (by Lelde Dreimane, Līga Sēja and Yanyi Zhang)

SWM (Galan, 2016). Namely, integration of SWM in urban planning and design, hybridization of blue, green and grey infrastructures, connection between SWM and ecosystem services,

management of run-off, both from a volumetric and quality perspective, and finally, identification of factors affecting the implementation and management of their proposals (Figure 5).

Interestingly, almost all the students agreed that the iWSS complemented their previous knowledge and provided them with new tools and approaches even in their own fields of expertise.

... "In general, this was a dynamic teamwork with positive cooperation with the tutors. We managed to create an efficient solution for the pilot site in a very short period of time. We gained knowledge, learned new tools and realized the great importance of stormwater management"... (anonymous feedback from an iWater student).

4. MATERIAL AND METHODS

A small group of students and teachers from Aalto University who participated in the iWSS evaluated the schools using the assessment criteria presented in Table 1. The assessment was developed using a questionnaire with fifty-one short questions that had to be answered with scores ranging between 1 (very low), 2 (low), 3 (medium), 4 (high) and 5 (very high). Due to the small size and homogeneity of the sample, results were not processed statistically although they provided key information for the future development of a comprehensive survey amongst all the students and teachers who participated in the iWSS. Nevertheless, the results suggested some preliminary conclusions regarding the quality of the iWater Summer School as an intensive and multidisciplinary planning studio, its potential to support research and its responsiveness to individual characteristics of both students and teachers.

5. RESULTS AND DISCUSSION

The analysis of the iWSS from a planning studio perspective suggests that the "acquisition of learning

outcomes", the "pedagogical approach", the "learning and teaching methods" and the "assessment methods" were aligned with the ones defined by Higgins et al. (2009) for a prototypical planning studio. Concerning the "skills commonly developed in planning studios" and according to both teachers and students, the iWSS had a low public engagement and an average performance in terms of self-management of time and acquisition of planning and negotiation skills. In spite of this, the schools were perceived as a positive platform for creative thinking, critical analysis and teamwork.

Secondly and regarding the level of multidisciplinary, interdisciplinary and transdisciplinary, the iWSS were positively evaluated by both teachers and students. This can be explained by the highly transversal character of the central topic (Stormwater Management) and by the academic diversity of the students.

Concerning the potential linkage of the iWSS to research, results indicated an average level in the overall research orientation of the schools, in the use of qualitative methods and in the level of abstraction, exploration and resolution of planning challenges transcending normal practice. The evaluation was particularly low concerning the use of quantitative methods, level of speculation, the use of mechanism to validate the outcomes as new knowledge, and the development of scholarly publications or research outcomes. These results can be the consequence of the introductory character of the schools, of their short length (5 days) and, mainly, of the absence of a predefined plan to provide a research dimension to the course.

Fourthly, the iWSS were not perceived as particularly responsive to the learning styles and personality types of their participants although teachers were more critical in this particular issue. These results can be explained

by the predefined structure of the course and by its short length, which hindered the possibility of individual adaptations.

Finally, and regarding the effects of organizing the iWSS in a highly intensive format, results agreed with the existing literature. Thus, both teachers and students considered that, in comparison with other similar and non-intensive planning courses, the iWSS were particularly effective in promoting high levels of motivation, focus, stimulation, discussion, peer interaction and in decreasing procrastination. In addition, students and teachers also positively evaluated the level of achievement of learning outcomes and the possibility to integrate the course as an additional activity in their academic calendars. On the other hand, results were more critical concerning the levels of retention of acquired knowledge, academic depth, workload, fatigue and flexibility. As detected in previous studies, results could have been highly biased by the positive predisposition of the students who attend optative courses and by their difficulties to compare them with other equivalent non-intensive courses.

6. CONCLUSIONS

The literature review and the pedagogical analysis of the iWSS identified a set of criteria to support and assess the design of intensive, studio-based, multidisciplinary planning courses. In addition, it suggested some crucial factors to reinforce their research potential and to make them more responsive to the personal characteristics of students and teachers. From a learning theory perspective, both, the literature review and the proposed ideas support the need of integrating behavioral, constructivist and social constructivist approaches to studio-based learning.

In addition, the outcomes of the iWSS showed the potential of intensive

studio-based planning courses and of transversal components, like Water, to promote multi-inter-transdisciplinary learning, to link different scales and to respond to a wide variety of planning challenges. Furthermore, some general principles were concluded for the use of Stormwater Management in urban planning and design, for the co-definition, co-implementation and co-management of sustainable green-blue systems and for the generation of ecosystem services.

The development of this paper suggests the need and convenience of advancing in the pedagogical study of studio-based planning courses in order to optimize their academic use and their future integration in an increasingly dynamic academic, social and technological context.

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Teaching Landscape Design Through Role-Playing: Students as Consultants and as Landscape Designers

PECHA KUCHA PAPER

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Keywords:

teaching, students, design, role-playing

ABSTRACT

In order to get students ready for future challenges and to empower them to meet the requirements of the 21st century, instructors seek ways of improving their educational techniques. Hence, the study shared in this paper was conducted to enable students to gain a different insight into design in the context of a new experience. Three students enrolled at a graduate design course were assigned, first, the role of a consultant designer developing design programs, and then, the role of a designer generating design solutions for problems explicitly defined by others. At the end of the semester, the students gained a different insight into the pre-design and design activities, improved their career and life skills, and developed self-awareness.

INTRODUCTION

In order to create functional, sustainable, enjoyable, healthful, aesthetic, and/or economic places for the well-being of human beings, landscape architecture students are expected to gain knowledge in a variety of topics. Moreover, they are required to develop basic learning and innovation skills, as well as career and life skills of the 21st century among which, as identified by Trilling and Fadel (2009), involve critical thinking, problem-solving, communication, collaboration, creativity, innovation, flexibility, and adaptability; and thus, as mentioned

by Kereluik *et al.* (2013: 128), exceed “the 20th century skills of repetition, basic applied knowledge, and limited literacy”.

Since design can be thought of both as a problem-solving (Piotrowski, 2011) and as a decision-making (Murphy, 2005) process, and because design and design thinking require communication and collaboration, as well as critical and creative thinking, respectively, a student attains these skills through the course of a process which, according to many design theorists, comprises of analysis, synthesis, and evaluation. Indeed, after being assigned a design problem, a landscape architecture student defines the problem and develops a program by considering user requirements and by carrying out site analysis, generates alternative solutions, and evaluates these solutions in terms of their suitability to the problem he/she has defined and to the program he/she has developed.

However, in the case of competitions and large-scale projects in which the client is a governmental organisation, university, etc., landscape designers are usually given complete programs developed by their clients or by other designers appointed as consultants by those clients. Accordingly, in practice, some landscape designers may specialise in programming whereas others may specialise in generating design solutions for the problems explicitly defined by their clients and/or their colleagues. Thus, the study shared in this paper was conducted to prepare students for such cases in the context of a new experience different from those they had experienced earlier in their education, and to help them develop competencies in critical and creative thinking, as well as in flexibility, adaptability, and communication.

THE STUDY

The study was based on an elective graduate design course taught by the author. Three female students enrolled at the course took part in the study in which role-playing was employed as an educational technique. Since role-playing offers one the opportunity to place oneself in the position of others, it enables students identify with the real worlds, and helps one develop insights and understanding that might not be achieved through traditional teaching methods (Chesler and Fox, 1966). A recent study conducted by Rao and Stupans (2012) also reveals that switching from one role to the other help students be aware of the actions of either people. Hence, in order to enable students identify with real-life situations, they were assigned first the role of a consultant specialised in program development, and then, the role of a landscape designer who would enter a design competition, and thus, had to follow a design program given to her.

Although the students were to work on the same site with the same external constraints, they were offered to work on different design projects. Accordingly, as a consultant, each student was randomly assigned one of the three hypothetical design projects—a day-care center for children, a youth center, and an elderly care center—for which she was expected to develop a design program. Then, each student, again by chance, drew one out of the two remaining design projects for which a program had been developed by one of the other two students. This time, by reversing their roles as landscape designers, each of them was supposed to generate solutions for the design problem which had been explicitly defined in the program developed by her peer for that project. Thus, almost the first half of the semester was spent with program development while the second half was devoted to designing. On the other hand, the students were

asked to record their reflections on their experiences—as if they were keeping diaries—throughout the whole semester. At the end of the semester, each project was presented by its designer, and was mainly evaluated by its consultant who developed the program. Finally, when all tasks were completed, the students were asked to share their reflections about what they had experienced in the roles of a consultant and a designer, and thus, reflect upon what they had learnt throughout the process.

REFLECTIONS

Reflections of the Students

While experiencing programming in the role of a consultant, all three students declared that the main difficulty they encountered was concerned with problem definition. Moreover, they were all worried about which details to put in their programs. However, two weeks after they had started to work on their tasks, they began to gain an insight into programming. They mentioned that discussions on the development of each program at hand during the course hours helped them better understand how to structure their own programs.

On the other hand, in the role of a designer working with a program already developed by a peer, experiences of the students differed from each other due to the variations in the clarity and comprehensiveness of the programs. While one of the students stated that there were ambiguous expressions in the program she was following, another student expressed that the program to which she was referring lacked some information. Although this student, at the beginning of the design activity, was uncomfortable with the lacking information, she, as the design progressed, realized that having some gaps in the program gave her freedom while designing. Contrary to these two students, the third student was more

positive about working with a specific program already prepared by her peer. According to her, having information at her fingertips speeded her design up.

Students reflected that they had a different learning experience which kept them challenged and motivated throughout the whole semester, and enhanced their understanding of the design process. All of them declared that it was the first time they had developed such a comprehensive design program, and one of the students stated that she better understood the importance of pre-design activities. Correspondingly, another one suggested that programming, as an elective undergraduate course, could be included in the curriculums of landscape architecture departments.

Reflections of the Author

Engaging students actively in the learning process by assigning them the role of a consultant and of a designer not only enabled them to experience pre-design and design activities in a context different from what they have been accustomed to, but also helped them improve their creative and critical thinking skills. Moreover, such an approach also let them identify with different design actors, and hence, increased their self-awareness. Indeed, they became aware of their strengths and weaknesses (e.g. adaptability, inflexibility) both in programming and in designing. Besides, they gained an insight into the advantages and disadvantages of solving design problems in accordance with a program developed by a peer, and realized how their flexibilities declined or expanded due to the nature of information in the program submitted to them. Thus, along with the personality traits of the students, nature of the information in the program also influenced their tolerance to designing with constraints. On the other hand, while evaluation of each design by the student who acted as

its consultant provided feedback to its designer, the responses of the designer provided feedback to the consultant. Thus, these discussions between students not only fostered peer-learning but also enhanced their communication skills.

CONCLUSION

Although the reflections in this study indicated that employment of role-playing as an educational technique enabled students to construct knowledge, to improve certain career skills, and to develop self-awareness, the experiences were limited to a few graduate students. Hence, in order to arrive at a more comprehensive inference, it would be more effective to employ such a technique in other design courses with more students.

ACKNOWLEDGMENTS

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Learning to Make Space for Demolition

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degrowth, demolition, context-driven research, landscape teaching, planning policy

ABSTRACT

The societal and political support for reducing urban sprawl in the densely urbanized landscape of Flanders seems to be growing, albeit slow. In its white paper for a new strategic planning document, the Flemish government proposes an evolution towards a zero consumption of open space for urban development in 2040, compared to the 6 ha per day now. This noble ambition ignores thousands of constructions and sealed surfaces, spread all over the landscape, that have a serious impact on physical, ecological and agricultural processes. The physical and mental 'space' in society to demolish these constructions, unseal the soil and restore or redevelop the landscape seems to be an unaddressed and thus non-existent challenge.

KU Leuven and University College Ghent have recently started to explore this challenge in a project funded by the Flemish Government Architect. The exploration has been set up as a common learning trajectory of students, teachers and researchers as it is embedded as a research project in the educational programs of both schools. The research ambitions seem quite obvious: a screening and typology of unused and underused constructions that could be demolished, reasons how and why these constructions are still present, their emotional significance for local society, (social, legal and financial) obstacles for demolition, and ideas and proposals for a qualitative landscape after the removal. During the learning trajectory, the participants will be inspired

by experts on issues that pop up.

Increasing the awareness in society as part of the learning trajectory is less obvious. A final exhibition at the Flanders Architecture Institute will raise relevant questions and stimulate the public to reflect on the sense and nonsense of the survival of abandoned constructions in an already densely urbanized landscape. By confronting visitors with recognizable situations and with the potential leap in landscape quality, the more academic learning trajectory will hopefully expand to a larger part of society as a first, modest step in learning how to make space for demolition.

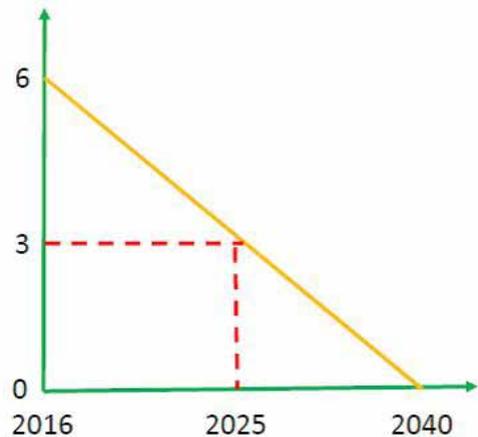


Figure 1. Reduction of daily consumption of open space

INTRODUCTION

Today's consumption of open space for new development in the already densely urbanized landscape of Flanders, the Northern part of Belgium, is on average 6 ha per day. Only recently the Flemish government has slowly but steadily come to the conclusion that this continuous expansion of human settlement area should be reduced significantly. An ultimate political approval is still pending, but the government's white paper for a new strategic planning document proposes a gradual decrease to 0 ha per day in the next 23 years (Departement Ruimte Vlaanderen, 2016). In other words, the current 6 ha daily consumption of open space should be reduced to 3 ha in 2025 and to 0 ha in 2040, an ambition

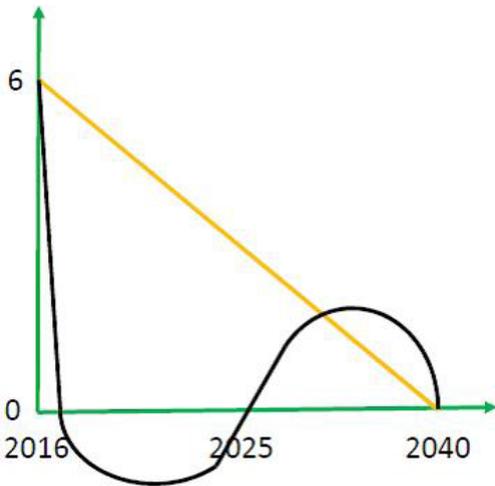


Figure 2. Combination of demolition and new development in S-shaped curve

which has become popularly known as the 'concrete stop'. However, it still implies that the surface under the slanting line in Figure 1 corresponds with the amount of open space that is yet to be urbanized before 2040, with many additional harmful consequences for a spatial system that is already under severe stress. Moreover, without vigorous measures, the reduction of the daily increase of settlement area will undoubtedly have some delay before (hopefully) heading for 0 ha in 2040. Harm will be done to even more open space as the surface under a bended line will be mathematically bigger than the one under the slanting line mentioned above.

Somehow overlooked, due to the large attention to the 'concrete stop', the white paper also suggests to decrease the rate of sealed surface by at least 1/5 before 2050. Although debates between government and administration are still running about the feasibility, this towering ambition is promising and trend breaking as it also implies a reduction of the already urbanized area. Just imagine the potential of combining the concrete stop, from the start, with the demolition of existing empty, unused or underused constructions and the removal of concrete or asphalt pavements (Figure 2). This creates

the opportunity in 2025 to assess at which more suitable, transit-oriented locations new urban development can be allowed. The strength of this combined story is that the demolition of 'bad' urbanized area will compensate for 'good' new urban development while no additional open space will be consumed.

DEMOLITION AS A LANDSCAPE OF CONFLICT

The demolition of unused or underused constructions and the removal of concrete pavement in a densely urbanized and highly fragmented landscape such as Flanders should be considered a contemporary and topical act of (landscape) architecture and urbanism. It is the spatial expression of a much needed 'degrowth' in current society. Where architecture and planning have always contributed to growth, they now should help society learn to 'degrow'. The 'degrowth' movement convinces more and more people that degrowth is not synonymous with 'getting unhappy' or 'missing opportunities'. It is a transition from efficiency to satisfaction: 'better' is no longer related to growth but to 'having enough'. (D'Alisa et al., 2015) More specifically, the demolition of unused artefacts in the landscape will reduce landscape fragmentation, allow for better development of agriculture and nature, create higher quality for recreational purposes, and, in particular, restore valuable, soil related ecosystem services such as carbon sequestration and nutrient and water cycles. But demolition will of course also meet resistance, first of all because it seems so very unfamiliar. Secondly, although many of these buildings or pavements have been unused for many years, the destruction will be perceived by the owners as an infringement of their property. This perception is even more negative when owners feel deprived of speculative real estate values in relation

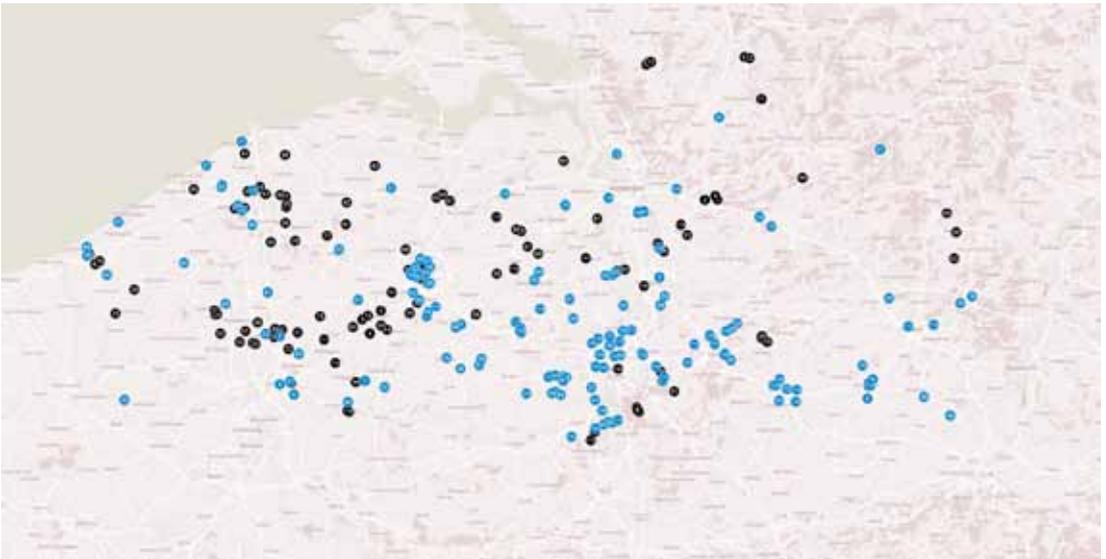


Figure 3. Crowdsourced map showing the distribution of cases across Flanders and Brussels

to current or future planning legislation. Thirdly, owners or neighbors might be emotionally attached to constructions for historical, social or cultural reasons.

These observations illuminate the 'landscape of conflict' demolition creates. A lot of the aspects mentioned above undoubtedly need more in-depth research. But, as 2040 is not that far away, doing nothing is not an option. The creation of 'mental space' in society for demolition is, however, a challenge that can be addressed immediately. Who doesn't know at least one construction in open space he/she hasn't already wondered about why it hasn't been demolished yet and how much better the landscape would be off without? That is why KU Leuven and University College Ghent have recently started to explore the physical and mental space for demolition.

ACADEMIC LEARNING TRAJECTORY

The exploration has been set up as a common learning trajectory of students, teachers and researchers as it is embedded as a research project in the educational programs of both schools. The research ambitions are quite obvious: a screening and typology

of unused and underused constructions that could be demolished, reasons how and why these constructions are still present, their significance for local society, (legal and financial) obstacles for demolition, and ideas and proposals for a qualitative landscape after the removal.

The first step in the learning trajectory consisted of a screening of unused and underused constructions. Students from both institutions were asked to collect real-life cases in their own familiar surroundings. These cases didn't necessarily have to be buildings, but could also include sealed surfaces, bridges or any other sort of construction. The cases had to show clear signs of disuse (or very inefficient use) in order to focus on possible quick wins rather than to run in conflict with current users, or to start never ending debates from the start. Another requirement for the selection of cases was that the removal or demolition needed to have a substantial added value to the surrounding open space once completed. This screening led to the creation and steady growth of a crowdsourced map that by now already contains over 250 entries (Figure 3). The variety of the cases is enormous and eye-opening: from burnt down or

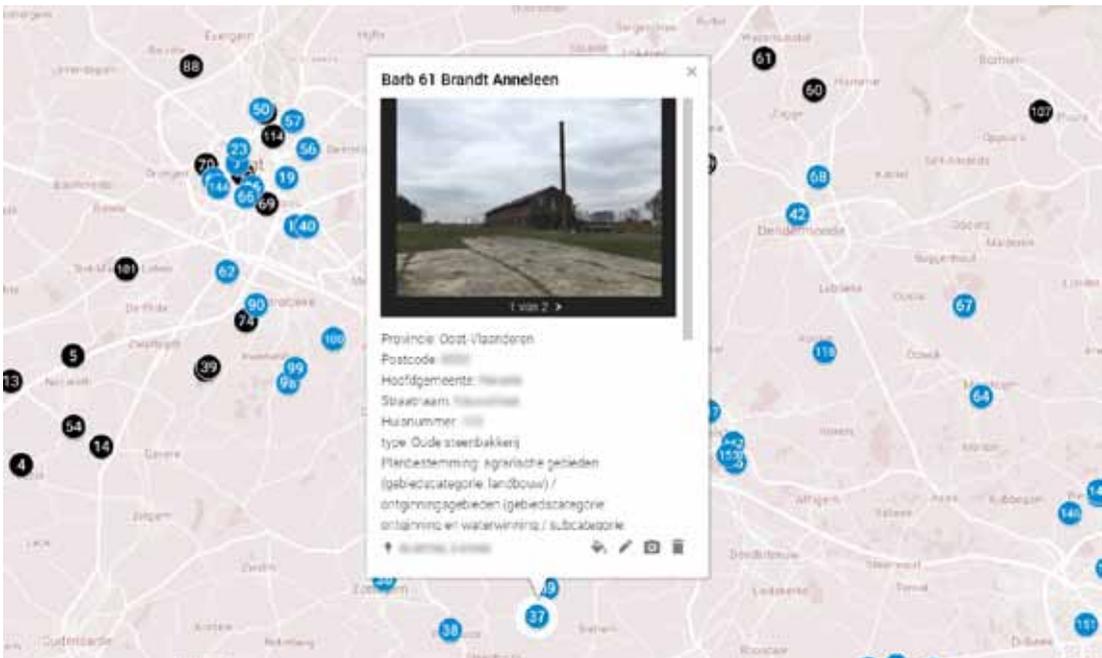


Figure 4. Detailed view of one of the cases (© Anneleen Brandt)

unfinished houses in zones intended for agricultural use to run down and closed theme parks, former military bases and airports, abandoned border control zones, failed recreational development or smaller dilapidated animal sheds.

Per case static info, such as address and planned use according to the land use plan, was added along with a selection of pictures (Figure 4). Also information and particularities about the spatial context and a brief history (as far as known) were included. Finally, students reflected briefly on the opportunities and added value of demolition.

Next, teachers and researchers jointly selected the most intriguing cases that represented best the broad range of cases and that seemed useful to be studied more in depth. The diverse backgrounds of teachers and researchers led to an interesting layering of the discussion on the selection. It was sometimes a challenge to come to an agreement whether a construction should (or should not) be demolished. This included for instance discussions on elements that could become heritage in the future, like on

a weathered grain silo that embodies the vernacular character of the historic landscape (figure 5), but that at the same time can also be seen as 'noise' when purely assessing the impact on soil sealing and visual landscape quality.

In the second phase students were asked, for certain cases, to track down the year of construction and the building permit history, to find out who the owner is, and to collect as much relevant information as possible. This was part of an attempt to find out what led to the loss of use and to the



Figure 5. Weathered grain silo and shed (© Timon Lamoot)

decay, and to determine the factors that contribute to the stubborn conservation of the construction. In other words, what are the obstacles for demolition? These often seem to come down to legal and financial reasons and range from building permit violations prohibiting further use, to real estate developers hoping to be allowed to re-parcel and develop one day, to land owned by government agencies (e.g. the Belgian railway company) waiting for possible future use, or to failed investments. Part of the in-depth case studies also involved interviewing stakeholders. These interviews gathered the narratives and helped try and understand the significance and meaning of the construction for society. Methods of analysis based on narrative approaches have a potential to give voice to actors (owners, passers-by, local residents, ...) that are often neglected in discussions



Figure 6. Before and after photo montage. This villa burnt down and was bought by a real estate developer hoping to re-parcel. Consequent requests for building permits have been denied following the negative advice of the Flanders Heritage Agency (© Stijn Vermeersch)



Figure 6: after

among experts (designers, policy makers, ecologists, ...) (Havik et al., 2017; Van Damme, 2013). Discussing demolition with local residents and passers-by also revealed the different values and meanings that are assigned to the construction and how it should develop, ranging from outspoken emotional attachment to support for demolition (Figure 6). A surprising result was the indifference of some of the local inhabitants: after several years, they didn't seem to notice the empty or underused constructions anymore. The limited time of the student exercise hasn't allowed for a thorough sociological investigation, but it has revealed different points of view and expectations that will play a role when discussing demolition in forums outside of academia.

Interestingly, students liked to use visualizations in their analysis and argumentation. Although design will only be required in the third stage, some students couldn't wait and already visualized their ideas in the form of photo montages (figure 6) and even abstract paintings. Interviews were associated with visualizations of preliminary design scenarios (Figure 7).

A third phase in the academic learning trajectory is taking place as we write. It focuses on the design of the future landscape of the sites of demolition and might even include methods on how this demolition can take place (e.g. instantly, partially, gradually,...). Dutch landscape architect Hannah Schubert was invited for a lecture on slow and natural transformation and the creation of a new reality as an alternative to instant demolition. Her explorative work suggests the introduction of minimal interventions for a maximal transformation by activating natural processes and thinking and planning on the long term. An additional overview of best practices, gathered by students, further focuses on international projects that deal with demolition and



Figure 7. Quotes from discussions with inhabitants, leading to different design scenarios for future development of the site of an unused house in Zingem (© Ellen Van Mechelen and Maité Himpe)

redevelopment, such as Parc des Cornailles by Agence Ter and Alter Flugplatz Kabach by GTL architects. Design strategies, such as reusing and piling brick, asphalt and concrete on site, clearly inspire the designs by the students. Students' design of the Ursel WWII flight base, today used as a recreational area (Figure 8), is based on a gradual transition in time, from an operating airstrip to an ecological connection between the adjacent nature areas, combining the different historical layers of the site. The interventions are simple: the rubber between the concrete slabs is removed and the airstrip is diagonally pierced by green corridors referring to the original parcel structure that still structures the rest of the site. The idea is that nature will take over the site gradually, while the form of the WW II airstrip remains present. However, most of the sites deal with much smaller surfaces or singular constructions. In the case of a holiday

house in a forest – an archetypical result of the *laissez-faire* urban planning policy in Belgium – the surface won by nature because of demolition is only a couple of square meters. But, also the asphalted road leading to the house can be omitted, resulting in much higher benefits. The analysis and redesign of the sites in the second and third phases of the project already demonstrate that demolition is not merely about the construction or sealed surface but relates to its larger material (physical) and immaterial (social, cultural) context.

DISCUSSION

Universities and University Colleges in Flanders have three main tasks: education, research and consultancy. The 'Space for Demolition' project is situated at the intersection of the three. It is a context-driven research, meaning 'research carried out in a context of application, arising from the very work of problem solving' (Limoges, 1996). Flanders' planning practice and its reality are the starting point of the project. Students collect real-life cases in their own living environment. Critical reflection is stimulated throughout the project by means of a theoretical framework provided by the teachers and researchers involved and by experts. Students are also encouraged to think actively about the way in which their findings can be of service to society. They are asked for recommendations on how demolition might be perceived as an opportunity. Moreover, specific stories of people involved are elaborated in the cases, bringing in more subjective feelings about the constructions. Students are also stimulated to think about how their ideas can be made clear - by means of writing and presenting in drawings, visualisations and movies - in a creative and attractive way.

The project induced an interesting cooperation between the architecture department of KU Leuven and the



Figure 8. Analysis and design for the Ursel flight base. Historical analysis, stories of locals and experts and design are gathered in one poster (design in progress) (© Marisa Borobo and Jan De Meerleer)

landscape architecture department of University College Ghent. Teachers and researchers from various disciplines – planning policy, landscape architecture and architecture - interact and discuss on the theme of demolition, often with unexpected results. As mentioned before, the selection of the case studies has led to both emotional and instructive discussions on the advantages and problems of demolition. At that moment, it already became clear that the primary ambition of the project is to link the diverse meanings about demolition, rather than to give immediate and tangible solutions.

A final exhibition in Spring 2019, curated by the Flanders Architecture Institute, will raise relevant questions and stimulate the broader public to reflect on the sense and nonsense of the survival of abandoned constructions in an already densely urbanized landscape. By confronting visitors with recognizable situations and with the potential leap in

landscape quality, the academic learning trajectory will hopefully expand to a larger part of society as a first, modest step in learning how to make space for demolition.

At the end, the project will, in other words, lead to learning outcomes at three levels. Firstly, the students go through a process of self-regulated learning through own case studies. The possibility to choose their own cases enables them to take control. Moreover, they are free to choose their own actions for gathering information, expanding expertise and developing ideas and proposals for a qualitative landscape after removal. Secondly, the multidisciplinary cooperation and discussions between the teachers and researchers of KU Leuven and University College Ghent generates innovative knowledge by integrating the expertise of different disciplines. It sows the seeds for further multidisciplinary research on the theme. And thirdly, the feedback by the commissioning team of the Flemish Government Architect and by the Flanders Architecture Institute and the final public exhibition will lead to an upscaling of the learning outcomes of the project towards policy and society.

It is clear that the societal urge for degrowth poses new challenges for spatial design disciplines. Demolition has proven to be a very interesting entry point for interdisciplinary tuning on this theme, engaging various stakeholders. Although there seemed to be a general agreement on the necessity of demolition, the case studies gave way to both various interpretations and subjective feelings. While planners stress legal possibilities on demolition and the way in which de-sealing can be facilitated, landscape architects are especially interested in the void and possibilities for new green space left afterwards. Architects pay more attention to the objects to be demolished and their value and sustainability. It gives way to fiery discussions about functional, aesthetical and ecological values of

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specific buildings and their surroundings. After all, already now, it has become clear that creating both physical and mental space for demolition might not be as easy as originally thought...

ACKNOWLEDGMENTS

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Landscape Architecture: The (Un)certain Choice in Uncertain Times

PECHA KUCHA PAPER

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Keywords:

employability; Portugal; high education; job; University of Porto

ABSTRACT

2011 Portugal's bailout was followed by a decrease in the number of candidates to public high education, with a great impact in the number of applications to landscape architecture undergraduate degrees. In face of the generalized public perception of landscape architecture as a less competitive and employable degree, this research aimed to assess: i) the level of unemployment of the University of Porto landscape architecture graduates, ii) the level of employment in the field of landscape architecture, iii) the level of self-employment and entrepreneurship, and iv) the geographic distribution of the employment. Employment data from graduates from 9 school years (2006-2014) was collected on social networking sites, personal webpages, and online portfolios, and later updated and confirmed with informers and/or the graduates.

Results show that 85% of the graduates are employed; 64% have a landscape architecture job; and most of the landscape architecture jobs are in planning and design. The majority of the employees work for private companies, but 17% have created their own jobs. 79% of the graduates work in Portugal.

The study has been helpful to adjust the University of Porto landscape architecture study cycles to market demand and to respond to the employment concerns of prospective students.

INTRODUCTION

The financial crisis and, particularly, the austerity measures associated to the Portuguese bailout caused a deep recession in the country, leading to a decrease in the number of candidates to public high education (Figure 1) (DGES, 2018), with a particular impact in the number of candidates to study cycles perceived by prospective students and parents as less generalist, less prestigious, or less employable.

Public high education places in Portugal are proposed by the universities but ratified by the Directorate General for Higher Education. Admission to public undergraduate degrees and integrated masters occurs through a national competition with three phases. Most candidates are admitted in phase 1. Only unfilled places are available for phases 2 and 3.

The number of candidates to landscape architecture undergraduate degrees dropped dramatically in the country after 2010. In 2010 there was a complete fulfillment of the 150 places offered by the five Portuguese schools in phase 1. The number of admissions in this phase fell to 91 in 2011 and has been decreasing since then (60 admissions in 2017) (Figure 2, 3, and 4). (DGES, 2018).

The phenomena affected four of the five schools in the country. The University of Porto (UP) was able to fulfill all the available places and even increased them, from 25 to 30, in 2015 (a year after the bailout closure), but the other 4 schools were unable to regain the admission numbers hold before the bailout (figures 3 and 4). The situation is particularly serious in the two schools located in the interior municipalities of Vila Real and Évora, with the number of 2017 phase 1 admissions being respectively 5 and 2 (figure 2). (DGES, 2018).

In face of the acute decrease in the number of candidates to landscape

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of valid candidatures	53062	52812	51852	46634	45078	40419	42408	48271	49472	52434
Admitted on the 1st call	44336	45277	45542	42243	40415	37415	37778	42068	42958	44914
Variation		0,995	0,982	0,899	0,967	0,897	1,049	1,138	1,025	1,060

Figure 1a: Figure 1: Candidates to public high education in Portugal – 1st call (2008-2017), Source: DGES, 2018

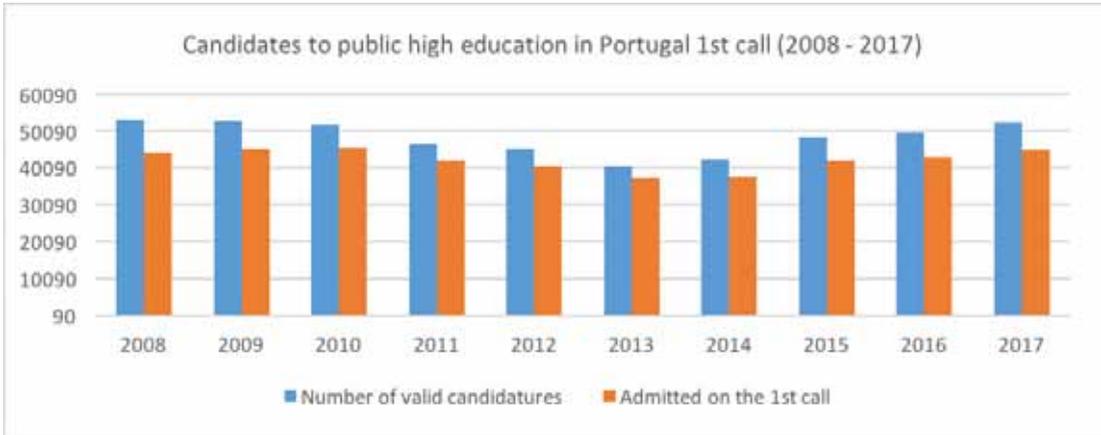


Figure 1b

Admissions	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Algarve (Ualg)	22	25	25	16	19	12	9	12	12	9
Évora (UEvora)	25	27	27	16	13	6	8	11	6	2
Lisboa (ISA-UTL)	45	45	45	23	21	17	11	8	9	14
Porto (FCUP)	25	25	25	25	25	23	23	30	30	30
Vila Real (UTAD)	25	28	28	11	15	25	13	10	8	5
National total	142	150	150	91	93	83	64	71	65	60

Figure 2a: Figure 2: Admissions to Landscape Architecture undergraduate degrees– 1st call (2008-2017), Source: DGES, 2018

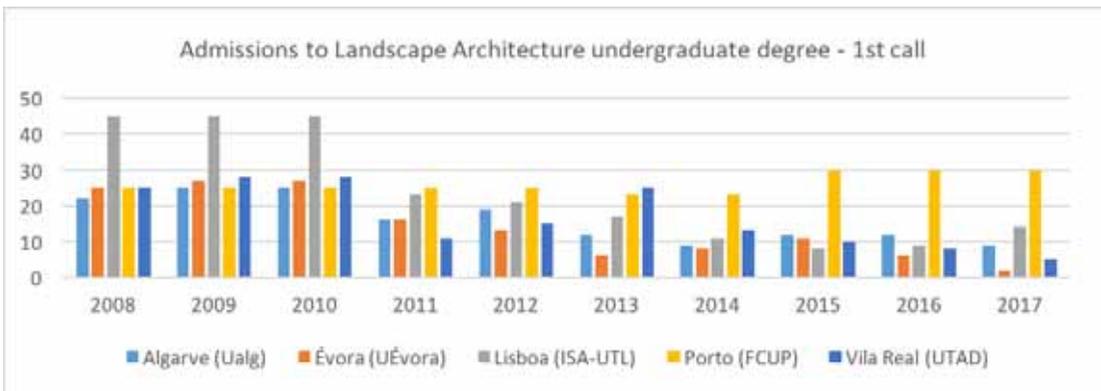


Figure 2b

architecture undergraduate degrees in the country and the generalized perception, among students and prospective students, of landscape architecture as a less competitive and employable degree, the authors conducted this research to assess: i) the level of unemployment of the UP landscape architecture graduates, ii) the level of employment in the field of

landscape architecture, iii) the level of self-employment and entrepreneurship, and iv) the geographic distribution of the employment.

METHODS

To conduct this study, employment data (employment status; current job; job area; employer type; and job location)

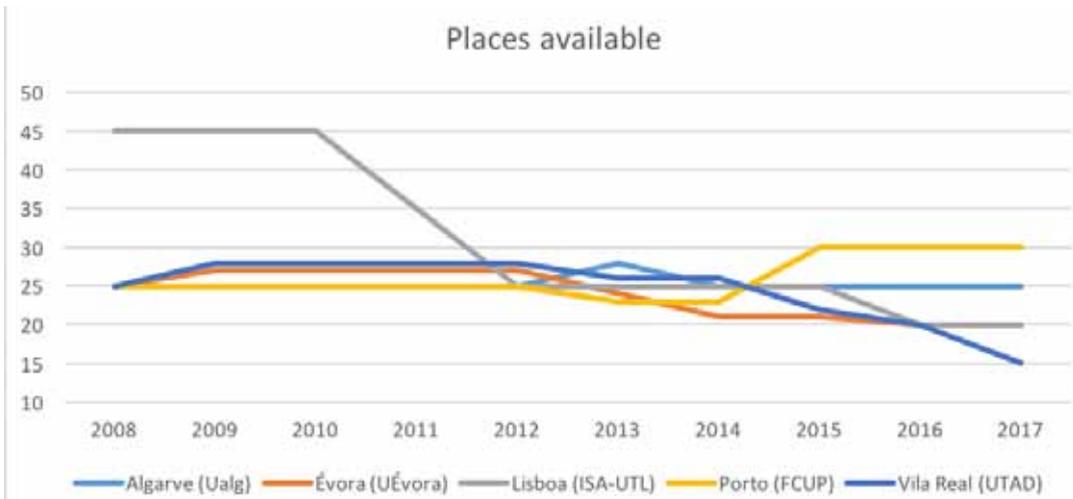


Figure 3: Places available in Landscape Architecture undergraduate degrees – 1st call (2008 – 2017), Source: DGES, 2018

from all the graduates from 9 school years (2006 – 2014) was collected and included in a database. 2006 was the year of graduation of the first UP graduates in landscape architecture, and 2014 the end of the bailout period (2011 – 2014). Graduates from the first four years (2006 – 2009) are pre-Bologna graduates (with a 5-year study cycle); graduates from the other five years are post-Bologna graduates (with a 3+2 study cycle).

Data was collected first on social networking sites (Facebook, Twitter, LinkedIn), personal webpages and online portfolios. It was later updated and confirmed with informers (usually a classmate of the graduate) and/or directly with the graduate. Data was compiled in a database and subsequently treated with descriptive statistics.

RESULTS AND DISCUSSION

Results show that 85% of the UP landscape architecture graduates are employed, with unemployment affecting only graduates from the last 4 years (2011, 2012, 2013, 2014), the bailout years. Except for 2014, levels of unemployment are below general unemployment numbers. The high level of unemployment in 2014 (46%) arises mainly from the fact that graduation

occurred only 2 months before the conclusion of the survey.

65% of the employed have a job in Landscape Architecture, and 11% a job in a neighboring area like Agriculture or Environmental Sciences. Most of the landscape architecture jobs are in planning and design (74%). Construction and maintenance jobs account only for 6% of the jobs, while there are 8 graduates employed in generalist companies doing planning, design, construction, and maintenance. Only 3 graduates have a job in landscape management. 4 graduates work as researchers and 3 in education-related jobs.

These numbers reveal some opportunities to be exploited by landscape architects, as construction and management jobs are still largely taken by graduates in agriculture, and landscape management jobs are either scarce or taken by natural resources managers graduated in neighboring areas.

The great majority of the employees work for private companies, but 31 graduates (17%) have created their own companies/jobs. The study shows the creation of 25 small businesses/firms, 15 of which in the area of landscape architecture.

The central and local administration provide for 20 jobs, a

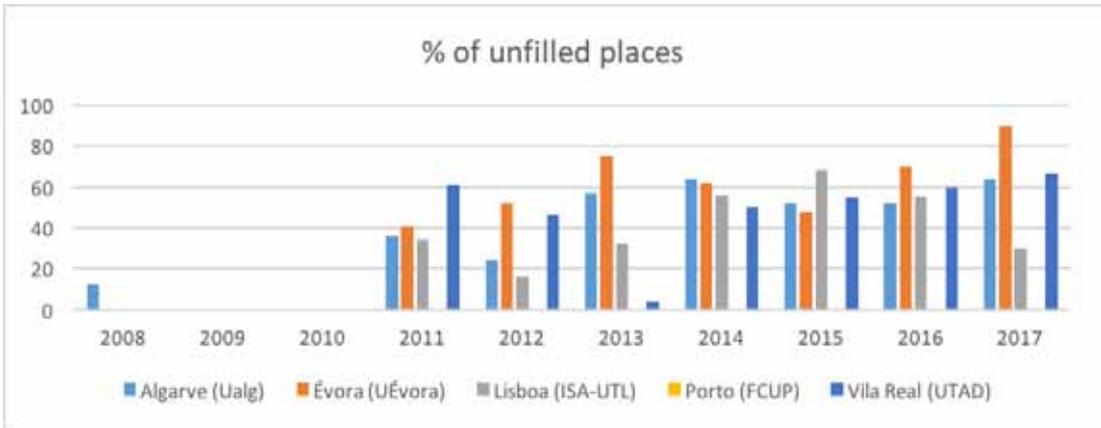


Figure 4: % of unfilled places in Landscape Architecture undergraduate degrees – 1st call (2008 – 2017), Source: DGES, 2018

small amount given the number of municipalities in the country without a landscape architect. While many municipalities acknowledge the need to hire landscape architects for their technical staff, the rules imposed by the Troika prevented the local and central administration to hire new staff. These rules have been slowly overcome, what might create, in the near future, an opportunity to increase landscape architecture employment in the public sector.

79% of the employed graduates work in Portugal, 14% in nine other European countries, and 8% in the other four continents. While emigration is a fate to many graduates in Portugal, the study revealed that emigration was not mandatory to find or create a job in landscape architecture. In a follow-up research conducted by the authors on the topic, landscape architecture graduates revealed as main reasons to emigrate the desire to have a professional experience abroad, the lack of landscape architecture job opportunities in Portugal, and the lack of well-paid landscape architecture jobs in Portugal.

CONCLUSIONS

The majority (85%) of the UP landscape architecture graduates were able to find or create a job, with unemployment affecting only those graduating after

2011.

Most of the employed have a job in Landscape Architecture (65%) or in a neighboring area (11%). Most of the landscape architecture jobs are in planning and design (74%). Jobs are scarce in construction and maintenance (6%) and in landscape management (3%).

Self-employment accounts for 17% of the jobs.

The large majority (79%) of UP landscape architecture graduates work in Portugal. Most of the emigrants work in 9 other European countries, but the diaspora reaches the five continents.

The study results had implications in the 2016 curricula revision of the UP first cycle in Landscape Architecture. Education in Construction and Management has been reinforced and restructured, namely through the increase of contact hours, practical classes and field classes. A successful example of these changes is the Green Spaces Management Techniques course unit, which has adopted a hands-on approach with the creation of practical classes in the UP Botanic Garden. This new pedagogic approach met a longtime requirement of students and was acknowledge, by teachers and students, to facilitate the learning process and the acquisition of competences in management and maintenance techniques (Fernandes et al, 2017).

As for Landscape Management, it has been since ever addressed in the UP Master in Landscape Architecture (MLA). While there is no room in the present MAP curricula to create more course units in this area, the UP Landscape Architecture Group acknowledges the need to provide more graduate offer in Landscape Management, namely in forest management and fire landscapes management. The possibility of creating a new Master or Post-graduation degree in the area is currently under study.

This research was first presented at the 2015 Jornadas AP@UP, a yearly seminar, undertaken at the beginning of the spring semester, aimed to bring together UP Landscape Architecture students and alumni. Apart from the presentation of this study, the 2015 seminar was composed of 10 oral communications, 5 from alumni that have created their own job/company and 5 from alumni working abroad, all presenting a range of strategies to overcome the employability constraints arising from the financial crisis. This seminar was of crucial importance to boost the enthusiasm of the students and their belief in the future.

The study has also been presented, mentioned, or made available in several actions to disseminate the UP Landscape Architecture study cycles and capture new students. In these actions, one of the main concerns of prospective students and their parents was the employability of the Landscape Architecture study cycles. The study has proved to be very efficient in answering these concerns.

While Landscape Architecture continues to be seen in Portugal as study cycle less generalist than Architecture; less prestigious than Architecture, Law, Medicine, or any kind of Engineering; and less employable than Medicine, Economics, and Management, or Engineering, a lot of effort has been done by the University of

Porto and the other universities offering the degree to promote it in these times of uncertainty.

Apart from this employability study, many other actions have been taken to disseminate the study cycles and the profession of Landscape Architecture: dissemination on social networking platforms; actions in the UP Junior University (summer courses offered to basic and secondary school students); collaborations with municipalities and other public institutions; and a national petition to the Parliament to create the professional order of Landscape Architects, among many others.

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Approaching Landscapes: the Act of Seeing

PECHA KUCHA PAPER

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Keywords:

Practice-based research, Landscape

Architecture, creative thinking.

ABSTRACT

This paper discusses how modes of practice found in landscape architecture were deployed as dynamic models for student centred teaching and learning for undergraduate and postgraduate students. This examination is conducted through three teaching and learning case studies that developed an approach to integrate design practice (techniques, tools and process) and projects within a theoretical framework and a historiographical and representational lineage. These three are 'the conference', 'the design laboratory' and 'the expedition'

Each used the terms 'landscape' and 'architecture' as active descriptions of the acts of seeing and acting. The paper will position the active terms of 'Landscape' and 'architecture' as a key part of a within five distinct but contested areas of contribution; Landscape as Field, Landscape as Matter, Landscape as Figure-ground, Landscape as System and Landscape as Found, methodology of enquiry that expands critical questioning within a non-binary approach that gives agency to thinking and making within a spectrum of actions, connections and possible solutions. Evaluate these processes to explore what is required in a student-centred learning approach that has the ability to empower students to think and act critically whilst demonstrating that holding multiple, articulated positions leads to a productive discourse?

INTRODUCTION

The financial crisis and, particularly, the austerity measures associated to

the Portuguese bailout caused a deep recession in the country, leading to a decrease in the number of candidates to public high education (Figure 1) (DGES, 2018), with a particular impact in the number of candidates to study cycles perceived by prospective students and parents as less generalist, less prestigious, or less employable.

Public high education places in Portugal are proposed by the universities but ratified by the Directorate General for Higher Education. Admission to public undergraduate degrees and integrated masters occurs through a national competition with three phases. Most candidates are admitted in phase 1. Only unfilled places are available for phases 2 and 3.

The number of candidates to landscape architecture undergraduate degrees dropped dramatically in the country after 2010. In 2010 there was a complete fulfillment of the 150 places offered by the five Portuguese schools in phase 1. The number of admissions in this phase fell to 91 in 2011 and has been decreasing since then (60 admissions in 2017) (Figure 2, 3, and 4). (DGES, 2018).

The phenomena affected four of the five schools in the country. The University of Porto (UP) was able to fulfill all the available places and even increased them, from 25 to 30, in 2015 (a year after the bailout closure), but the other 4 schools were unable to regain the admission numbers hold before the bailout (figures 3 and 4). The situation is particularly serious in the two schools located in the interior municipalities of Vila Real and Évora, with the number of 2017 phase 1 admissions being respectively 5 and 2 (figure 2). (DGES, 2018).

In face of the acute decrease in In response to the increasing expectations from students, institutions and workplaces in regard to 'work integrated' learning experiences this paper explores the question; 'In

what ways can modes of practice be integrated into a creative learning environment beyond conventional internships or placements?’

This paper discusses how three dynamic ‘practice-based teaching’ models; *‘the conference’*, *‘the design laboratory’* and *‘the expedition’* were developed for the purpose of engaging multiple intelligences in order to develop both lateral and linear thinking. This is an expansion of what is commonly understood as the ‘studio learning model’, into a ‘collaborative and cooperative’ learning model which suggests a pedagogical structure customised to various types of disciplinary learning and doing.

In the Discipline of Landscape Architecture creative forms of intelligence are discussed in teaching and learning environments, however rather than arguing for an either-or-model, in this paper we suggest that multiple forms of intelligence may be engaged, which we title as a ‘practice-based model’ for teaching and learning. This is explored as a model to enable multiple forms of engagement and learning capacity which is inherent in the process of learning for the discipline.

A dissemination of this model will be made through three teaching and learning case studies that each developed an approach to integrate design practice (techniques, tools and process) and projects within a theoretical framework, and a historiographical and representational lineage.

The articulation of these processes of positioning within modes of practice were developed to equip students with the ability to engage in a ‘practice-based’ learning process and develop an awareness in creative intelligence, in which students are empowered through a process of creative critical thinking and connecting the *‘act of seeing to the act of thinking and doing’*. The aspiration is to develop a pedagogy of practice-based

learning that has the ability to empower students to think and act critically and demonstrate that holding multiple articulated positions creates a productive discourse which contributes to disciplinary understandings.

**‘Landscape’ / ‘Architecture’ |
‘Seeing’ / ‘Acting’
Structuring disciplinary
dichotomies for rhizomatic
learning**

‘the rhizome pertains to a map that must be produced, constructed, a map that is always detachable, connectible, reversible, modifiable, and has multiple entryways and exits and its own lines of flight’.
(Deleuze and Guattari 1987)

Historically landscape architecture has drawn from practices of ‘seeing’ for example, landscape painting, mapping and GIS. At the same time forms of action have been modified from gardening, architecture, painting and other fields. Taking this idea of multiple lineages as a starting point, a teaching practice was developed that actively used the tension between processes of seeing and acting in landscape architecture to establish a dynamic frame of reference for analysis and positioning, in which the act of positioning is always in motion and capable of producing multiple threads of connection. This oscillating framing of seeing and acting became a way for students to explore ideas using multiple intelligences and establish a suite of tools for students to position their own work and the work of others.

A key part of this approach is around the examination of the very term ‘landscape architecture’. The terms ‘landscape’ and ‘architecture’ were used as operative descriptions of the processes of seeing and acting in design. The interplay between the terms unfolded as a methodology of enquiry that expanded critical questioning

within a non-binary approach that gave agency to thinking and making within a spectrum of actions, connections and possible solutions.

The three models of the 'conference', the 'design laboratory', and the 'expedition' were the means through which these ideas were developed and tested in three core courses across undergraduate and postgraduate levels within the disciplinary field of landscape architecture. They were learning models that prioritised, but were not exclusive to, learning which was either self-reflective, collective & collaborative, and or discursive.

Case Study 01: The Conference: (self-reflective learning)

Course name: Theoretical Frameworks III

An undergraduate course was developed as part of a suite of three covering theoretical frameworks of Landscape Architecture. It was designed around the practice-based model of a conference. The ambition was for each student to come to a key question or position on a contemporary project through examination of related projects, approaches and techniques of production.

Within this mode of practice, the learning was structured in three key ways. The first around the concept of landscape (ways of seeing) and architecture (ways of acting) to assist a constructed analysis of contemporary practices and projects. The second was through the act of drawing as a way to position and construct an argument around the project through representation. The third was through the combination and connection of this information into a verbal conference presentation and question and answer session.

Within this framework students have been enabled to hold multiple positions and the development of agility in taking on roles and perspectives.

In this way the students were engaged in self-reflection as a continuous process of positioning using multiple intelligences. Through positioning of the project, their individual relation to it and the constellation of relations through drawing, writing and discussing the students undertook processes of connection usually found in the design studio environment.

Case Study 02: The Design Laboratory (collective learning)

Course Name: Project A & B

A final year, independent

project course within a coursework masters, this course was designed to focus and extend the techniques, approaches, modes of representation, and modes of positioning to enable an individual design research practice to be developed and defined within the discipline of landscape architecture.

Within this course there were multiple design research 'laboratories' formed around different approaches to the act of design in landscape architecture the laboratories were organised through three phases over the course of the semester and were structured for students to position their independent research in a context (the collective) that allowed framing and connection of a project lineage.

The deliverables were explicitly framed around commonly found types in practice. The students identified a stakeholder, client and user group. These varied audiences informed the development of the design research project, from multiple perspectives and the production of an exhibition, a document and a verbal presentation that was specifically tailored.

Across the course there were four phases designed to scaffold the building of a critical project brief and set of responses. Phase 1: positioning, Phase 2: techniques of analysis, Phase 3: techniques of forming and Phase 4: techniques of connection.

Through modelling practice

delivery types, the students positioned their projects and refined communication strategies across multiple forms of intelligence.

Case Study 03: The Expedition (discursive learning)

Course Name: Design Research Seminar

In this postgraduate seminar course, students adopted the role of an 'explorer' in order to develop and question the role of mapping. In this way the person of the explorer acknowledges the construction of the map as a critical and creative act. The perspective of the explorer as a narrative device reveals and connects techniques, assumptions, ideas and realities.

Through the expedition students engaged with fictional notions of fieldwork as a post factual condition that is constructed, positioned and curated through a suite of drawings and a written narrative that are in dialogue with each other.

Across the course there were three phases in which each was simultaneously both analytical as well as creative; Phase 1: constructing the brief and site, Phase 2: constructing a suite of maps, Phase 3: constructing narratives

The role of the explorer was structured to simulate a practice model that is stakeholder oriented in its critical positioning and view of the world. It is to enable students to develop discursive methods between multiple subject matter and intelligences.

CONCLUSION

This work contributes to Landscape Architectural learning and teaching practice in five key ways.

- Explores diverse models for practice-based research beyond internships and placements.
- Utilizes a range of operative

devices to engage students in processes of multiple forms of intelligence.

- Develops a pedagogical structure that encourages deep learning
- Develops a pedagogical structure customised to disciplinary learning and doing.
- Empowers students with the capabilities for self-directed lifelong learning

Howard Gardner in *Multiple Intelligences* identifies eight intelligences in which design is not listed, however design can be identified in many that that he lists; linguistics, logical-mathematical, spatial, musical, bodily kinaesthetic and intra-personal. Vaughen (2007) highlights the notion that design may be regarded as one of many intelligences that demonstrate it not be a singular capability but clarifies the 'nature of design ability and offers a framework for understanding and developing the culture of design'. If we then consider that practice-based teaching and learning has a multiplicity of approaches to the disciplinary field and practice, then this requires different forms of understanding in the teaching and learning context, which will vary according to areas of disciplinary contribution, techniques, approaches and projects.

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Learning Landscape Design by Facing a Real Professional Talk

PECHA KUCHA PAPER

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Keywords:

public presentation, external evaluation, park
"Podpinjol", Rijeka

ABSTRACT

School of Landscape Architecture in Zagreb has been trying for years to provide each student generation, at some stage of their study, with at least one opportunity to work on a real project/task, whether based on the needs of a local community, a public competition or a project initiated by the students themselves recognizing a specific spatial problem.

In this paper, the authors / mentors will elaborate their vision of the challenges, the benefits and the limitations that such an approach provides to the teaching of landscape design, which often requires increased work effort both from students and mentors, as well as additional time for the realization of the project.

The emphasis will be on presenting the task of designing a historical park "Podpinjol" in Clinical Hospital Centre Rijeka, which was in many ways a new and specific experience for all involved - the initiator, investor, students, mentors and conservation services.

The crowning achievement would be the construction of the park.

INTRODUCTION

Graduate students of the School of Landscape Architecture Zagreb learn about the park (or any other topic) by listening to lectures on the contemporary park design, the development of park design, by analysing both recent and historic examples and, finally, by designing a project of their own.

This surely is a serious and common preparation for the future professional encounters with the usual design tasks, but is it really enough?

The challenge of an encounter with a real project location, real investor, real specific requirements of its future users (whether these are already defined or need to be questioned, so called "wicked problems" as defined by Rittel (Protzen and Harris, 2010)), the challenge of the cooperation within a team, of articulating one's own standpoints and arguments within a project team, the challenge of competing with other teams, as well as the challenge of a public (joint) presentation to the professional and non-professional audience. These are all common situations for professionals but the students usually remain unaware of them during the regular course of education. The importance of finishing the master level "with a strong relation to practice through real life projects and with the help of teachers who practice" is also emphasised by Gazvoda (2002).

A rare opportunity to comprise this integral process in a very limited time span was offered to the teachers / mentors and students of the 2nd year graduate study in the academic year 2016/17 – to elaborate a professional project of the Podpinjol park in the Clinical Hospital Centre Rijeka.

HISTORICAL PARK "PODPINJOL" IN CLINICAL HOSPITAL CENTRE (CHC) RIJEKA

CHC Rijeka is situated in the northwestern part of the wider city center and in its northwestern corner is the Podpinjol Park (Figure 1.). The entire area is under protection, but lacking the relevant historic documentation or at least the living memory of the citizens.

Until recently, this rather small, heavily overgrown and unpleasant green area, situated on the hilly slope, presented more a threat to the complex



Figure 1. Park Podpinjol position/current situation

of the Clinic than a potential for leisure. Although located in the vicinity of the mostly frequented hospital parts, during the long period of neglect the area suffered and lost its clear boundaries and entrances due to the invasive spread of the nearby roads and automobiles parked along them, until the natural succession process and the absence of regular trimming completely shrouded the earlier structure.

Only after the sanitary clearing of the vegetation was performed at the end of 2016, the cleared area showed its unusual natural stone beauty, decorated mostly with the indigenous trees and bushes, as well as the existence of articulate, albeit neglected walkways and a few peculiar, unusual benches cut out in live rock.

In the vision of the hospital management in one brief moment the impassable bushes turned into valuable space that could be offered to patients,

their visitors, hospital employees and passers by to use.

It is well known that the soothing effect of the designed green spaces improves the well-being, reduces the stress and even enhances the healing process and recuperation, which all together adds value to this vision.

COOPERATION ROLES DEFINITION

Faculty of Agriculture, University of Zagreb, readily accepted an invitation from CHC Rijeka and the Takeda Pharmaceuticals company to collaborate in defining the contents and the landscape design of the area.

It was clear right from the start that this invitation offered a possibility to include students in the project and enhance its design and educational aspects.

The roles in the project were clear:



Figure 2. Students' designs: Teams „Koi“ and „Krug“

Takeda, as the initiator of the landscape design of the Podpinjol area will finance the project, the students of the School of Landscape Architecture will explore the potentials of the area in their works, the Department of Ornamental Plants, Landscape Architecture and Garden Art will extract the project programme from the students' proposals, make the final project design and obtain the Conservation Authorities approval, while CHC Rijeka will collect donations for its construction.

STUDENTS' WORKSHOP

It was planned that 15 students of the second year of the graduate study of Landscape Architecture, split into four groups, led by two mentors, will develop four concepts of landscape design which will constitute the students' project work within their regular education frame.

First, the students visited CHC

Rijeka on January 30th 2017. The visit commenced with the introductory speech held by the hospital head, prof. Davor Štimac, PhD, and was followed by the tour of the hospital and park location, where students took photographs, made sketches, met the architect of the restaurant currently under construction in the immediate vicinity of the park, analysed and discussed the topic with the mentors...

Back in Zagreb, the students elaborated their concepts of the park's landscape design during the very intensive two weeks' workshop.

The intensive multi-hour multi-day team work on the project with the constant presence and interventions of the mentors were the main challenges for the students as well as for the mentors during the first week of work. Association to the Japanese initiator of the project is an integral part of the task.

The teams emphasize their inspiration sources by naming their



Figure 3. Students' designs: Teams „Industrija“ and „Uvikontra“

groups: „Koi“ (Japanese fish), „Krug“ (Circle), „Industrija“ (Industry) and „Uvikontra“ (Alwayscontrary“) which on the symbolic level enhances coherence and the sense of belonging to the group, but also serves as a constant reminder of the basic idea.

Approximately in the middle of the process the students had the opportunity to present their concepts to the hospital head, during which the students and their mentors had the opportunity to hear the first-hand comments and observations.

The critical remarks and realistic assessment (primarily because of the financial constraints) discourage some students and almost make them want to abandon their concepts or even leave the workshop. Such emotional and work downward tendencies are not uncommon in workshops held under the increased pressure (high quality requirements and very limited time) and these crises represent additional

challenges for the mentors. Mentors insisting on the improvement of the original concepts, instead of changing them resulted with four mature, finalized and very diverse design proposals within ten days. The „Koi“ team adds a video clip to their presentation (a walk/fly through presentation) and this induces two other teams to make their own video clips in the same technique. „Koi“ then adds a very illustrative model to their presentation and the other teams can't follow their initiative!

The exhibition was set up in CHC Rijeka on February 27th 2017 and the accompanying presentation of the students' landscape designs of the Podpinjol Park was held that same day, followed by the discussion with the representatives of the investors and initiators, representatives of the town authorities and patients' associations. The discussion brings out the individual qualities of each design which became important parts of park programme. (Figure 2. and Figure 3.).



Figure 4. Park „Podpinjol“ Construction Project

A month-long students' work public exhibition brought also an unexpected result – the official Conservation authorities response / statement : „We would like to compliment the initiative to entrust the design of the Park Podpinjol to experts - landscape architects, to give students the opportunity to be a part of the project, to organize a public exhibition of their designs and thus popularize still inadequately known profession in the public and at the same time to set up an example of proper design approach” (Dumbović – Bilušić, 2017).

The feedback on web pages, the published pdf brochure and the flyer with students' works all helped the investor to animate and attract the donors and at the same time contributed to the visibility of the School and the LA profession.

PARK CONSTRUCTION PROJECT

The previously accumulated experience and results of the education process significantly facilitated the articulation of the project task (Van Etteger, 2017) and the explication of the desired design premises: to define the exact park borders, to retain the original park matrix as much as possible, to preserve the valuable historical elements and simultaneously introduce the contemporary ones, to preserve indigenous vegetation, but also subtly introduce new plants and to adapt the walkways to the needs of the disabled.

The historic source research proved the non-existence of any park documentation but it brought to light important information about its immediate vicinity. Insisting on a more detailed additional land survey of some key areas resulted in the adequate accuracy of the plan (Figure 4.).

The initial intention to include the participating students in the professional project was unfortunately not realised but one student participated in the 3D presentation of the project.

CHALLENGES, BENEFITS AND LIMITATIONS OF THAT SPECIFIC EDUCATIONAL-PROFESSIONAL APPROACH

Involving the students in the design process necessarily slows it down but on the other hand it multiplies examination possibilities of the park space potentials and park programme through several different designs (as it is done in competitions).

The mentors' task is to encourage the students to preserve their design diversity but also to be prepared to accept partial external interfering in the educational process and the final evaluation.

The students are expected to work in a short time frame, in partially randomly formed teams and to come up with their best and presentable designs that will be publicly presented and evaluated both by professionals and non-professionals, as well as investors and initiators.

Crisis situations similar to those encountered by professional teams present additional challenges both for students and their mentors and generally are a new experience for students.

The initiator and the investor are taking part of the risk in such a process because of its unpredictable results, but in return they have the satisfaction of collaborating with the academic community which gives (or should give) a certain aura to the undertaking. Moreover, the investor can use the students' works to animate the donors even at an early stage.

CONCLUSION

This kind of workshop often requires increased work effort both from students and mentors as well as additional time for the realization of the project. Also, it should be taken into account that this form of teaching includes subsequent travels and additional presentation expenses for which a budget needs to be provided (either from the project's own funds and/or additional financial support by the Faculty, investors or initiators).

Experience shows that students working on such tasks show greater motivation and, without exception, achieve better results.

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INTRODUCTION

Fieldwork in Landscape Architectural Education: some Personal Experiences in Teaching and Backgrounds

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ABSTRACT

Fieldwork is one of the characteristic and key elements of landscape architectural education. Teaching landscape architecture is based on learning to work in 'real life' situations and environments, fieldwork is part of that. In this paper I would like to share some of my personal experiences on fieldwork in different teaching forms and in different schools and relate them to experiences and publications on the subject by others.

The problem definition is what content and role of fieldwork in landscape architectural education is and what backgrounds it is based on. In the first part I will give a brief overview of the different types of fieldwork and how they function in their teaching context. In the second part content and role of fieldwork in education will be further elaborated. In the third part some backgrounds of teaching fieldwork will be worked out; pedagogy and didactics.

One of the conclusions is that fieldwork is so fundamental that it is often quite implicit in program descriptions and curricula. Including fieldwork in teaching and making use of it in design is a specific didactic quality that not all educators automatically have, even if they are experienced landscape architects.

This is a paper on one of the key teaching modes in landscape architectural education; fieldwork. It comprises excursions, site visits for design projects, visits of realised projects, both in the home country and abroad.

No program in landscape architecture can be without fieldwork as core of education. In the field the landscape is observed, studied and experienced in real time. Even though fieldwork is an essential part of all landscape architecture education there is remarkably few attention for fieldwork in research and publications. Just two examples as illustration; in the ECLAS conferences of the last five years (2013-2017) there were only two papers explicitly on fieldwork (Oles & Horrigan, 2015; Saniga, 2016).

The paper of Oles & Horrigan (2015) is quite explicit on the content and role of fieldwork in landscape architectural education in their statement: 'We wish to make fieldwork methodology the core of landscape architecture education.' The authors see a gradual decline in the role of fieldwork in landscape architecture programs because of the growing tendency to 'formalize landscape architecture as a science'.

The second example; in textbooks on landscape architecture no attention is paid explicitly to fieldwork even if site analysis is mentioned. As illustration I mention here; Bell (1999), Motloch (2001), Holden & Liversedge (2014); in none of the three fieldwork, excursions, terrain visits is explicitly mentioned or dealt with.

There are many other disciplines that also rely heavily on fieldwork as part of their educational programs such as geography, social sciences, archeology, geology, soil science, hydrology, geodesy and more. I found one publication explicitly dealing with fieldwork in geography (Bolton & Newbury, 1967).

TYPES OF FIELDWORK

Fieldwork as part of learning to see, experience and analyse the form of the landscape as object of planning and design

The paper is based on my own experiences as a student in two schools (Wageningen and Berkeley, California), my research in different institutes in Wageningen and after that my teaching and research experiences in four different schools at the Master's level (Wageningen, Versailles, Delft, Budapest). The context, experiences and references are predominantly European. In working out the problem definition, three research questions have been distinguished:

- What is the content and role of fieldwork in landscape architecture education?
- Which types of fieldwork can be distinguished?
- How can fieldwork as integral part of landscape architectural education be taught: pedagogy and didactics

The research method is based on the principles of case study research (Zeisel, 2006). The cases are the different teaching experiences in fieldwork in different schools in the Master's.

Learning to see is typical for the start of education in most disciplines. Especially for a design discipline this is a key issue in the beginning. It starts with making a distinction between visible and invisible phenomena; in the landscape everything below ground level such as groundwater, soil, geological material is only indirectly visible. It not only means focus on specific phenomena but also learning to see relations between phenomena such as the relation between form & use, soil & climate & vegetation. Form is related to formation (what are the forces behind the form?) and giving form (Fig. 1).

Learning to see can be taught in different ways and in different forms. Documentary analysis of sites, settlements as for instance in the case of Kattendijke (1973) — a small settlement in Zeeland — where students spent a week in the settlement to



Figure 1:
Left: learning to see form, size, scale and level. MLA students from Budapest make a boat trip on the river Danube during one of their fieldtrips on 'spaces of flow'. The river is here between 250-450 meters wide. Seeing the river and being part of the space of the river gives a different experience of the urban landscape than seeing it from the city.



Right: excursion to contemporary projects
Students of the International Course in Landscape Architecture on a two-day fieldtrip to Zeeland and the Deltaworks. Here students are discussing their observations and conclusions and comparing them to plan documentation of the project to be analysed. The regional scale is not so easy to grasp and to comprehend because you cannot oversee the study area without maps and map reading and understanding is not easy. The International Course in Landscape Architecture in Wageningen no longer exists; with the introduction of the BSc/ MSc system it was no longer needed.

document the site in drawn maps, cross sections, details, axonometries. So the exercise is a dedicated project.

Another example is a week of sketching in the field, part of the program in Wageningen and Versailles, where basic aspects of landscape perception are dealt with, for instance in Wageningen under the title of 'Het begrijpen van het landschap d.m.v. schetsen' [Understanding the landscape through sketching] (Baarsel, 1990).

In landscape architecture the distinction between size, scale and level needs special attention. Size refers to physical size of elements, distances and elevations in the landscape. Scale is relative size. If we talk about the human scale, humans are the relative size against which the object is measured. The German landscape architect Latz stated that students can only get to know the nature of scale by working on a scale 1:1, so in fact realising a plan (Weilacher, 2008). His students practiced in the school garden by realising elements of gardens or even complete small gardens.

Level is dependent on the size of the project; in a small garden the level of structure is of a different scale than in a region. In design projects we speak about the levels of intervention; strategic, structural and material level.

The result of learning to see, experience and analyse the landscape is to learn to distinguish between land, landscape and landscape architecture on the basis of form, structure, functioning and use.

Fieldwork as part of studio teaching; site analysis and design history

A point of departure in any landscape architectural project is a site analysis. This is also the case in education; especially in the design studio. It is a form of research during the design process that has already a

long tradition.

A crucial aspect of site analysis is to study use in relation to form and how they influence each other; the social use of space (Fig. 2). For designers it is important to investigate whether and how designed space influences the use of space.

Finding the right location for a program is another aspect of site analysis; think of Vitruvius (1999) on the finding of the right location for cities. In his 'The site of the city' (Ch. IV) he is explicit on a close investigation of the site in order to make a good choice. He considers different aspects of the site in different landscapes to be taken into account. He gives detailed instructions on what to look for on the spot and is thus the first to emphasise the importance of fieldwork in written form.

The same goes for the site analysis Le Nôtre did for his projects, be it redesign of existing gardens or design completely new ones. Le Nôtre was thinking and working at a structural level in order to organise these large size spaces in his projects (Mariage, 1990). He integrated drainage and changing the natural water system by major ground work into a newly created structure by making use of the laws of perspective to create new ensembles. For his site analysis he used the most advanced technology of his time, the first instruments to measure elevation and location by triangulation (Farhat, 2013; Maroteaux, 2013).

Excursions for getting to know historical and contemporary projects

Building up a generic body of knowledge about landscape architecture is part of all programs. Depending on the program, the origin of the school and the teaching staff, such a teaching on the foundations, history and backgrounds of the discipline can be very different.



Figure 2: An excursion with students to Japan; the Ryōn-ji garden in Kyoto. The garden is one of the most famous of Japanese gardens. Having seen images of it at the internet from every corner and during every season doesn't come close to the experience even for a European who does not speak or understand Japanese. The cultural dimension of garden design in Japan stands out here, this can also be experienced on the site. The contrast of the garden with its direct surroundings of contemporary Kyoto is striking.

The primary goal of such excursions is to learn about the archetypes of examples of gardens, parks and landscapes by seeing, analysing and experiencing them in real. The research question is to observe and analyse on the spot which not only gives an idea about the design history but also how such a project is functioning and used in contemporary context; the regional and cultural context is an important issue (Fig. 3).

Excursions abroad are in most cases longer than a week and need special attention in the organisation and preparation in order to get the maximum effect and result. They are formal part of the program with work load in ECTS and grading. There are three basic components in the organisation of these excursions; preparation and making an excursion guide, the journey with an itinerary and program, after return the working out of observations and analysis and presentation of results. The use of a journal or notebook is mandatory. An example of use of such a basic structure for fieldtrips abroad can be found in the publication on a fieldtrip abroad for Wageningen students to Paris (Meijden et al., 1976). In Europe in most cases these excursions will be abroad which will also give an opportunity to learn more about other countries and schools. Visiting schools abroad is always interesting for students to meet their peers in another country and culture.



Figure 3: The relation between 3D and 2D; map analysis. In perception of the landscape the relation between 2D & 3D, is a key issue. 2D refers to maps while 3D to the landscape in the field; without (topographic) maps you cannot observe the landscape in a professional way. Above a rapid analysis from the GoogleEarth map; during an excursion to France we also visited La Grande Borne, an urban extension south of Paris. While visiting the project it was difficult to figure out the size of the circles of the flats some in serpentine patterns, because they are extremely difficult to measure or even to estimate. When working out the fieldwork students discovered the one basic size of the circle pattern being varied into different patterns just by making use of GoogleEarth. New technologies offer unprecedented possibilities for use in the field, for instance cross sections can be measured from GoogleEarth. Rekkittke & Paar (2011) elaborate on working with new technologies in circumstances where there are no maps of other cartographic materials available and where these new technologies enable to do fieldwork with drones, mobile phones and lap tops.

CONTENT AND ROLE OF FIELDWORK

Perception

Perception starts with the landscape we see; the image of the landscape. Different people see the same landscape differently; this depends on their viewpoints (Meinig, 1979).

Moreover the image relates to form of the landscape but is not the same because parts of the landscape are not visible since they can be hidden or underground. Learning to see the relations between image, form and formation is the heart of the matter. What are the forces — natural, socio-economic, cultural — behind the form and how does the form of the landscape change due to these different forces?

Perception is more than just seeing; it also implies use of other senses and it is always related to a goal (what are you looking for?) and leads to experience (Fig. 3).

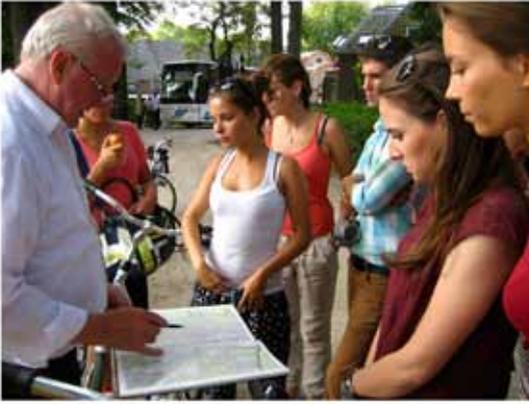


Figure 4:
Site analysis; what you see in the field and what you see on the map. Left: Hungarian students on excursion to Holland on the bicycle. Before departure a short explanation is given of the itinerary on the topographic map. For foreigners the Dutch landscape has two aspects that are not so easy to distinguish in the field. First of all the small differences in elevation that are hardly visible yet making big differences in land use and occupation. Secondly being below sea level sounds more spectacular than it looks like in the field; in most cases you need the topographic map to find it out.

Site analysis

A site analysis is in most cases related to an assignment in the studio. In a site analysis the landscape is analysed in a systematic way. The program defines goal and problem analysis. One of the techniques in site analysis is to distinguish between horizontal and vertical relations (Toorn & Bonin, 2012). The horizontal relations are analysed in making sequences and cross sections while the vertical relations are based on map analysis. Relating vertical to horizontal relations gives also an insight into the landscape development in the long run and how that influences the contemporary functioning and (land) use of the landscape (Fig. 4, 5).

Analysing and relating patterns and processes gives further insight into the dynamics of landscape form, its functioning and use (Bell, 1999; Toorn & Bonin, 2012).

Analysis of plans; precedent analysis

Learning from plans, realised or not, is used in all design education. There are differences between the various design disciplines though, in



Right: Explanation and discussion during fieldwork. Discussion in the field on a specific problem that students had with the interpretation of the geological map during an excursion to Scotland. For Dutch students — and the teacher — the geology of Scotland is totally different from Holland and not so easy to grasp and understand. From a geological point of view, Holland is very young while Scotland is much older and far more complicated. That's why parts of Simon's book (Bell, 1999) that deal with cases referring to the geology of Scotland is certainly not for first year students.

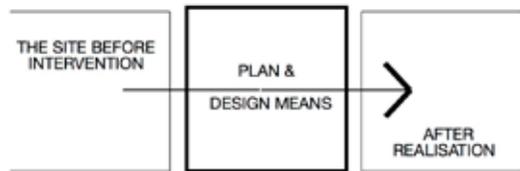


Figure 5:
Analysis of plans is based on the principle of comparing the site before intervention with the plan and the plan after realisation. In case there is a predefined analytical framework as basis for the analysis, we use the term 'precedent analysis' (Toorn & Guney, 2011). The analytical framework comprises three steps in the analysis. In the analysis of the site before intervention the landscape is analysed in its functioning as a natural system, a socio-economic and a cultural system. The plan is analysed on the basis of existing site and program, which leads to design means as basis for the interventions on different levels. In the realised plan the analysis focusses on how the design interventions have affected functioning and use — or not.

landscape architecture the relation to context the existing site before intervention and in some cases the design history, forms a characteristic part of it (Fig. 6).

Precedent analysis can contribute substantially to insights on effectiveness and efficiency of design means and as such enlarge and deepen explicit design knowledge. This knowledge will enable designers to make use of the principles and apply them to a different site and time. At the moment this design knowledge is mostly implicit and not empirically based.



Figure 6:
A special aspect of learning in real life and in real time; the embodied experience of the landscape. Albert Fekete with students climbing the Piatra Secuiului Mountain (Székelykő, "Rock of the Szeklers"), a looming 1382 m high outcrop in Transylvania.

Left: a number of exhausted students who keep asking him how long it still takes to get up while we are only half way. Right: everybody has arrived on top and enjoys the magnificent view of the village and the valley. Next to the basics of learning to see, to see relations between phenomena and coming



to grips with the form of the landscape, there is also the 'embodied experience' of the landscape. Albert Fekete from Budapest takes students into the Transylvanian landscape and let them walk long distances and climb mountains. Of course he explains about the geology, vegetation and history of the occupation but he also explicitly mentions to students that it is important to experience the landscape with their bodies, finding out what distance, elevation, material means in their own personal experience (Toom, 2015). He considers this a basic foundation for landscape architectural education.

TEACHING APPROACHES, PEDAGOGY AND DIDACTICS

Teaching approaches

In general we distinguish between different types of teaching; instruction, learning and education. These different types of teaching are not only different in form but require also a different approach and method.

Instruction is learning how and relates to professional techniques. The skill to use GoogleEarth is such a technique which is basic for all landscape architects.

Learning is teaching how and why. For instance in courses and seminars on applied planting design you learn how to use plant materials and why (depending on function and program).

In education students not only learn how and why but also about values of good and bad, of aesthetics. In education the discipline and its approaches is related to its role in society, to values.

Pedagogy

Pedagogy is the science of education. One of the key issues

in pedagogy is 'learning theories', such as behaviourism, cognitivism, constructivism, experientialism and social and contextual learning (Wilson & Peterson, 2006). Learning theories not only make us aware of the different ways of learning but also are of great use in setting up new elements in the curriculum and setting up a curriculum as a whole.

In design disciplines the pedagogy is different from that in other disciplines because design is about imagining, conceptualising and realising elements and environments for the future which is unknown. In fieldwork in landscape architecture the pedagogy is first of all based on the concept of learning in real life & in real time, on learning based on an active attitude from students and teachers and on the dynamics of form and use.

Below I have chosen three issues to illustrate that.

1. Learning in real life and real time

Fieldwork demands for a fundamentally different pedagogy than studio teaching, lecture courses and seminars because direct experience is the heart of fieldwork. This direct



Figure 7:
Analysing the relation between form, functioning, use, construction. Left: students of the International Course in Landscape Architecture from Wageningen analysing the Schouwburgplein in Rotterdam to study its functioning and use. We always start with a short introduction about the project and its backgrounds. Then there is a short explanation about the assignments for the different groups for this project and after that students can start their work in the given time schedule. Fieldwork is best organised in groups that study different subjects. Each group gets a subject — such as ‘plantation as design material’, ‘form & use’, ‘transitions’, ‘water system & hydrology’, ‘metalling’ — and focusses the analysis in the field on that subject. After returning from the fieldtrip, the observations, measurements and impressions are

worked out and presented to the others. It has the advantage that everybody observes the same landscape but discovers different aspects. In this way students immediately become aware of the complexity of the form of the landscape and the efficiency of dividing fieldwork in specific subjects, a principle which they will also need later on in practice. Right: metalling as part of the practice of landscape architecture. Work in the making on the level of materialisation; laying a pavement of cobbles as part of a pedestrian street. All aspects of the process are visible; the material, the bed of course sand, the levelling of the ground layer and the distance between the cobbles. Such ‘unplanned activities on the way’ are very instructive to see how pavements and constructions are made. The same goes for maintenance.

experience is the basis for learning (Dewey, 1997).

In landscape architecture unlike the sciences the daily environment is not reduced by modelling but studied in real, in its daily functioning and use; the theory is in the practice. This learning in the daily environment can take place in different ways and in different teaching modes even within the domain of fieldwork in general (Fig. 7).

In the landscape, larger scales can only be studied and experienced by making use of maps. For professional purposes we use topographic maps that also give information about elevation in the form of contour lines.

In design projects the distinction between observation, analysis and interpretation needs to be clearly made in order to come to grips with form, content and intervention. In the field and in presentations students often mix them up which results in inconsistency in reasoning.

The theoretical background of experiential learning is that students are experiencing phenomena and form

for themselves and learning from that experience. It comprises perception, analysis, reflection and then rethinking; how does it fit into earlier experiences or insights from others? Thinking about what you have done — as in fieldwork for instance looking at your sketches, comparing maps — interpreting, abstracting and reflecting, is cyclical process. In a later stage also values will play a role.

2. Design teaching requires an active attitude from both the student and the teacher

The learning in real life and in real time demands for an active attitude because seeing, thinking and learning are considered as an interactive process. This learning can take place both in groups and individually (Fig. 8).

Analysis of how people use their environment can be done in different ways. Even though landscape architects are no social scientists, they should learn to be keen on how people use their environment, designed or not. Next to results of research by

social scientists, it is an important part of all fieldwork to be keen on the relation between functioning, use and form in the landscape. Besides the usual perception of the environment, landscape architects should be able to do systematic observation studies as described by Zeisel (2006). In her analysis of urban squares in Holland, Sanda Lenzhölzer did a series of observation studies (Lenzhölzer, 2010).

Imagining, drawing and sketching play an important role in this interactive process; it is the direct link between design thinking and acquiring design knowledge, as a result of the direct hand-brain connection (Ferguson, 1977; Latour, 1986; Baarsel, 1990; Goldschmidt, 1991).

The learning theory of cognitivism finds its scientific underpinning in the interaction between seeing, thinking and learning, a key issue in the cognitive sciences. For fieldwork it also implies that from a viewpoint of cognitive sciences, 'the more you see, the more you know' and vv. Cognitivism focuses on what happens in the mind such as thinking, abstracting and reasoning. New knowledge is built upon existing knowledge and students need active participation in order to learn.

3. How to deal with the complexity of form, functioning and use of the daily landscape?

Most important in dealing with the complexity of the form of the landscape is to focus. Focus is first of all achieved by defining a goal; why are you doing this fieldwork? What do you want to research?

People - Environment studies deal with how people use their environment and why they do so. For designers these studies are interesting from a general point of view, more specifically designers are interested in how design interventions influence use and how use influences designed form. In Europe there is a special association on that subject, the International Association

of People-environment Studies (IAPS) which organises conferences on many subjects within this large domain of studies. The American counterpart is Environmental Design and Research Association (EDRA).

People-environment relations can be studied in different ways; for a systematic approach, Zeisel (2006) has a whole chapter on 'Observing environmental behaviour' next to chapters on 'Focused interviews', 'Standardised questionnaires' and 'Asking questions, topics and format'.

The complexity is partly due to the complexity of people-environment relations since they are time & place-specific and always multi-causal. That's why only the principles behind these relations and other backgrounds are so important for application in design.

A second important issue is to learning to abstract from the images, phenomena, impressions of the landscape by making a distinction between morphology and typology. In a first step the result of fieldwork is a large number of drawings, photographs, notes, diagrams and impressions. One of the ways to organise them in a meaningful order is to make types in the form of different types of elements, structures and processes.

If there is no sense of typology, the analysis accumulates and eventually can result into 'analysis leads to paralysis'. So, there has to be some sort of reorganising the results of analysis into a meaningful order.

Learning theory: constructivism

Constructivism is about learning to develop an active, contextualised process of constructing knowledge rather than acquiring it. The student compares past experiences and cultural factors to a current situation and each student has a different interpretation and construction of the knowledge process. Interaction between people and environment plays an important



Figure 8: The use of notebooks during fieldwork. Discussion of an exercise in the field; students showing their work in their notebooks. In this way both the students and the teacher get immediately an idea and overview of the results of the observations and analysis.

role in fieldwork such as in observation studies in the field (Zeisel, 2006)

Didactics

Didactics is the science of teaching. Teaching comprises the process of conveying knowledge next to skills, values, traditions, behaviours. In an educational setting this takes place in a structured way; different teaching modes that are part of the curriculum. Contemporary teaching methods involve the active participation of the students; they are made to learn through experimenting, self-study, and experience. In general all academic study relies heavily on abstraction in the design process; on learning to see, to think and to act on the basis of that perception and experiences.

In fieldwork the pedagogic principles of learning in real life and in real time, the interactive process of seeing, thinking and learning and the embodied experience, are elaborated in the practice of teaching in different forms.

1. Including fieldwork in teaching

For teachers, including fieldwork in day-to-day teaching requires special attention and specific qualities. Even for experienced landscape architects, it is not always easy to teach observation of the landscape and analysing its

form in the field because there are no ready-to-use methods of what to do and how to approach it. Moreover the local conditions in the field can vary considerably in time so that improvisation is always needed (Fig. 8). First of all you have to find out the level of observation the students already have (Fig. 9). Secondly coming to grips with the form of the landscape requires a focus based on a goal, which could come from the program but that is not mandatory.

Drawing the landscape is an essential way of learning to see the form of the landscape (Latour, 1986; Dee, 2001).

2. Notebooks

Notebooks are an important didactic tool both for students and teaching staff (Toorn & Have, 2012).

The idea of notebooks is that the daily work and thinking is reflected in notes, drawings, sketches, diagrams (Figure 9). Keeping track of the content of daily work can give an idea of the evolution and development of ideas. Especially this last aspect is important; to have a specific place where you can play with ideas and where the experimental and explorative work can be done. Moreover the evolution of thinking on a longer time scale can also be overseen by the student him/herself.

In working out design ideas in the studio, teachers can track the original ideas and can elaborate further on that viewpoint or not. In fieldwork for design projects the recording of first impressions can be a rich source for design ideas in the first conceptual development of a project. If the fieldwork is done with a notebook, these first impressions can often be traced. Also for teachers the development over a longer time can be overseen from the notebook; it can give clues to the development of a student over time.

3. Grading

While in fieldwork perception is the key to learning, a large part of learning also takes place in working out fieldwork for an intermediate presentation, presenting the results of fieldwork in the studio and in grading. Like in all teaching grading plays a pivotal role in learning. Grading gives immediate feedback, the more intermediate presentations and grading, the greater the learning effect but it is a lot of work for the teacher. Even if the fieldwork is done in groups, the changing of group composition for new assignments grading stimulates the interaction and learning experience.

In pedagogy and didactics we have seen different interactions in field work as a basis for learning. Interactions with the physical environment, interactions between students in working together in groups and learning from each other and in observation, analysis and study of the interaction between people and their environment, designed or not.

CONCLUSIONS

One of the characteristics of fieldwork is: what you learn and experience in the field, you cannot learn from books, YouTube or in other ways. 'Embodied experience' is a special aspect of fieldwork.

All schools of landscape architecture should emphasise explicitly the content and role of fieldwork and excursions in their programs. In the comparing of programs by prospective Master students this is an important issue which also gives an idea whether the core of the program is 'landscape architecture' or 'architecture and landscape' with the ever growing 'love for the landscape' by architects.

Fieldwork demands an active approach from both students and teacher where the interaction between perception, knowing and learning are part of teaching and learning. Moreover

drawing can be a way of acquiring new knowledge.

Even though I am fully supporting the 'manifesto' of Oles & Horrigan (2015): 'We wish to make fieldwork methodology the core of landscape architecture education.', in my personal experience I have also seen a lack of teachers — even being professional landscape architects — who are capable and motivated to include fieldwork in their teaching in a meaningful way. This could be another reason why fieldwork in landscape architecture programs needs more attention.

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5.6. THEORY AND PRACTICE

GROUP H

In Search of Urban Landscapes

Beatrix Gasienica-Wawrytko

On the Archetypes of Public Space

Koukouvelou Antonia & Sunderland Sarem James

PECHA KUCHA PAPER

Methodologies and Strategies for Requalification of Municipality Urban Public Spaces: A Case Study in Oeiras, Portugal

Sónia Talhé Azambuja

Mapping Cultural Ecosystem Services using ppGIS Method in Budapest MetroPolitan Region

István Valánszki

Developing a Methodology: Unravelling People's Attitudes towards Blue-Green Infrastructure

Jinxuan Wang

The Influence of a Cultural Background on the Perception of Illuminated Urban Spaces: An Eye-Tracking Study

Xinyi Zhou

In Search of Urban Landscapes

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Keywords:

Landscape classification, urban landscape, multivariate cluster analysis, European Landscape Convention

ABSTRACT

Due to the current densification processes in urban areas, most European cities are undergoing further transforming processes. The standards of living are changing, as well as the urban landscape. This paper is debating about the need of urban landscape classification on a neighbourhood scale due to the aim of the European Landscape Convention that reaches to develop management plans for European landscapes. It proposes variables and important elements that should be taken into consideration by identifying and characterising urban landscapes.

INTRODUCTION

European Cities are growing. According to the United Nations by 2050 about 82% of all European inhabitants will live in urban areas (UN, 2012). According to Gavarildis et al. (2016) and the European Environment Agency (EEA, 2016) more than a quarter of the European Union's territory takes the form of urban land within which almost 73% of the European population lives. Urban growth leads necessarily to morphological changes in the structure of cities – urban landscapes are being transformed (e.g. Breuste et al. 2008: 279; Chuman and Romportl, 2010; Wascher, 2004). Due to these changes, cities are increasingly affected by the loss of open spaces, which influences both the quality of life and urban

ecology in general. The question is therefore, what should future cities look like? How do urban morphological structures influence the quality of life of citizens? Which kind of urban structures and which elements of the urban fabric favour well-being, and does urban ecology play a role with the regard to this?

Since 2000 the Council of Europe has been promoting the protection, management and planning of all European landscapes through the European Landscape Convention (ELC), and this includes urban landscapes. According to the ELC definition of landscapes: "landscape is an area, perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (EU, 2000, Art.1), thus human perception of the environment, the landscape, should be taken into consideration, while discussing about how landscapes can be protected, managed and planned. In addition, the ELC requires all signatories, to "promote landscape protection, management and planning [...]" (EU Council, 2000, Art. 3) and defining "landscape quality objectives" (EU, 2000, Art.6). The ELC requires all signatory states to investigate and characterise their landscapes while the preamble underlines the fact that landscapes have an impact on people's well-being. Consequently, the perception of landscapes on the one hand and the need to sensitize people to landscapes on the other has become a very important issue within the landscape community..However, the ELC does not give a clear definition of urban landscapes (e.g. Stahlschmidt et al. 2017: 15), and thus there is a need to propose a method or a tool to define, identify and characterise urban landscapes, one that takes account of human perception in its typology. This is therefore a challenge for city planners and administrations but also for the public.

One possible approach to

analysing different landscapes is to classify them. There is a long tradition of “rural” landscape classification methods which have their origins in landscape ecological research (e.g. Múcher et al. 2010, Frukalo and Romportl, 2014). However, if urban areas are to be considered as landscapes, can they be subject to same methods of landscape classification as rural landscapes?

Can cities also be seen as a mosaic of different types of landscapes that distinguish themselves through different qualities and might these differences influence people’s perception or well-being? Following the intentions of the ELC, urban landscapes can also be identified through their structure. So, are urban landscapes thus just to be seen as built-up areas that differ from rural landscapes in the proportion of sealed surfaces, building heights, etc., or should be there a more detailed definition e.g. one that differentiates their scale, when talking about urban landscape types?

This study considers the need to see urban areas as landscapes, which might bring another perspective into current urban planning strategies. It has the intention of testing the theoretical analyses and creating a model of different landscape types for the City of Vienna. It aims to identify key elements that can lead into a definition of urban landscapes by reviewing existing and current research.

CLASSIFYING URBAN LANDSCAPES

Landscape classifications procedures are generally carried out to identify specific landscape types. There are numerous approaches that are still in use, but nevertheless, there “is no single correct characterisation method” especially for urban landscapes (Simensen et al. 2018: 558). According to the reviews by Van Eetvelde and Antrop (2009) or Simensen et al. (2018), there are

several methodological approaches to classify and/or identify landscapes. Many are based on biophysical characteristics and often rely strongly on statistical analyses.¹ Moreover, studying and classifying landscapes can help landscape planners to understand human interactions with landscape (e.g. Farina, 2006; Alcántara Manzanares et al. 2015). This, in turn, might lead to a better understanding of landscape dynamics and more profound management plans. Additionally, by interpreting the demands of the ELC, there is a need for planning and management strategies that “combine preservation of landscape diversity with sustainable use of land resources” (Simensen et al. 2018). Therefore one aim of this study is to propose a method to classify the diverse urban landscapes within a city area, that could be applied to other cities. Because cities are today faced with densification, this process “impacts in various ways the structure, function and dynamics of the urban system. Irrespective of way the city was formed, its spatial pattern influences the internal, external, physical, socio-economic and ecological processes.” (Válceanu et al., 2014). Today’s support for the concept of compact cities on the part of planners and architects provides a means to deal with the process of densification. The idea behind the approach is to “limit the effects of urbanisation on the surrounding landscape and local environment” (Gavriliadis et al., 2016).

Natural or cultural areas in urban surroundings also provide positive benefits (e.g. ecosystem services) for cities and their citizens like food, recreation, climate change adaptation, services that impact on the well-being of people. Together these landscape-mosaic pieces create urban landscapes that influence their inhabitants. According to Matsuko et al. (2008) people have special needs in urban areas, such as the “need for nature” (directly linked with the physical

features of the environment settings) and/or the “need for human-interaction”. Identifying these potentials or detecting a lack of them within a city can be seen as one way to create an urban landscape typology. And, being high structured landscapes, cities deliver good examples with which to examine the relationship between people and nature (e.g. Crow et al., 2006).

As landscapes can be seen as a product of human actions, there is an argument for characterising landscapes by their visual perception and under socio-cultural aspects. Such holistic approaches are applied to all landscape concepts that involve human perceptions and cultural aspects (Simensen et al. 2018; Van Eetvelde and Antrop, 2009). Therefore, new landscapes classification methods have been developed in response to new research goals. In the early 1990s the “Landscape characterisation and assessment methods” were established, and have become central to landscape characterisation in Europe (Simensen et al. 2018). Although this approach has its origins in art, aesthetic theory and the humanities, it tries to integrate natural (geology, landform, soil, vegetation, etc.) and cultural (e.g. character of a settlement) aspects of landscape², by taking people’s perception into account, forming a spatial framework for planning and development (e.g. Van Eetvelde and Antrop, 2009; Simensen et al. 2018; Warnrock and Griffith, 2014,). However, these methods have been carried out and tested only in relation to “rural” landscapes, although according to the ELC, management plans should be prepared for all landscapes, urban landscapes included. Testing this approach for urban landscapes ought to provide a method to identify different kinds of landscape types within city boundaries.

As Simensen et al. (2018) and Cosgrove (2008) both pointed out, landscapes could be studied as objects. Multivariate analyse methods

are in this case a common method to determine landscape classes, with the demand of a strong simplification of the variables that are describing them. This approach is used usually in landscape analysis as a non-spatial operation to group similar objects and to define different landscape types (Van Eetvelde and Antrop, 2009; Bryan 2006; Owen et al. 2006). Following a morphological analysis of the urban fabric, firstly, variables that reflect best the morphology of a city area, like the urban built landscape, the green areas, topography, etc. have been selected. The focus thereby is on the urban open spaces, which is the interaction space of the inhabitants, a place for where the perception of landscape can be discussed. The indicators selected should lead to the possibility of making statements about the structure, the function of the urban fabric and how this composition of these urban elements influence the perception of the inhabitants, e.g. the percentage of vegetation or the tree cover within a certain landscape type can have an impact of the well-being of the inhabitants and might be characteristic for a certain landscape type. Secondly, all chosen indicators that are already geo-referenced, have been merged into a 500m x 500m grid that covers the whole city area. This grid allows on the one hand the possibility to treat the data statistically, and on the other hand, the raster represents the walkable distance and allows drawing conclusions concerning the perception of these landscapes by people. Thirdly, all variables that have been merged into the grid are subjected to a multivariate cluster analysis to detect different urban landscape types. Table 1. gives an overview of the variables selected, grouped by their principle urban landscape elements. Morphological indicators like the height of the buildings or the length/width of streets, or other non-morphological indicators like the decibel level in streets can be combined

by a multivariate cluster analysis which identifies different types of urban landscapes types and which impact these might have for the inhabitants of Vienna. At least, an urban walk together with people through chosen urban landscape types is to be organised. By questioning participants concerning their perception, the statements made should make it possible to validate and refine the map of the detected urban landscape types.

Table 1. Elements of the urban landscape

The project is carried out in the City of Vienna, which serves as a good testing zone to create an urban typology map. It represents a typical Middle-European metropolis with different kinds of building typologies and a high diversity of (green) open spaces. Besides, Vienna is known for its high living-quality of life, which is partly the result of this situation, but how can this satisfactory be localised? Another reason of choosing Vienna as a test city is the good access to open data, especially spatial data.

CONCLUSION

Because most European metropolises are getting denser, existing urban landscapes are undergoing a transformation, their qualities are changing. Planners are aware of these changes in the qualities of landscapes and their impact on the inhabitants. Creating a tool to define urban landscapes within the city area and how they are perceived by inhabitants can provide a further input for future urban planning. An urban landscape classification method will help to identify these different landscapes. Although a lot of research has been done in developing and testing landscape classification methods, these methods were mainly developed for rural landscapes. Seeing the urban fabric with its different elements as a

patchwork of urban landscape types with varying qualities, can provide a way to understand the effects of certain interactions of urban elements by asking the inhabitants about the impact of these compositions. Proposing a method to identify urban landscapes on a small scale can contribute a supplementary aspect within a holistic urban planning approach that combines urban ecology with human well-being in urban areas, using urban landscape morphology as a key.

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TABLES

Table 1 Elements of the urban landscape

Group of elements of the urban landscape	Morphology	Function
Building structure	Building height; building density within a raster/grid cell; total amount of built area within a raster/cell grid	Residential buildings, public buildings; age of buildings, etc.
Open space structure	Squares, roads, accessibility; amount of public open spaces, amount of sealed surfaces (without building area), amount of street surface, length and width of street surface,	Functionality of open spaces public / private (e.g. playground.); pedestrian areas, etc.
Green infrastructure	public green spaces, parks, gardens, forest; vegetation height; amount of public green spaces	Private green, forest, agricultural use, public / private, historical gardens, etc.
Blue infrastructure	rivers, lakes, amount of water surface, length of water body;	Private water body, rivers, stagnant water body, running waters, etc.
Other elements	Decibel frequency, emissions, topography	

On the Archetypes of Public Space

PECHA KUCHA PAPER

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Keywords:

public space, archetype, agora, bazaar,
street, common ground

ABSTRACT

The current context of public space in society is replete with conflicts around the roles and values it is based on. A constructive understanding and positioning on the matter becomes crucial in the practice of designing these spaces. This paper provides an understanding based on the early archetypes of public spaces. It examines four archetypes - the agora, the bazaar, the common ground and the street - in regard to their urban qualities and questions their relevance in the current context. The study reveals that a variety of factors influenced each archetypes' urban qualities and that a continuity can be observed in the importance of these aspects until nowadays. It concludes on the relevance of these references in the field of public space design and proposes an according definition of public space.

INTRODUCTION

Problematic

The everyday leads us to use and enjoy public space, often without considering it. This spatial element that we take for granted is actually at the very core of the way society functions and its design reveals much of how we live in the city. When defining public space however, it becomes clear that it is a complex notion with many facets and many understandings. This research therefore seeks to bring up an understanding by examining archetypes of public space in order to provide an insight to its origins and initial values.

Method

Four of the earliest and most prominent forms of public space are examined: the agora, the bazaar, the common ground and the street. Each case forms an archetype of public space, considering the definition of archetype as "a typical example of something, or the original model of something from which others are copied" (Archetype, n.d.). A brief overview of each archetype's spatial and functional characteristics is given. They are then questioned in their relevance to the current context and examined with a method based on the analytic raster developed by Kretz and Kueng. In their approach, cases are assessed through six urban qualities that are: centrality, diversity, interaction, accessibility, adaptability, appropriation (Kretz and Kueng, 2016). Each quality is subdivided into three quantifiable aspects. The assessment of a case is summarised in a diagram that provides an overview of its qualities which is to be read as a constellation. In the present paper, each archetype is assessed in its archaic context and time. As it is types and not specific cases that are observed, the value of certain aspects can vary. In such cases the possible range of values is marked with a dotted pattern. It is to be noted that public space being intimately dependant of its immediate context, the assessment also takes this context into account.

ARCHETYPES

Archetype 1: the agora

Defined as a punctual void by the surrounding buildings and delimited by a peripheral columnated gallery (the *stoa*), the agora was the heart of the ancient Greek city. The space would typically be equipped with a fountain, trees and statues, whilst the bordering buildings tended to be of high public importance (Camp and Mauzy, 2010). A wide array of functions

was covered: the central open space, where one came to meet, debate and spend time, would provide ground for social, cultural, political and religious activities, whilst the surrounding stoa hosted the economic sphere with its covered markets. Access, however, was restrained to free born citizens - which forbade the access to women or slaves.

Nowadays, a close descendant of the agora is the public square, where the spatial and functional essence has remained. The actual spatial setting evolved in many directions according to societal changes and the local context: the stoa, for example, tended to disappear, often replaced by periodical markets or façade shops.

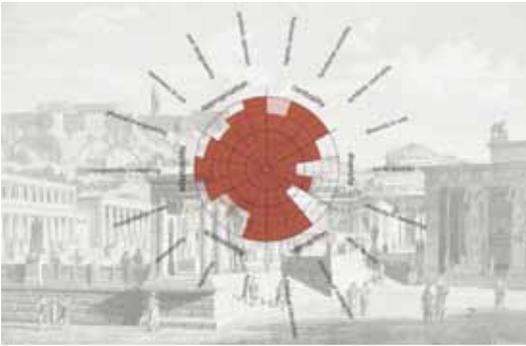


Figure 1: the agora
Background illustration: imaginary view of the Athenian agora, ancient Greece
El Mundo Ilustrado, Published Barcelona, 1880
Classic Image, Alamy Stock Foto

Its assessment according to the aforementioned reading raster reveals a place of generally high urban quality, penalized by its exclusion of women and slaves. Its high centrality and openness to different uses make it a predominant case in the discourse on public space.

Archetype 2: the bazaar

Also denominated as *souq*, the bazaar originated in ancient Persia and spread throughout Islamic cities, of which it formed the heart in economic, social, cultural, religious and to some extent, political terms. The ancient bazaar was made of a network of covered streets, of open access, on

both sides of which merchants would display goods and engage with the public circulating in the middle. Trade was the central activity followed by many others such as socialisation, debate, celebration and protest. Its branches articulated many key urban programmes such as caravanserais and mosques. The network typically expanded between city gates and reached to the citadel (the governor's palace) (Assari, Mahesh, Emtehani and Assari, 2011).

The positions of bazaars in society changed throughout urban transformations of the last centuries and the emergence of other commercial centralities, but the archetype still functions closely to its original form nowadays and remains operative. It has however become a key pedestrian space and network, free from the growing motorised traffic.

The analysis of its urban qualities reveal another place of generally high quality, limited in its capacity to welcome other forms of use and meaning by the fact that its streets are generally dedicated to commercial practices, as opposed to cultural activities for example.

Archetype 3: the common ground

As a form of land use found to have taken place throughout Europe, as well as in Japan (where referred to as *sato-yama*) and in former British colonies in America, common ground is land of common usage, dedicated to practices such as grazing, arable farming, haymaking, collection of wood and turf, extraction of minerals and fishing. Ownership of the land varied, according to political systems: in England, the land was owned by the crown with rights given to lords which would grant individuals or communities with 'common rights', whilst in the Swiss equivalent of the *almend*, the land belonged to municipalities or corporations which managed the rights of use (Stuber, 2016).



Figure 2: the bazaar
Background illustration: the grand bazaar in Constantinople, 19th century
Alamy Stock Foto



Figure 3: the common ground
Background illustration: view of the Cambridge Common, ca. 1808-09, drawing by Bell, Daniel Capt.
Wikimedia commons, Public Domain (PD-US)

The common ground lost its place with the modernization of farming practices and the privatisation of land, almost entirely disappeared from rural landscapes. It however found a certain translation in urban and peri-urban settings in the form of public parks, with functions shifting from agriculture to recreation and the notion of 'common' to that of 'public'. Another descendant could be the practice of urban farming with its integration of agriculture, ecological habitat and interaction within the modern city.

The assessment brings forward a generally low urban quality (or rather, peri-urban quality). This is due to its specificity in function and accessibility (mostly restricted to farming practices and closed circles). The importance of the archetype is not to be underrated though, as it is a key predecessor to green public space and agricultural practices within the public sphere.

Archetype 4: the street

The street dates back to the early times of sedentarism. It is a key, distinct element of the city fabric. We understand the street as the space formed by a linear, paved surface in an urban section, destined to the movement of people and goods. It is defined by its geometry (width, length and shape), as well as by its bordering constructions such as buildings, fences and walls. The street does not only link places and buildings but also hosts

social and commercial activities, as well as political, religious and cultural manifestations in given occasions.

The street rose as a formally defined public space in the last centuries only. A first shift, exemplified by the Haussmannian interventions in Paris, occurred with the widening of former medieval street along with the planting of trees and the introduction of sidewalks and lighting. This created a new experience of this space and ensured the presence of crucial qualities such as light, fresh air and drinking water. The last 70 years have seen a second shift with the inclusion and formalisation of recreational uses in its pedestrian spaces.

The evaluation of the archetype on basis of urban qualities reveals a type with potentially high qualities, the precise evaluation of which depends on specific cases. Its openness, reachability and flexibility create an important space of interaction, balanced by its dedication to movement and therefore, low duration of interaction.

Outcome

These four archetypes relate to many current types of public spaces (squares, parks, shopping areas, streets, etc) in European cities. However, what is understood as city at the time of the archetypes differs from nowadays. The cities at the epoch of the archetypes had smaller and simpler structure in comparison

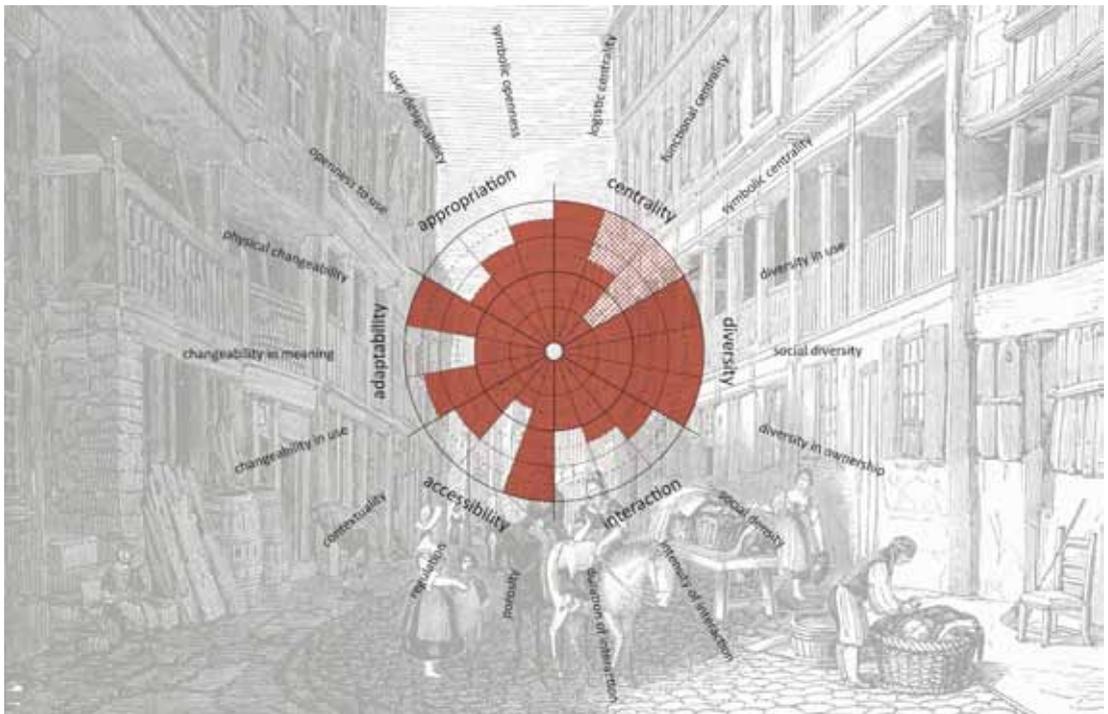


Figure 4: the street. Background illustration: engraving of Watergate Street, Chester, England M&N, Alamy Stock Foto

to the current metropolitan ones. For example, the agora had a more central importance in ancient Greece than it has today where it co-exists with other public squares and centralities. This section summarises the outcome of comparative studies between archetypes and their urban qualities.

The public space formed by these archetypes can be described as a network (bazaar, streets) or a single space (agora, common ground). This highlights two different spatial strategies in the creation of public space. Networks tend to achieve high porosity, density and proximity whereas single places favour high adaptability, appropriation and diversity in uses.

When the public is restricted to a specific group, significant loss of urban quality occurs in regard to diversity, as is the case with the common ground or the agora. This is particularly true in the context of democratic societies where social cohesion is a crucial factor. Public space is the central opportunity in cities to achieve interaction between

different social groups. When spaces for specific audiences are required, social mix can be achieved by including these spaces within a larger public space e.g. to include playgrounds, sport infrastructure and services within a park or next to a street, rather than isolate them.

Whether a primary function is defined or not strongly influences the qualities of adaptability and appropriation. In the case of the agora and the street, the openness to various uses and acts of transformation results in wide possibilities of temporary or permanent change and diverse activities. In opposition, the bazaar and the common ground are strongly defined in regard to these and allow for little change (except for their extension or decrease in size).

CONCLUSION

The field of public space design has undergone deep renewal in the last 40 years. With the arrival of landscape

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architects, architects and urbanists in the field, the rise of new types of public space and new objectives (e.g. improvement of social condition instead of beautification), a necessity for new approaches has emerged. There is a need for references in precedents as well as in new fields (e.g. nature, art). The presented archetypes offer both references for design and an understanding of the origins of public space. They legitimise the presence and creation of public space and provide us with strong examples in which key urban qualities are embodied.

This research reviews archetypes of public space according to their urban qualities. It was examined that archetypes do show strong constellations of these qualities which are still important nowadays. The continuity of these qualities through time asks for their further integration in the design of public space and their reintroduction where lacking. The design of public spaces should not only rely on materiality and composition but also on the urban qualities that are generated.

The research process of the present paper led to continuous interrogations as to what public space is. Whilst definitions cannot grab all the dimensions and evolutions of public space, they are essential in order to engage with the subject and gain an overview. Hence, considering the examined archetypes as well as the urban qualities brought up by Kretz and Kueng, this research proposes to understand public space as *'an urban or peri-urban ground space of a certain centrality, open to multiple social groups and uses, offering a stage for interaction and exchange, of open accessibility, which can be adapted through time and appropriated temporarily by different groups according to their needs'*.

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INTRODUCTION

Methodologies and Strategies for Requalification of Municipality Urban Public Spaces: A Case Study in Oeiras, Portugal

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Urban Public Space; Landscape Architecture; Requalification, Oeiras (Portugal)

ABSTRACT

The integration of public spaces in the urban environment has become an increasing concern, not only at an environmental level but also at a social level. The number of degraded and unused public spaces are increasing, raising concerns about how to requalify these spaces. Here we critique the Municipal Urban Requalification Plan ( reas Plano concept) created by the Green Spaces Division of the Oeiras Town Council, ultimately proposing a new methodology and intervention strategies in public spaces that is aimed at developing principles and strategies that foster best practices and guidelines in Landscape Architecture projects. This concept aims to requalify urban public spaces by enhancing and enriching the urban green structure by connecting areas with environmental value. We propose the requalification of public space of an urban settlement in Figueirinha, in the Municipality of Oeiras, which is in imminent need of intervention. We combine the use of Geographic Information System (GIS) tools, observation, and behavior and statistical mapping to evaluate user behavior within the urban green spaces. It is intended that the requalification projects in the plan areas effectively serve the users and their aspirations.

About 10 years ago, the Division of Green Spaces of Municipality of Oeiras had been developing a project entitled " reas Plano", whose objective was to requalify the urban environment through the recovery of the public space, namely green areas, infrastructures, equipment/furniture, and waste.

The basis of this work was to review the original methodology and the delimited and already intervened areas, making a general proposal of strategy and proposing new areas (if justified).

We propose a new methodology using observation methods through behavior mapping and by applying Geographic Information Systems (GISs). This approach is expected to help with decision making during public space design.

This methodology adapts to the original  reas Plano approach, but complements it with new processes and elements of analysis, as well as the elaboration of databases, with georeferenced data through GIS systems, whose objective is the easy access, reading, and updating of data.

The application of the participant observation method combined with behavioral mapping allows us to perceive who the people are for whom we are designing and must be considered as the fundamental principle of urban public space design. This will enable us to apprehend the current flows and uses of each space, as well as the creation of possible scenarios, potential uses, and redefinition of paths/routes. The observation of user's behavior also allows us to make conclusions about the failure to make use of spaces; if this approach is insufficient, we plan to apply other participatory methods, such as interviews and surveys.

The general objective of the case study is to identify the types of public space existing in Figueirinha, in the municipality of Oeiras, and their current

uses, with the purpose of defining new intervention strategies that respond to local needs.

Defining Public Space

“The public space, of which the street is the first expression, is the cornerstone of the structure of cities, it is the meeting point of all citizens and the confluence of all urban functions” (CML, 2016, p. 20). The public space orders the relationships between transitional spaces and open spaces in each area of the city (Borja, 2000), transmitting an environmental image within the urban environment through the opening of views and contrasting with urban areas, interconnecting the components that constitute the urban space (Lynch, 1965).

One of the goals of the creation of new public spaces is the reappropriation of obsolete areas of the city, such as disabled industrial areas, brownfields, military terrains, old stations or ports, among others, allowing restructuring of the city. An example that has had a significant impact on the urban public space in Portugal was “*Parque das Nações*”, which transitioned from a landfill and degraded industrial zone to become one of the most important public spaces of the city, with greater visibility of the metropolitan area of Lisbon, comprehending green spaces of leisure, valuing the riverfront, and improving the population’s quality of life. According to William H. Whyte’s documentary, ‘The Social Life of Small Urban Spaces’, people seek a place of refuge in the public space, an escape from city life (Whyte, 2001).

According to Carmona (2003), successful public spaces are characterized by the presence of people, attributes (such as comfort and image), access and articulation, and social uses and activities (see table 5.1 in Carmona, 2003, p.100).

The goal is to create spaces that are appealing to the user and to make

the space sustainable; because space only becomes sustainable if it is used.

Public Participation

The “Project for Public Spaces” (PPS) is based on the idea that it is not enough to develop ideas and design elements to requalify a public space; there must be (from the beginning) a process of public involvement that defines and responds to the conditions and needs of the community. The Place Diagram (Fig. 1) is a tool that helps the citizen to evaluate each space as good or bad according to four criteria (sociability, access, and connections, uses and activities, comfort and image) and intuitive and qualitative aspects. It allows the determination of the success or failure of a space.

Proposed Framework

Researchers such as Jane Jacobs, Kevin Lynch, William H. Whyte, Clare Cooper Marcus, Carolyn Francis, and Jan Gehl have advocated the need to base the urban design on the study of how people currently experience and use urban environments (Lipovská & Štěpánková, 2013).

Behavior mapping is a method developed by W. Ittelson, whose goal is to record behavior in a projected scenario. Behavior mapping is a discrete and objective observation method that marks the location of individuals and measures activity levels simultaneously, determining the current use of a space (Moore & Cosco, 2010).

Behavior mapping data can help researchers to understand the behavioral dynamics of the built environment, the level of use, the way it is perceived, and the profile of users (frequency, flow ratios), thereby helping to improve the quality of relationships between people and the environment (Thompson, Aspinall & Bell, 2010).

METHODOLOGY

The first techniques were done by

recording data in loco, and hand-drawn graphics to represent the results spatially. van Andel was the first researcher to create a digital program to insert codes of behaviors and attributes of built environments interconnected through a relational database. The development of geographic information systems (GIS) made this task easier since GIS software programs not only record events and activities on the ground but also their location (Moore & Cosco, 2010).

The main goal in using the Behavior Mapping methodology is to plan improvements for an existing space, improve its overall design, or confirm that space supports the behaviors for which it was designed. Behavior Mapping can be defined as a product of observation and a tool for analysis, and at the same time for the design of space (Goličnik & Marusic, 2012). Two general principles are suggested, where the behavior can be recorded: from tables/matrices and maps (Goličnik & Marusic, 2012). To create a database as informative as possible, it is essential that the mapping process be organized: (1) Create a site plan or map with scale of the study area, it can be an outline in paper or through graphics software; produce multiple copies or prints of the map in order not to overlap data, which makes the process difficult; (2) A rating method and counting system can be developed to attribute to the behaviors recorded on the map (attributes such as type of activity, gender and age of the user, duration of activity, time day, weekday, direction of movement and weather conditions at the beginning of the activity, and should be inserted in formatted tables).

The produced maps are drawn manually on paper prints. The list of symbols differs from symbols for male and female users (Goličnik & Marusic, 2012). The visualization of the aggregated results allows us to see the overlap of paths covered by the users,



Figure 1. The Place Diagram, public space evaluation method that uses qualitative and intuitive criteria. Source: Project for Public Spaces (2012).

determining zones of higher affluence and underutilized zones (Moore & Cosco, 2010), as well as various factors (e.g., the time of day, day of the week, season, weather, and behavior) (Thompson, Aspinall & Bell, 2010). To reduce or explain these uncontrollable variables, several site visits should be made to accurately capture the patterns of a space use (Clyne, n.d.).

CASE STUDY

The case study of Figueirinha is located in the Union of parishes of Oeiras and São Julião da Barra, Paço de Arcos and Caxias, in Portugal (Fig.2).

The history of this place dates back to the 17th century and has long been a residential neighborhood of multi-family dwellings. Today, after 30 years as a residential neighborhood, there has been a shift, with the area becoming more functionally diversified, including commerce and services.

Zoning

Zoning of the area was proposed through the definition of public space typologies (Fig.3) in Zones and Subzones (Fig. 4), with the objective of evaluating the problems and potentialities of place (Fig. 5), making a perspective of functions and uses. This allowed us to perceive the type of flows and directions of the user's circulation and possible future connections.



Figure 2. Oeiras Council and Área Plano Figueirinha location. Source: Cartography extracted and adapted from Oeiras Council Geoportal.

Behavior Maps

Observations were made from seven observation points (Fig. 6) according to the flows and circulation map and typology of the identified space and consequent zoning (Fig. 4). Observations were made on days 19, 24, 25, 26 and 29 of November 2015, corresponding to weekdays and weekend, during the morning, lunchtime, afternoon, and late afternoon. The observations lasted 10 min, and the activities were recorded at

the same time, the gender, time of day, date, subarea, and age in tables (Fig. 7), as well as the map with the exact location.

The activity with the greatest number of records was “walking alone” and the majority age registered was more than 60 years. The numbers of people counted were similar during the morning and afternoon. The area with the highest flow registered was Zone 1B, which is a green area with the largest dimension of green areas in the space and is bounded by a main road.

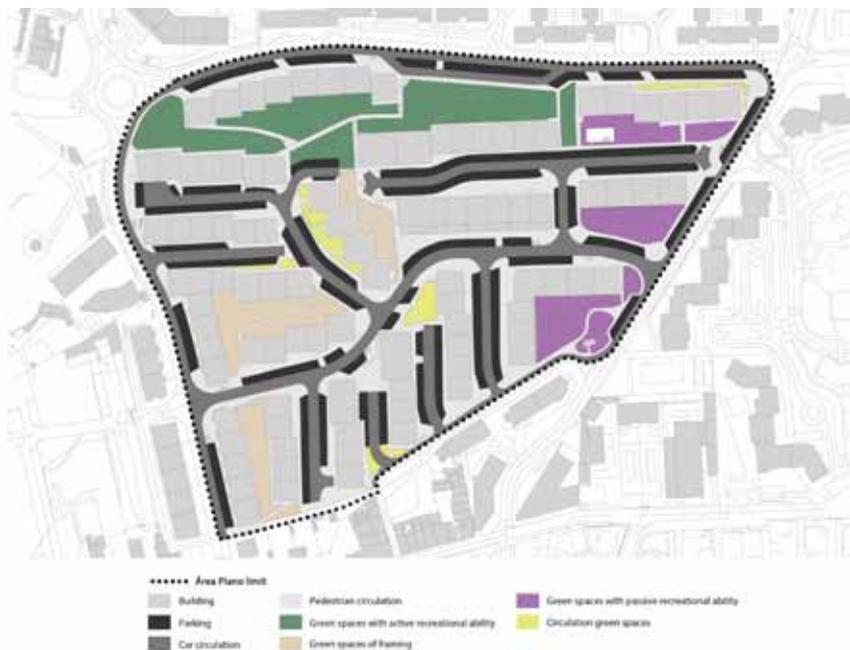


Figure 3. Definition of public space typologies of Figueirinha. Source: © Mafalda Caneira.

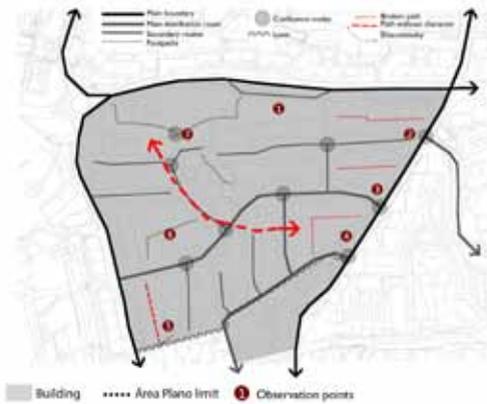


Figure 4. Map of flows and circulation and zoning of the Figueirinha area, making a perspective of functions and uses. Subzone 1B and 1A are relatively large spaces and have an aptitude for active recreation and passive recreation, respectively. Smaller spaces, such as subzone 2A, 2B, and 2C, have no ability for active recreation, they work more like a passage space without any seating function or work as a distributing element between subzones. These spaces could work as squares, although there aren't connections between the distribution network of the agglomerate. Source: Mafalda Caneira.

The observed spaces are characterized by the fact that they cover activities related to movement, as opposed to activities of a more static character. Activities such as “walking the dog”, “walking alone”, and “walking together” were registered.

They are places of passage and contemplation. Spacious places to stay and walk. Despite their high level of degradation, they continue to be used, rather than as passing spaces.

Intervention Masterplan

The design strategy is to provide open, multifunctional, sustainable, dynamic spaces for all ages involving different considerations: cultural infrastructure, environmental sustainability, healthy living, interpretive nature, and innovative design. As such and with the objective of solving the problems detected and enhancing the potential of the public space of the Plano, the proposed intervention strategies are based on guiding principles, namely:

- Adequate stratum the function performed;
- Create framing zones with substrates of different heights, sets of heights, color, texture;

- Integrate new materials with low maintenance and high level of durability in the reconstruction of degraded walls;
- Design space-routing paths, formalizing existing foot-ways, being those used by the population that was observed and registered on the behavior Map (Fig. 6);
- Break down the segregating barriers introducing new species of vegetation, and proposing urban tree alignments, thereby creating new areas with environmental value and enriching the urban green structure;
- Promote the dynamization of slopes by planting and proposing the introduction of terraces;
- Introduce new pavements to differentiate the various uses and activities of each area;
- Reorganize the space through the use of vegetation defining various functionalities;
- Propose a functional design by opting for organic forms as well as the paths that are marked, as from the existing tree elements and the location of the illumination;
- Propose informal recreation areas in areas whose natural decline

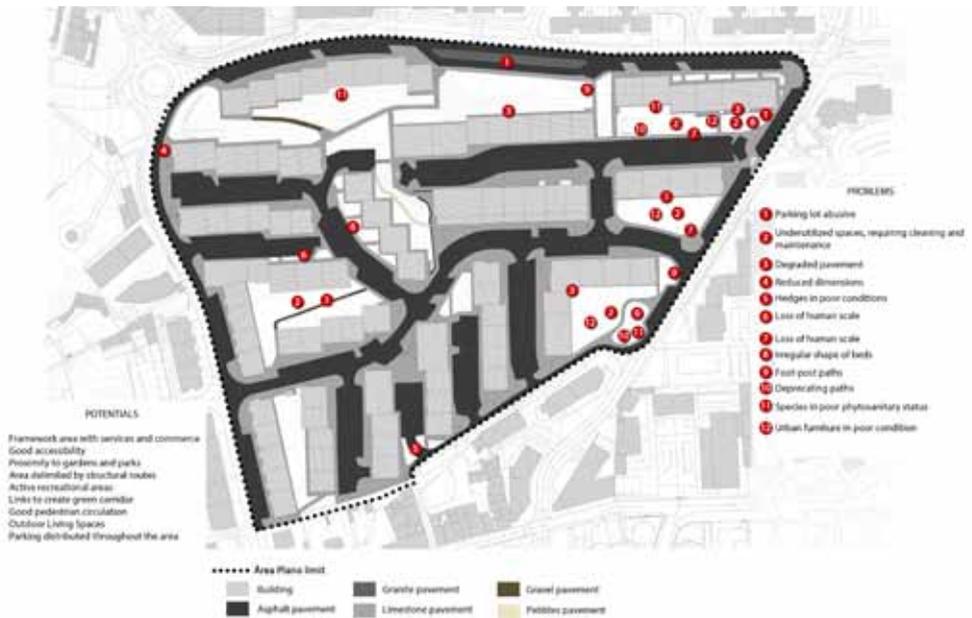


Figure 5. Problems and potentials analysis of Figueirinha public space. Source: © Mafalda Caneira.

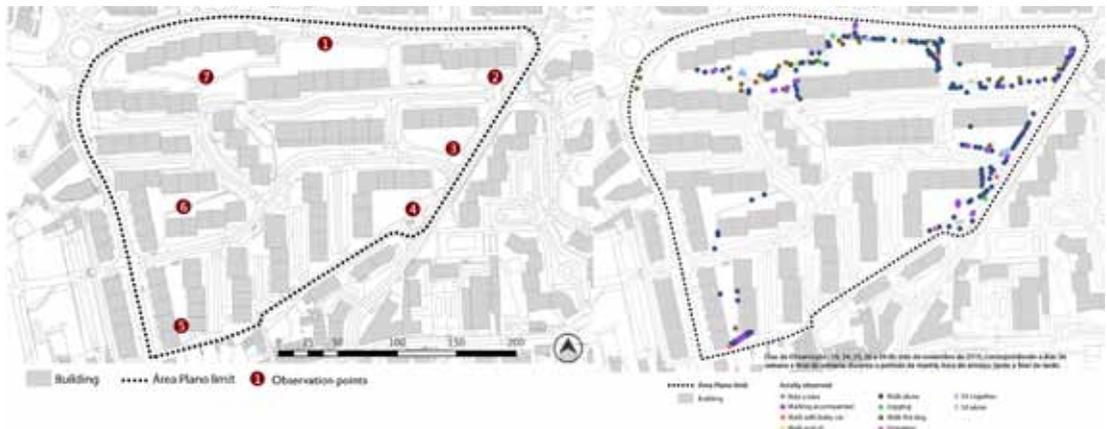


Figure 6. Location of user's behavior observation points in Figueirinha public space and Behavioral Maps. Days of observation: 19, 24, 25, 26 and 29 November 2015, corresponding to weekdays and weekend, during the morning, lunchtime, afternoon and late afternoon. Source: © Mafalda Caneira.

- enhances this use;
- Provide opportunities for people to meet;
- Create functional spaces in which the pleasantness of the use is inherent, as well as the ease of construction and future conservation;
- Propose support equipment for space users as a reference in the *Área Plano*.

The proposed design for the public space of the *Área Plano* (Fig. 8) is based on the pattern of use of

the population and aims to resolve the existing problems associated with the neighborhood. To achieve this, we propose afforestation of streets to allow a continuous reading through arboreal elements, choice of similar species, as well as the standardization of pavements. The proposal of zones of stay and new routes allow the introduction of new centralities and connections that contribute to the green continuous of the county of Oeiras.

The goal is to create multifunctional spaces that can function as spaces for staying, passage, recreation

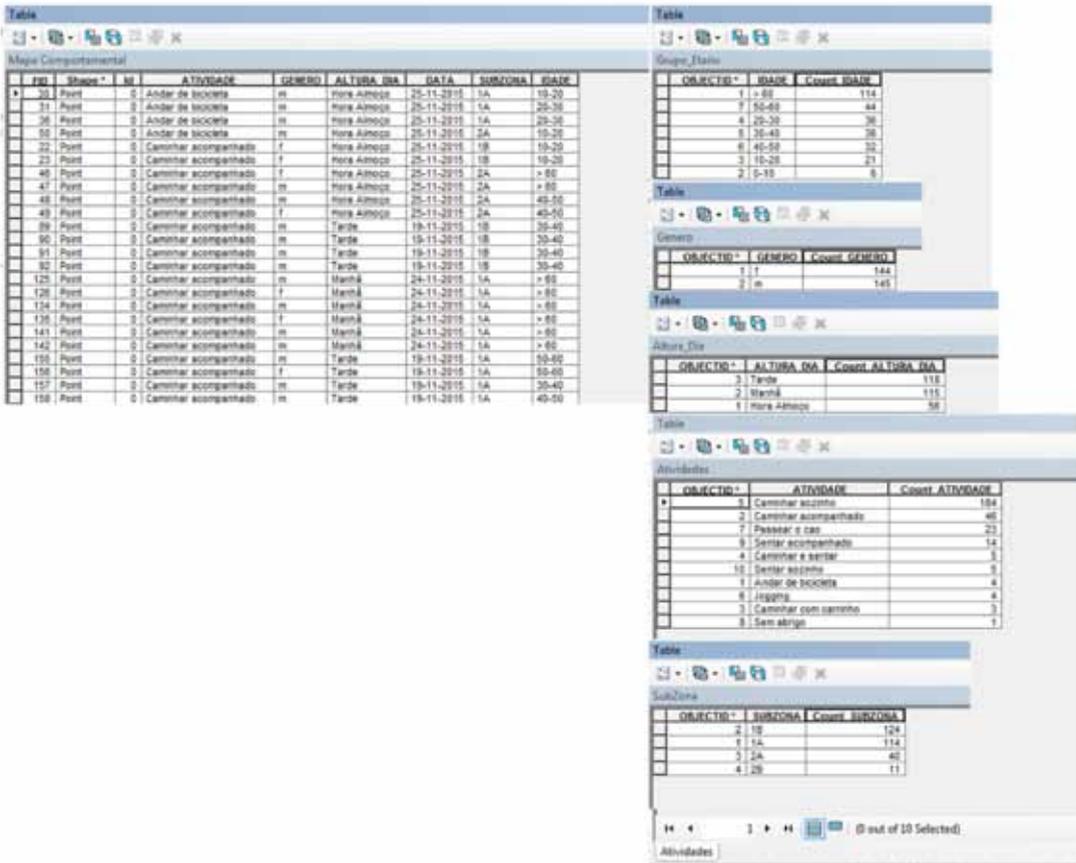


Figure 7. GIS Behavioral Maps table. Source: © Mafalda Caneira.

or contemplation of nature. It is intended to solve the problems, to valorize and to maximize the suitability of use.

CONCLUSIONS

A significant problem with the re-qualification for the public space of Figueirinha is that there are preexisting projected spaces used as zones of passage and stay; spaces that are used daily. The character of space must be preserved, as well as the preexisting uses and functions. This proposal aims to enhance the image of the neighborhood, introducing value and character in spaces, thereby improving the quality of life of the population. Following the “think global, act locally” principle, we aim to stimulate the use and appreciation of public spaces, from the garden to the pure tree-lined street.

Planning of the public space must be approached from the level of the neighborhood and not only considering large spaces, such as gardens and urban parks; spaces within the proximity are also part of the green structure, but because of their size, they are often undervalued.

The underutilization and degradation of spaces is often due to problems with the original design, including poorly designed paths resulting in foot-post paths, choice of inappropriate species, lack of areas of stay and attractive areas, lack of multi-functional spaces, visual incoherence and fragmentation, and lack of a unit reading.

Concerning the involvement of the population in the process of requalification of public spaces, it is essential that there is a constant involvement



Figure 8. Intervention Masterplan for Área Plano Figueirinha. Source: © Mafalda Caneira.

of the users in the management of occurrences, as well as in sharing opinions.

The green spaces cannot be seen only as scenic elements, and it is the work of the Landscape Architect to promote awareness and appreciation of the benefits and functions through the design of multifunctional spaces.

To conclude, this work contributes to the preparation of a guide to good practices in the design of urban public space in the municipality of Oeiras. This is achieved using principles and strategic lines of intervention that address the four criteria of a successful urban space. At the level of public participation, there must be an independent and current involvement of the population, fostering the use of new technologies, thereby allowing better management and maintenance of public spaces. This approach enables the users to maintain the space and to achieve joint management with the responsible entities.

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Mapping Cultural Ecosystem Services Using ppGIS Method in Budapest Metropolitan Region

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cultural ecosystem services, ppGIS, public participation, metropolitan region, Hungary

ABSTRACT

Several researches and international conventions highlight the importance of public participation in the process of strategy building (Primdahl et al., 2013). In the frames of our research we applied ppGIS method, a special, mostly new tool in Hungary. Our former researches justified the significance of this method especially in mapping of cultural ecosystem services (Valánszki, 2016). We applied the ppGIS method in micro-region of Vác situated in Budapest Metropolitan Region. 5 cultural ecosystem services were defined: aesthetic value; recreational and therapeutic value; spiritual; cultural and historic value; educational value. The survey was carried out between 2017 and 2018 collecting 184 maps. We had the following research questions:

Are the mapped cultural ecosystem types concentrated or more dispersed in the study area? What are the reasons for that? Which ecosystem service groups have similar spatial distribution? What are the characteristics of spatial distribution of the mapped services considering urban and natural areas? Our results reflect the importance of certain landscape elements considering ecosystem services and show which elements are of less importance for the locals. Especially the spiritual and historic values are concentrated in the built-up areas. Similar spatial distribution can be identified for recreational, aesthetic furthermore the spiritual and historic values.

INTRODUCTION

Recently there is a growing focus in the international literature on sustainable landscape management and ecosystem services. In the peri-urban, continuously changing areas there is a great threat on ecosystem services. Major land use conflicts can occur in these peri-urban areas, landscapes, as opposing interests form their development (interest of investors, municipalities, locals). Fast, intensive changes can cause also conflicts (intensive growth of built up areas, loss of natural, semi-natural areas, loss of identity, cultural ties to specific locations because of the changing population composition furthermore the break-up of traditional communities). So it is highly important to define and assess these services in order to apply the most effective regional development, nature and landscape protection strategies and sustainable landscape management techniques in order to minimize, avoid conflicts in the landscape. It is especially true for cultural ecosystem services, as these can be the base of local identity, communities and in many cases the local economy (tourism) not just in rural but also in peri-urban areas.

The UN Millennium Ecosystem Assessment program from 2001 was the most comprehensive research in the field of ecosystem services (MEA, 2005). The most frequently used grouping of ecosystem services are: provisioning, regulation, supporting, and cultural services (de Groot, 2006, Costanza et al., 1997).

Several studies and researches highlight the significance of cultural services (Constanza et al., 1997, TEEB, 2010). In this group former researches have distinguished subgroups (Brown, 2004, Alessa et al., 2008) such as: aesthetic value, educational value, recreational value, spiritual value, historic value, therapeutic, cultural heritage value.

Recently several reviews were



Figure 1: On site survey (student's photos)



Figure 2: Location of the study area

carried out summarizing the assessment methods of ecosystem services (Andrew et al., 2015, Englund et al., 2017). The results of the former researches show two possibilities for defining and assessing cultural ecosystem services. One is the assessment based on statistic data and GIS databases and other means of the involvement of local communities. Other researches (Fagerholm et al., 2012, Vejre et al., 2010, Willemen et al., 2010) highlight the importance of the former method as the locals are the “experts” of their environment. Meanwhile the landscape including tangible and intangible values represent a living memory for the locals. By the involvement of local communities the conflicts can be avoided more effectively than by plans elaborated by external experts and planners. The involvement of local stakeholders is especially possible on regional and local level. This spatial level is where locals use the services, goods of the landscape and influence their environment (Fagerholm et al., 2012).

These levels spatial data is needed the most and data is mostly available.

We have applied a special method for community based assessment and involvement of local communities. The so called pGIS or ppGIS method (Public Participation GIS) combines community based mapping with GIS techniques (Tulloch, 2008, Brown, 2012, Brown and Pullar, 2012). The most important advantage of this method is that it makes possible to explore such potentials, cultural assets which are hidden for external experts as these are mostly not protected (e.g. folk architecture), or there is no homogeneous database available (quiet, secluded places appropriate for spiritual replenishment), or places remarkable just with their surrounding (castles on higher ground, sacred places).

In our research we applied ppGIS method for defining of cultural ecosystem services in the agglomeration zone of Budapest. Our research questions were:

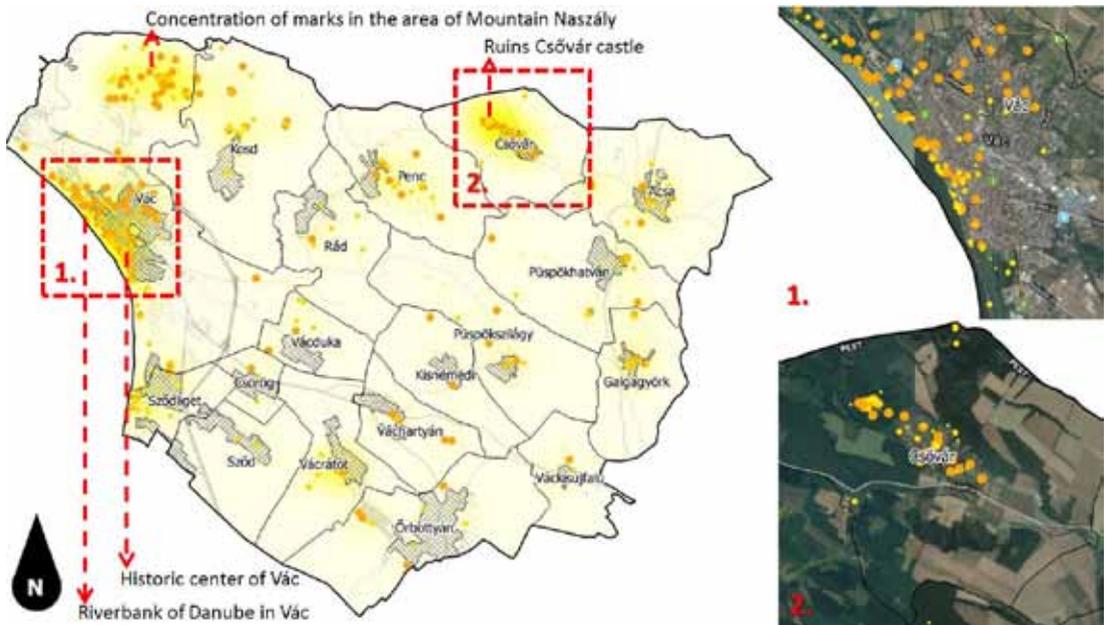


Figure 3: Concentration of marks of aesthetically significant elements

- Are the mapped cultural ecosystem types concentrated or more dispersed in the study area? What are the reasons for that?
- Which ecosystem services have similar spatial distribution? Which ecosystem services have different spatial distribution?
- What are the characteristics of spatial distribution of the mapped services considering urban and natural areas?

MATERIALS AND METHODS

For data collection in the frames of ppGIS method there are several methods and techniques available. Brown and Pullar (2012) justified that points can be used more effectively than other figures but higher number of samples are needed. Pocewicz et al. (2012) justified that paper based mapping has higher rate of responses and remarkably reduces the mistakes.

Based on all these results, the characteristics of the study area and the research objectives we defined the method of community based assessment. We used paper maps in order to reach the highest rate of

responses, and for the involvement of wide range of social groups (for involving those groups who do not use the internet). The chosen method is appropriate to avoid the potential mistakes because of closer interaction with the interviewed, the unclear issues can be more easily resolved. As base map we used Google Earth maps which are easily understandable for non-professionals as well. We marked the borders of the study area and the names of the settlements on the map to make orienteering easier.

In all aspects we used three markers. We considered the priority order also important so we numbered the markers: 1, 2, 3 (number 1. represent the most important goods from the given point of view). The differences in significance are highlighted in the maps by using different shade of the colors. In the frames of the ppGIS method we applied of size A3 maps.

We applied the five types of cultural ecosystem services (aesthetic value; recreational and therapeutic value; spiritual; cultural and historic value; educational value) in a simpler grouping. We carried out the research

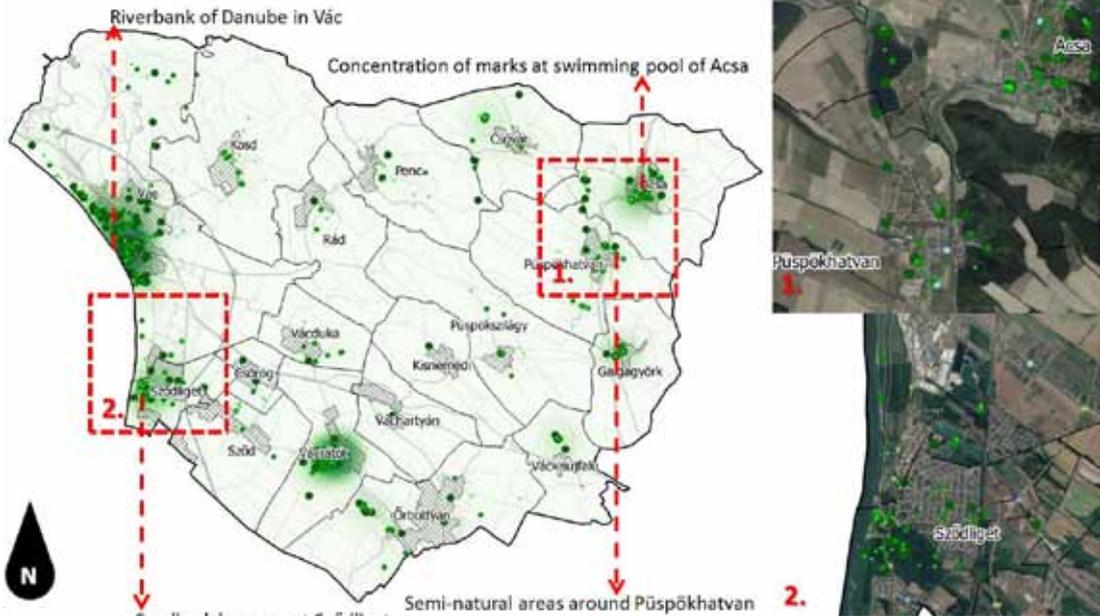


Figure 4: Concentration of marks of recreational elements

program by involving students between September 2017 and April of 2018 (Figure 1). We used QGIS program for processing 184 maps and comparison analysis, assessment of the results. It is important to emphasize that the results of ppGIS method are not simple generic maps of object locations but these maps can be considered as specific mental maps reflecting preferences of local people (dot densities and distributions).

The study area is micro-region of Vác in the agglomeration zone of Budapest (Figure 2). The micro-region consists of 18 settlements, 362 km², with of 67 781 population. There are great spatial differences in the area, Vác, the center of the micro-region has outstanding conditions furthermore the areas along the Danube and in the vicinity of Budapest are developed but there are smaller villages and more significant natural values in the East. Because of its location and diversity (agglomeration zone of Budapest) the study area is an interesting example of peri-urban areas under pressure and subject to various conflicts.

RESULTS

We present our results according to the 5 groups of cultural ecosystems.

Considering aesthetic values our results show that all the natural and artificial landscape assets can be important for locals (the assets were marked in almost identical numbers)). It is justified that the diverse topography (e.g. the mountain Naszály), the natural and semi-natural landscapes (e.g. Southern-Eastern part of the study area), and surface waters (e.g. river Danube (Figure 3, detail 1), and lakes) can be considered as the most significant assets from aesthetic point of view.

In case of artificial landscape elements it can be stated that landmarks in a dominant position (on higher grounds) can be considered more significant from aesthetic point of view for locals than other culturally significant assets blended into their surrounding (e.g. ruins Csóvár castle (Figure 3, detail 2)). It is the case also when several assets of high aesthetic value are concentrated in a relatively small area (e.g. historic downtown of Vác along

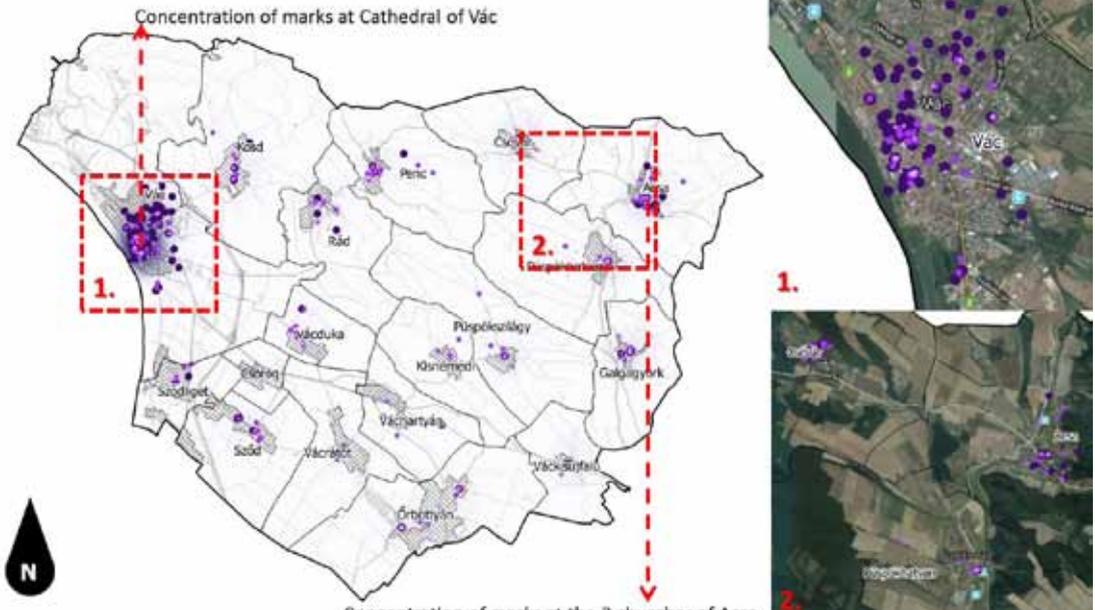


Figure 5: Concentration of marks of spiritual elements

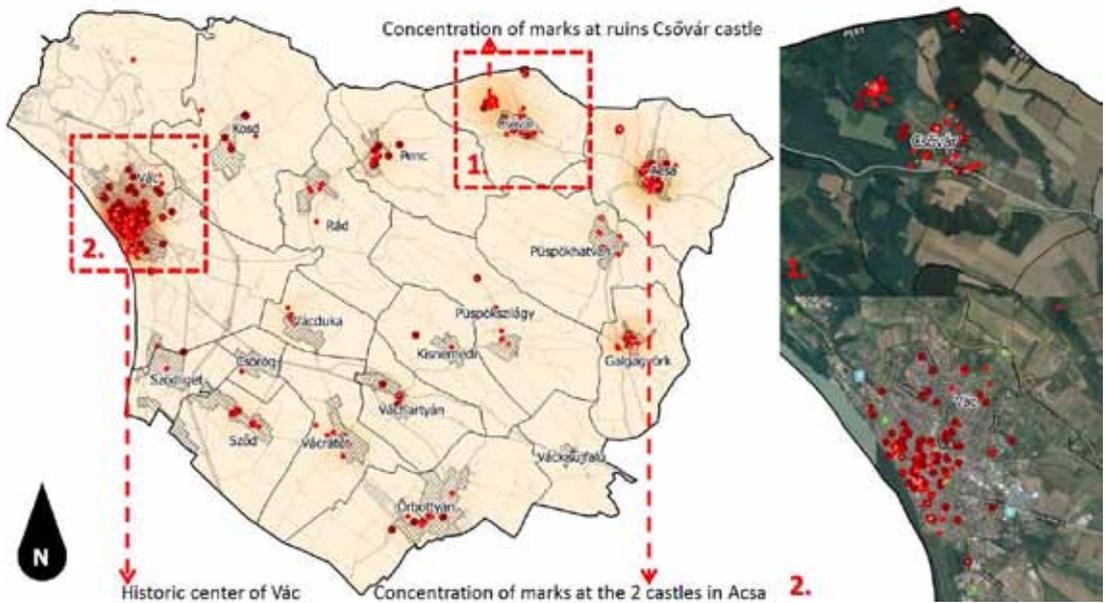


Figure 6: Concentration of marks of educational ecosystem services

the Danube). Our researches justified the overestimation of such areas by local people. In our result maps the borderline between the built and unbuilt areas are not remarkable, the marks are not concentrated. These justify the significance of all the natural and artificial landscape elements for locals and it highlights the subjectivity in this group of ecosystem services (Figure 3).

Considering recreational goods and services the result maps show the most diverse elements and places. It justifies the fact that considering the recreational value the natural water surfaces (e.g. Danube, smaller lakes (Figure 4, detail 2) represent the same significance as specific recreational facilities (e.g. swimming pool in Acsa).

Our results justify the significance

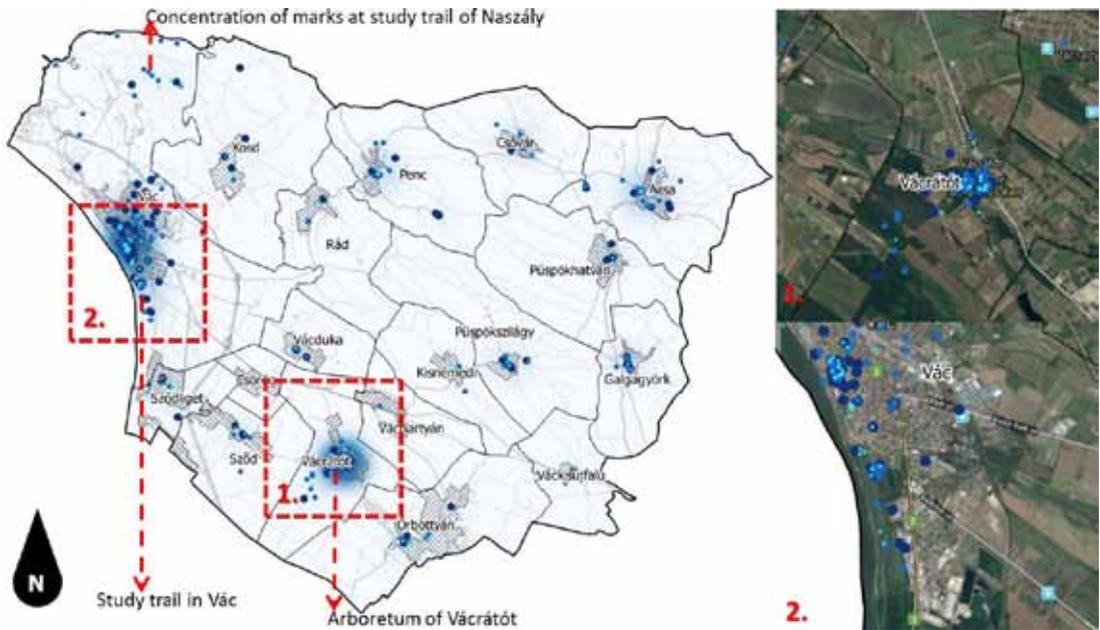


Figure 7: Concentration of marks of educational ecosystem services

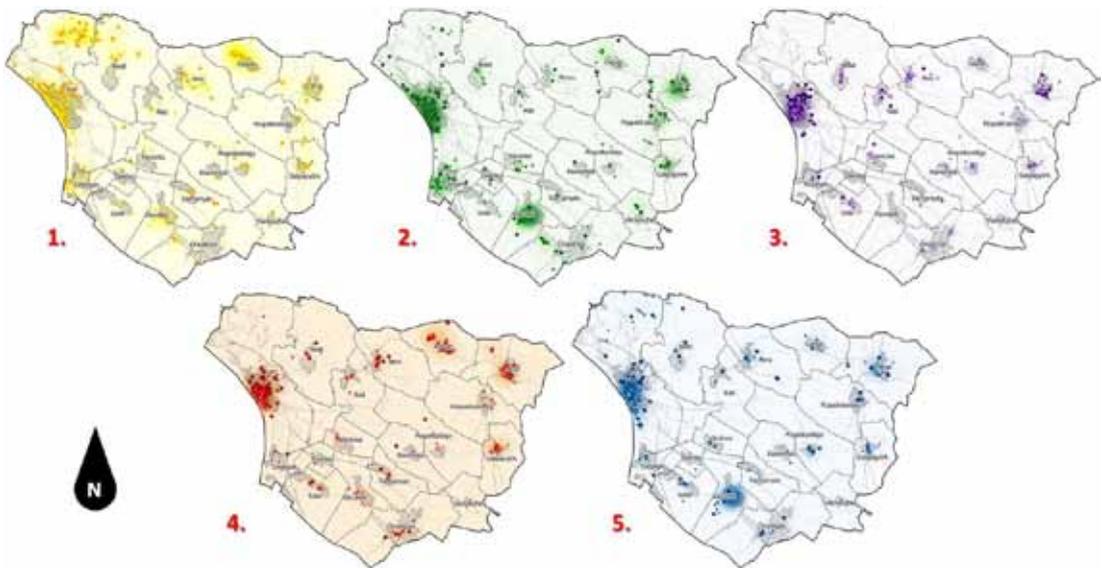


Figure 8: Comparison analysis of the result maps (1: Aesthetically significant elements; 2: Recreational elements; 3: Spiritual elements; 4: Historic value; 5: educational ecosystem services)

of natural surroundings of built up areas from recreational point of view. Due to this fact were blurred the borderlines between the built and unbuilt areas (e.g. Püspökhatvan (Figure 4, detail 1)), furthermore the concentration of marked places is not characteristic for this group of services (Figure 4).

The assessment of spiritual ecosystem services show that locals

marked only religious assets, places which reflect the Christian traditions. In case of this group of ecosystem services we can see a remarkable concentration of marks. Compared to the other two services (aesthetic, recreational) it is more clear which assets are most important from spiritual point of view for the locals (e.g. cathedral of Vác (Figure 5, detail 1)).

It is also an important achievement that the smaller scale sacred objects (e.g. crucifixes, Calvary, chapels) have less or no significance for locals at all, the locals haven't marked these objects. The places significant from spiritual point of view are concentrated in built up areas (Figure 5, detail 2).

Considering historic cultural elements locals marked just the artificial landscape assets so the built up and unbuilt areas can be clearly distinguished. The results show a similar concentration to the spiritual services but the center of the micro-region (Vác) is less dominant. These results show that local people consider the protection of heritage assets in their hometown/village or in neighboring settlement important (e.g. rural castles in Acsa, castle ruins in Csővár (Figure 6, detail, Figure 6, detail 2).

Our experiences show that educational services have been the most problematic, the least interpretable for the locals. Marked places dominate in urban areas representing mostly museums, folk houses. In the unbuilt areas mostly the popular study trails are marked (e.g. in mountain Naszály or in Vác (Figure 7, detail 2)) and furthermore arboretum of Vácrátót (Figure 7, detail 1), as the most significant touristic and research institution of the region. In this group of cultural ecosystem services there are not significant differences between the built and unbuilt areas, however the concentration of marks is significant as a result of uncertainty related to this type of services (this type of services was the most difficult to understand for the locals).

Based on the comparison analysis of the five surveyed ecosystem services groups there are characteristic similarities considering aesthetic and recreational services. Furthermore we can find similarities between the spiritual and historic values though in case of the former group the marked points are less concentrated. Based on our researches we can state that those areas are the

most important recreational areas for the locals which are of high aesthetic value, and the majority of spiritual and historic assets overlap each other.

In the study area there are certain places which are more significant in all groups (e.g. historic downtown of Vác, Danube riverbank, Arboretum of Vácrátót). Meanwhile there are remarkable differences between certain places considering specific ecosystem groups, these were important because of their topographic or natural character but from other aspect they were meaningless for locals (e.g. mountain Naszály, central area of the micro-region) (Figure 8).

DISCUSSION AND CONCLUSION

Using ppGIS method we explored the preferences, relation to cultural ecosystem services of local communities in the study area. Based on our researches we can state that:

- the natural and artificial landscape elements have the same significance considering aesthetic and recreational ecosystem services;
- however the marks of spiritual and historic ecosystem services are concentrated in built up areas (cultural assets);
- the result maps of the above mentioned ecosystem services are similar, so we can state that those are the most important recreational areas for locals which have high aesthetic value, and the majority of marked spiritual and historic assets overlap each other;
- based on the preferences of locals the following landscape elements are of most significance: diverse topography, natural landscapes, dominant landscape elements, concentration of landscape assets of high aesthetic value;
- the most important recreational landscape elements for locals are

natural waters, and natural, semi-natural areas around the settlements

- the most important spiritual values are related to religious objects;
- landscape assets of historic significance are concentrated in built up areas, however in this case the patriotism of locals is the strongest;
- because of the uncertainties related to the educational assets further researches, clarification is necessary;
- it can be stated, that it is advisable to survey, assess the ecosystem service groups separately as the result maps can differ significantly;
- contrary to our expectations, the dominance of Vác, the center of the region is not remarkable in all cases.

Overall, it can be stated, that this method is appropriate to explore such assets as well which would be hidden from external experts, using only desk-work. It revealed the significance of these assets for local people. Our experiences show that the application of ppGIS method can enhance the patriotism, identity of local people above the scientific results. This effect is highly important in case of future development because the locals will accept projects based on the existing values, furthermore the potential conflicts can be minimized.

In our future researches we plan to explore the relations between dwelling place, surveyed areas and marked sites (is there any relation and what kind). Related to these aspects it is highly important to analyze the commuting patterns. In the first phase of our research with the contribution of students we carried out a detailed survey of cultural and natural heritage (which meant data collection without field trips). We also plan a comparison analysis of this data collection with the results of ppGIS method analyzing the optimal involvement of local communities.

In order to clarify and generalize the results of the research, we consider

it desirable in the future to increase the number of collected maps, and carry out researches on further study areas of similar and different character.

We consider our research method applicable not just in Hungary but also for European peri-urban areas of similar characteristics. Especially these results can serve as a base for regional development and management plans.

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Developing a Methodology: Unravelling People's Attitudes Towards Blue-Green Infrastructure

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blue-green infrastructure, landscape
preference, developing a methodology

ABSTRACT

This paper is about the landscape transformation that has emerged as a result of dealing with contemporary hydrological issues in cities. These hydrological challenges are a result of the shift towards more sustainable approaches for coping with urban drainage issues (i.e. blue-green infrastructure (BGI)), instead of the more conventional grey infrastructure. However, the associated change in appearance of the resulting urban drainage systems could lead to controversy. The preference of water per se and its associated landscapes is well documented. This paper therefore seeks to develop a methodology for identifying diverse attitudes to aesthetic preference of water-related landscapes. This methodology could contribute an insight into the aesthetic response of public preference to these new landscapes, which may assist landscape architects and those with responsibility for the implementation and management of new BGI projects.

INTRODUCTION

The global expansion of cities and the resulting urbanisation has led to dramatic environmental change (Eggermont et al., 2015), such as the increase in impervious land cover and associated probability of urban flooding (Burns et al., 2012). Novel solutions for dealing with these hydrological issues are creating new landscape typologies (Depietri and McPhearson, 2017, Desimini, 2013, Austin, 2014). BGI is one of these new sustainable solutions,

seeking to deliver multiple functions to urban environment and society. RLCB (the Ramboll Liveable Cities Lab) in their report "making cities liveable" suggest that BGI can bring a range of social-ecological benefits for people and nature, as well as provide water-related benefits (i.e. quality control and quantity control) to enhance capacity of stormwater management (RLCB, 2016).

The changing demand has resulted in an alteration in the appearance of drainage systems. By contrast with conventional grey infrastructure, BGI is viewed as the landscape-based measure that typically includes green rooves, bio-swales, rain gardens, constructed wetlands etc. (Ahiablame et al., 2012, Dietz, 2007, Desimini, 2013). However, it is widely acknowledged that in response to dilemma of technology and nature, society regularly has three reactions: "it may deny that a problem exists; it may accept that there is a problem, and finally, it may act toward resolving the problem" – deny, acceptance and action (Thayer, 1994: 159). Therefore, many of the shifting appearances of BGI could produce visual controversy as well as the associated landscape preference. This poses a potential question regarding what people's attitudes towards the appearances of these new landscape-based infrastructures are.

Previous studies reveal that perception of aesthetics in landscapes strongly influences public attitudes to BGI projects, and little studies pay an attention to public perception of BGI regarding aesthetics (HR Wallingford, 2003, Apostolaki et al., 2006, Everett et al., 2015). This informs that there is a knowledge gap existed in what public preference of BGI concerning aesthetic responses is. This paper seeks to develop a methodology for identifying diverse attitudes of different stakeholders in relation to aesthetic preference of water-related landscapes. The paper briefly demonstrates a dynamic attitude towards water and

its associated landscapes, introduces the theoretical context of landscape perception and preference research, and provides a methodology to recognise people's attitudes to BGI in relation to aesthetic response.

DYNAMIC ATTITUDE TOWARDS WATER AND ITS ASSOCIATED LANDSCAPES

A range of literature indicates that people's perception of water and its associated landscapes could prove dynamic. An inseparable relationship between human and water indicates the dependency associated with the purpose of survival, and functional and spiritual demands. The early relationship between city and water in the ancient civilisation is based on the purpose of survival (Appleton, 1975, Appleton, 1996) as water provides essential pre-condition for life. This demonstrates that people inherently require water and its adjacent environmental settings since the origins of urbanisation. The positive perception of water also refers to functional use in the ancient times as the natural power being an agency: 1) for transportation, such as Grand Canal in China (Mao et al., 2014); 2) for natural defence, i.e. the fortification of the city (Jellicoe and Jellicoe, 1971). Moreover, water is coupled with spiritual dimension, such as symbol of the source of life. This belief is demonstrated on religion and underpins many works of art (Ryan, 2010). For instance, the fountain symbolises both the emergence and disappearance of fresh water (the origin of life), as well as providing aesthetic pleasure for people (Moore and Lidz, 1994).

The literature reveals that people's attitude to water is not always positive. The negative attitudes are often connected to unfavourable symbolic meanings and natural disasters, i.e. floods. By contrary with positive symbol as life, in some of physical states water also appears as empty, dark and

cold that represents death, fear and uncertainty (Moore and Lidz, 1994). In relation to natural disasters, flood has been viewed one of the most significant hydrological risks since ancient times. The records of floods along the Nile River date back to thousands of years ago (Hassan, 1981). The worst floods (over 1500 times in record) in history is associated with China's Yellow River, the most disastrous one of which led to more than 900,000 people died in 1887 (Kozlowski, 1984). The contemporary examples of flooding not only take place in the flood plain but also in urban areas. For example, during the last decade, Chinese cities, like Beijing, Xi'an, Shanghai, Hangzhou all experienced water inundation in rainy seasons after large storms (Mo and Yu, 2012). Similar cases also exist in Western, such as UK (Miller and Hutchins, 2017). The above aspects regarding water may produce negative mental effects to people and their preference of associated landscapes.

It is obvious that the two contrasting positions indicate that people have a complex attitude to water *per se* and its associated landscapes. This controversy raises a question about the notion of the aesthetic taste for contemporary water-related landscapes (BGI). To address this question, a flexible and accessible methodology for assessing diverse aesthetic preferences of BGI is required.

LANDSCAPE PERCEPTION AND PREFERENCE

Research suggests that some human response to landscape is universal (Appleton, 1975, Appleton, 1996) while other responses are related to cultural experiences (Kaplan and Kaplan, 1989, Bourassa, 1992). The former perspective is evolutionary-based, indicating that the human inherently has preference for landscapes that provide good conditions for survival, i.e. water etc. (Appleton, 1975, Appleton,

1996, Kaplan and Kaplan, 1989). The biophilia hypothesis supports this point of view and extends the dependence of human on nature, not only for physical survival but also for seeking aesthetic, intellectual, cognitive and spiritual meaning and satisfaction from nature (Kellert and Wilson, 1995). Information processing theory proposed by Kaplan and Kaplan (1978) is one of the most influential and well-known theories on landscape perception and preference. The central concept of information processing theory is information that not only suggests people to gain information from environmental settings, but also the surroundings require promising information for people to explore (Kaplan and Kaplan, 1978, Kaplan et al., 1998). Berlyne's arousal theory explains why people prefer certain situations for a longer period of time rather than other situations (Nijhuis et al., 2011: 43). According to Berlyne (1971), the perception of an environmental setting is a process of an explorative behaviour and of information transmission, and aesthetic responses of which arise from the process of curiosity conditioning and move towards an optimal level with uncertainty and conflict in the environment (Chang, 2009). Additionally, the significance of arousal and hedonic for influencing aesthetic response is supported by Wohlwill (1976). He demonstrates a relation existed between landscape preference and the degree of mystery (Nijhuis et al., 2011).

Other studies inform that landscape aesthetic response is also associated with cultural experiences. Research manifests that the role of cultural experience in landscape aesthetics have effects on the manner in which different cultural groups interpret the forms of landscapes (Bourassa, 1992). Three aspects have effects on cultural experience, including familiarity/experience with residence, cultural/ethnic variation and effects of formal knowledge and expertise (Kaplan and

Kaplan, 1989: 73). Familiarity referring to "the product of experience" is the major factor for comprehending variations of different groups of cultural experience (Kaplan and Kaplan, 1989: 73) and implies a certain kind of knowledge about a landscape that leads one group of people to view things differently from the other one group (Bourassa, 1992: 103). As stated by Kaymaz (2012), understanding of a setting could assist people to feel secure or reduce fear about the environment that will be met. In order to understand an environment comprehensively, the Kaplans inform that the enhancement of familiarity with the setting could potentially have a positive effect on people's perception (Kaplan et al., 1998). Nevertheless, it is also notable that familiarity does not represent all dimensions for predicting preference (Kaplan and Kaplan, 1989).

DEVELOPING A METHODOLOGY

Landscape perception and preference research often encounter a paradox that links with objectivist and subjectivist. According to Lothian (1999), perception of landscape aesthetics is based on two assumptions, i.e. landscape quality is an intrinsic physical attribute (objective) and landscape quality derives from the eyes of the beholder (subjective). He also informs that the both of two assumptions possess advantages and disadvantages. Within this context, it requires a mixed analysis (qualitative and quantitative) for landscape preference study. The multi-strategy is a well-applied research strategy in the field of social science, which aims to address the kind of problem: "when the researcher cannot rely on either a quantitative or qualitative method alone and must buttress his or her findings with a method drawn from the other research strategy" (Bryman, 2004: 458). In this paper, the developing methodology adopts the multi-strategy including photo-pairs experiment and

two-rounds questionnaires (by using Delphi method).

The photo-pairs experiment employed in this methodology aims to address the question regarding What types of appearance of blue-green infrastructure are liked and disliked, which enables participants to choose a most preferred image from the designed images. The use of photograph as landscape surrogates has been widely applied to visual stimuli in landscape preference research (MLURI, 2012), although this medium of presentation has still often encountered a debate. Some scholars indicate that photograph can be a valid substitute to employ, while some others do not agree with that and highly concern the issue of validity of photographic simulation (Kaymaz, 2012). For this concern, Sevenant and Antrop (2011) present that new technologies, i.e. computer graphics, 3D-modelling, virtual reality, GIS-based photo-realistic visualisation, could facilitate visual representation.

The second step of the developing methodology is qualitative-based, which undertakes to two-round questionnaires for exploring stakeholders' differences in attitudes to aesthetic performance of the blue-green infrastructure. The qualitative-based research involves an interpretive, naturalistic approach to the subject matter, and allows to interpret phenomena in terms of the meanings people bring to the researchers (Groat and Wang, 2013: 218). Delphi method is developed by studies that the RAND Corporation conducted in the 1950s (Okoli and Pawlowski, 2004). This method particularly suits to collect reliable consensus of a group of experts on certain topics (Dalkey and Helmer, 1963), and typically includes at least two rounds of inquiry. The Delphi method beneficially provides a controlled iterative process, during which participants give opinions without group pressure and direct confrontation (Rowe and Wright, 1999, Skulmoski et al., 2007, Dalkey and Helmer, 1963). It

is notable that the use of Delphi method in this methodology is proposed in a qualitative way without statistical consensus.

CONCLUSION

In sum, sustainable solutions (BGI) for dealing with urban drainage issues are an inevitable trend of future urban landscapes. However, many of these shifts regarding appearances of the drainage system could produce visual controversy as well as the associated landscape preference, while people's complex attitude to water per se and its associated landscapes raises a question – what is the aesthetic taste for contemporary water-related landscapes is. Within this context, this paper aims to develop a methodology to identifying the diverse attitudes from different stakeholders in relation to aesthetic preference of water-related landscapes. Two components of the methodology are constructed including photo-pairs experiment and two-rounds questionnaires (by using Delphi method). The proposed methodology will reveal diverse attitudes of BGI from stakeholders and could provide a critical insight into effects on cultural variations to aesthetic preference of BGI, which may strengthen practical guidelines for how to design and manage those new and existing practices.

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The Influence of a Cultural Background on the Perception of Illuminated Urban Spaces: An Eye-Tracking Study

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eye-movement

ABSTRACT

The circadian rhythm of the sunlight exerts a significant effect on humans and their landscape perspectives. Landscape elements in the urban park (e.g. lush greenery) that are visually attractive during the day, can turn into a dangerous shield for offenders at night. When darkness takes over, the lack of light increases the feeling of fear due to the visible limitation of evaluating surroundings. The strategy of illuminating the nocturnal environment not only raises the night-time security but it also transforms the city into an energetic urban space that is worth visiting, even after nightfall. On account of the fact that the major focus of the landscape perception studies (explicitly dealing with the cultural factor) lies on the diurnal sceneries, considerably less is known about the nightly landscapes. To this end, this study aims to probe the viewing behaviour between different cultures, together with the analysis of the allocated attention at night. Eye-tracking technology was used to examine the difference in eye movement between Belgian and Chinese respondents. Hence the visual interest and desired illumination can be distinguished. And a perspective of pluralism is essential to achieve sustainable urban lighting systems.

INTRODUCTION

With a thriving cultural diversity in many vibrant cities like Brussels and Ghent, growing numbers of multinational students and expatriates take up a

considerable amount of the population. In such a way the urban green spaces in these 'international' cities are beneficial (for both locals and non-local users) to their sense of well-being. In their study, Buijs et al. (2009) verified the immigrant-status as the stronger predictor of natural landscape preference compared to age, gender and education level. "While landscape perception and appreciation are in the end individual mental phenomena" as Jacobs (2011: 45) put it, the strength of culture has a remarkable effect on the ideology, sensation and social behaviour of its members (Lehman, Chiu & Schaller, 2004). Culture represents a set of collective thoughts and habits (that are) shared within a cultural group (Jacobs, 2006), which is also tightly linked to another underlying concept 'familiarity'. Familiarity illustrates to which degree people could relate themselves to the depicted landscape. "There exists a commonly shared 'idealized image' that is defined by cultural factors ... People have learnt to recognize a specific landscape configuration and value it in a specific way" (Hagerhall, 2001).

Due to the fact that the benefit from nature is closely connected to the active participation of the city populations, a design of urban green space that considers the observers' demographic variables can have a positive outcome of residential gratification (Wang & Zhao, 2017) and public support (Gobster, Nassauer, Daniel, & Fry, 2007). People from various cultures perceive the landscape differently. Substantial landscape perception research and the cross-culture comparison in particular are based on photograph surveys (Buijs, Elands & Langers, 2009; Kaplan & Talbot, 1988; Tips, 1986; Tips & Savasdisara, 1986; Yang & Kaplan, 1990; Yu, 1995). Research has examined the differences amongst nationality (Buyhoff, 1983; Zube & Pitt, 1981) and religion (Tips, 1986). Other cases include the landscape

appreciation comparison between Asian residents and Western tourists (Tips & Savasdisara, 1986), representatives from two cultural-background groups (Kaplan & Talbot, 1988), Korean residents and Western visitors (Yang & Kaplan, 1990) as well as Chinese residents and American students (Yu, 1995).

Generally speaking, landscape perception research is preferably conducted during the day, whether the form considers an on-site survey or usage of photographs as a substitute for evaluation. The night scenery is rarely addressed from the cultural perspective. Meanwhile, the prolific utility of artificial lights in the city has dramatically changed the social lifestyle. Illumination has a profound impact on the city perception during the night, which can be regarded as an influential key on the hospitality concerning a park visitation or an evening walk in the urban landscape. Lighting through darkness socially symbolizes the safety, civilization and urbanization (Jakle, 2001). In this respect, several “light sensitive areas” should be paid close attention to, as Hölker et al. (2010) referred to the periphery of residential areas, exemplified as parks, forests and water shores.

Therefore, the aim of this study is to explore the night perception and how it is influenced by a cultural background. The important question to answer is how to detect and to understand the knowledge of cultural similarities and differences in the perception behaviour. Since the eye-tracking technology shows its trend of popularity and the usefulness has been ascertained in landscape research (Dupont, Antrop & Van Eetvelde, 2014; Dupont, Antrop & Van Eetvelde, 2015; Nordh, Hagerhall & Holmqvist, 2013), it is interesting to implement this approach to reveal the viewing patterns on photographs associated with cultural variability: How do the eyes react to the darkness in the urban

park between natives and non-natives? Does lighting have a distinct effect on the eye movement? Does the landmark perception (e.g. buildings and sculptures) show a significant difference from the daylight when it is illuminated at night? When do the eyes land on a target (landmark) and how is this visual ‘travelling’ evolving?

METHODOLOGY

Although the aforementioned variables (e.g. age and education level) have minor influences compared with the individual’s cultural background (Buijs, Elands, & Langers, 2009), we still want to minimize the potential impact on the perception behaviour. In this regard, two groups of participants (20 native Belgian and 20 non-native Chinese, the mean age is 27 and 28, respectively) working in the Department of Geography, Ghent University were recruited for this study. Considering the safety and impossibility to conduct experiments in site after dark, photographic stimuli were adopted. They were digital images taken from urban parks in Ghent and Brussels (Belgium). Each corresponding pair of day and night images were shot on the same day at an identical geographic location. 20 colour photographs were presented in total (10 daily and 10 at night). The daily photographs represented the control sample as the nocturnal perception was analysed and compared with the observations in natural daylight. During the eye-tracking experiment, a RED250 eye-tracker device mounted on the computer screen was monitoring and recording the participants’ gaze positions simultaneously when they were freely viewing the photographs on the screen. The exposure duration of each scene was 10s in a randomized order across the subjects.

The analysis of the eye-tracking data was carried out by using the Eye-Tracking Metrics (ETMs), which necessarily entails the information

of observation pattern. Given the research objectives, several Areas Of Interest (AOIs) (e.g. landmark and artificial lighting) were identified on the images. Consequently, the corresponding glance, fixation and saccade related metrics in conjunction with other measurements (scan path, entry time, dwell time) derived from these basic metrics have been yielded and assessed. Fixation means the stationary state of eyes and saccade refers to the movement, namely, the shift from one fixation to another. Glance represents the saccade that enters the AOI from outside and the sequence of consecutive fixations (in broader terms: the serial processes of the eye movements) is delineated as the scan path. Entry time illustrates the duration before the first fixation enters the AOI and dwell time reveals the sum of saccade and fixation durations that happen within the AOI.

RESULTS AND DISCUSSION

Eye-tracking metrics that originated from the eye movement data illustrate a significant difference between Belgian and Chinese individuals when viewing the images in daylight, whereas the eye's action on nightly sceneries occurs independently of the cultural variable.

Chinese subjects generated larger amounts of fixations and saccades as well as longer scan path and dwell time on the defined AOIs compared with Belgian participants by day. The outcome of scan path and dwell time demonstrate that Chinese participants scanned larger areas on the photographs and absorbed hence more visual information from the stimuli. A likely reason (for that) is the unfamiliarity with the urban landscape and the need to explore the image. With regard to familiarity, some photographs (displayed as stimuli) are the quotidian sceneries that Belgian people would come across every day, they are not well-known by Chinese

people notwithstanding. Every glimpse incorporates a novel message when the viewer encounters an unfamiliar environment (Potter, 1975) and a prior experience can alter their anticipation of the environment. Thus, when exotic urban parks (dissimilar from their mentally referenced image) were presented, a desire to see as much contents as possible was motivated and the contextual novelty remained fairly high among the Chinese people. They made remarkable more efforts to cognitively process the photographic contents during the day. Conversely, acquisitions and cognitive processes of visible features (e.g. endemic species) demanded less effort from the Belgians on account of its consistency with their mental representation of the urban green space.

Nevertheless, the influence of the darkness restricted the perceptual capacity after nightfall, both for Chinese and Belgians. Landscape elements blend into the darkness, whilst lighting develops into the determinant driving force for scanning night-time images. There was more of a tendency to explore the lightened areas on the photograph and no salient difference emerged from these two groups in terms of the main ETMs.

The entry time to the landmark and the first fixation duration on that specific landmark reflect the fact that the cultural difference in eye-movement patterns emerged very early. Moreover, the entry time indicates that the respondents initially directed their eyes to the landmark at the beginning of the exposure time and it was remarkably shorter at night than during the day. Landmarks attracted glances (more than once), so as to capture people's attention during the time course. Dwell time on the landmark constitutes 35 % to 65 % of the total exposure time in both day and night images although the AOI area only takes up 3 % to 5 % of the size on the whole image. The components that can be characterized

as the landmark in our case are the unique designs occupying the photograph's dominant positions. They are designated as eye-catching objects and are often chosen for the application of gleaming illumination as well, which shapes them to be even more outstanding and captivating compared with other landscape elements at night. Illuminating strengthens the landmarks' readability as Belgian and Chinese individuals appeared to coincide on the same landmarks brightened in the dark. In contrast, the landmark without a highlighting illumination lost its attraction as a frequently fixated element when the atmosphere turns dark.

To put it briefly, the decision regarding at which landscape components could be looked when darkness takes over, is independent of the cultural difference for the reason that the potentially perceptual recognition narrows down exclusively to the parts where brightness is visible. Accordingly, the active 'reading' of landscapes during the day that is under the influence of the cultural backgrounds of individuals, transforms into the negative night observation that depends on the artificial luminance.

CONCLUSION

It is undeniable that the cross-cultural commonalities exist. Human beings are seeking stress-free restoration when they feel the desire to go for a walk in the park. And when it comes to darkness, the notable consistent viewing behaviour between two groups of respondents (native and non-native) shown in this study can be interpreted by the human's customary act to avoid danger. This mindful focus on a danger signal is tightly associated with the pre-programmed fear of dark, which is reflected on the eye movement as a form of seeking light and brightness.

As a matter of fact, the park's design and management is a complex process that should take multiple

factors into consideration. This study particularly probes the light function of the park at night related to the cultural background of the park users. A sophisticated lighting system stimulates the curiosity as the essential motivation for observation at night. For more operative suggestions, the nocturnal visual resource can still be divided into two subsets – the atmospheric illumination to enhance the aesthetic value and the functional luminance for the nightly visitor's safe experience. This could be an advanced analysis of the next step.

To conclude, the utility of the eye-tracking technology (in combination with the on-site photograph as a real-scenario simulation) proved to be feasible in this exploratory study. The culture attached topic is worth exploring in greater depth for expatriates will continue to have a growing presence worldwide. This beneficial perspective and a greater understanding can be integrated into an optimal design of the landscape experience and the management process of public space in the future.

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5.6. THEORY AND PRACTICE

GROUP L

Embedding Ecological Networks and
Envisioning Agricultural Practices in the
Neerpede Valley

Jolein Bergers

Landscapes Reflexive Practices as
Embodied Thinking for Gaps' Reduction
between Human and Nature

Rita Occhiuto

Integration by Design

Elizabeth Rose

Conquering New Landscapes.
A Contribution to the Narrative of Dutch
Landscape Architecture

Noël van Dooren

The Organization Form of the Edible
Landscapes in the Public Space of the
Residential Area in China

Xin Wang

Embedding Ecological Networks and Envisioning Agricultural Practices in the Neerpede Valley

PROBLEM STATEMENT: THE LOCAL EMBEDDING AND SITE-SPECIFIC DESIGN OF ECOLOGICAL NETWORKS

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ecological networks, urban agriculture, communities of practice, landscapes of practice, hybrid designs

ABSTRACT

The development and design of ecological networks in the Brussels Metropolitan Region is hindered by the shortcomings of top-down planning and bottom-up initiatives. On the one hand, technical planning instruments, such as the Regional Plan for Sustainable Development (RPSD) (2013) and the Regional Nature Plan (RNP) (2016) tend to reduce 'ecological' networks to autonomous 'green' frameworks, disconnected from daily practices of local communities living in the surrounding urban fabric. On the other hand, bottom-up initiatives such as urban agriculture are initiated and embedded locally, but tend to lack visioning on a regional scale and explicit design imaginaries. What is needed is an approach which combines the shortcomings and advantages of both. This paper takes the pilot projects of BoerenBruxselPaysans in the Neerpede valley as a starting point to discuss the potential of urban agriculture initiatives in the development of ecological networks. Our hypothesis is that these initiatives could actively contribute to a 'landscape of practice' on a regional scale, which is providing a way to deal with ecological networks on several levels: (1) as a way to embed the active production of landscape in local communities through work and leisure and (2) as an example of how new forms of design can accommodate and develop ecological infrastructures.

In ecological sciences, the concept 'ecological network' has been defined as 'a set of spatially linked, coherent ecosystems, interacting with the landscape matrix in which they are embedded' (Opdam, Steingröver and Rooij, 2006) In the disciplines of landscape and urban planning, this relational aspect between the network and the landscape has increasingly been used to bridge the paradox between nature conservation (fixing nature in space and time) and urban development, which is implying change (Jongman, 1995; Opdam, Steingröver and Rooij, 2006) This resonates with the urban design discourse, in which ecological infrastructures are being mobilized as structuring devices for urban development and the reconceptualization of the contemporary city (De Block, 2015).

Also in the Brussels' fringe, green open spaces are being foregrounded as a facilitators of growth and transformation, providing decompression spaces away from urban discomforts (e.g. pollution, noise, stress, ...). For example, the *Regional Plan for Sustainable Development (RPSD)* (2013) aims to spatially link fragmented open spaces to a 'green' network (Figure 1), with the ambition of developing it into a structuring device for urban development (Perspective Brussels, 2016). In line with urban development strategies formulated for the green network in the RPSD, the Regional Nature Plan (RNP) forwards the concept of 'ecological network', that more or less addresses the same open spaces as the green network, but focuses on biodiversity.

However, a number of problems still occur when trying to develop the 'green' network (of the RPSD) and the 'ecological' network (of the RNP) on the terrain.

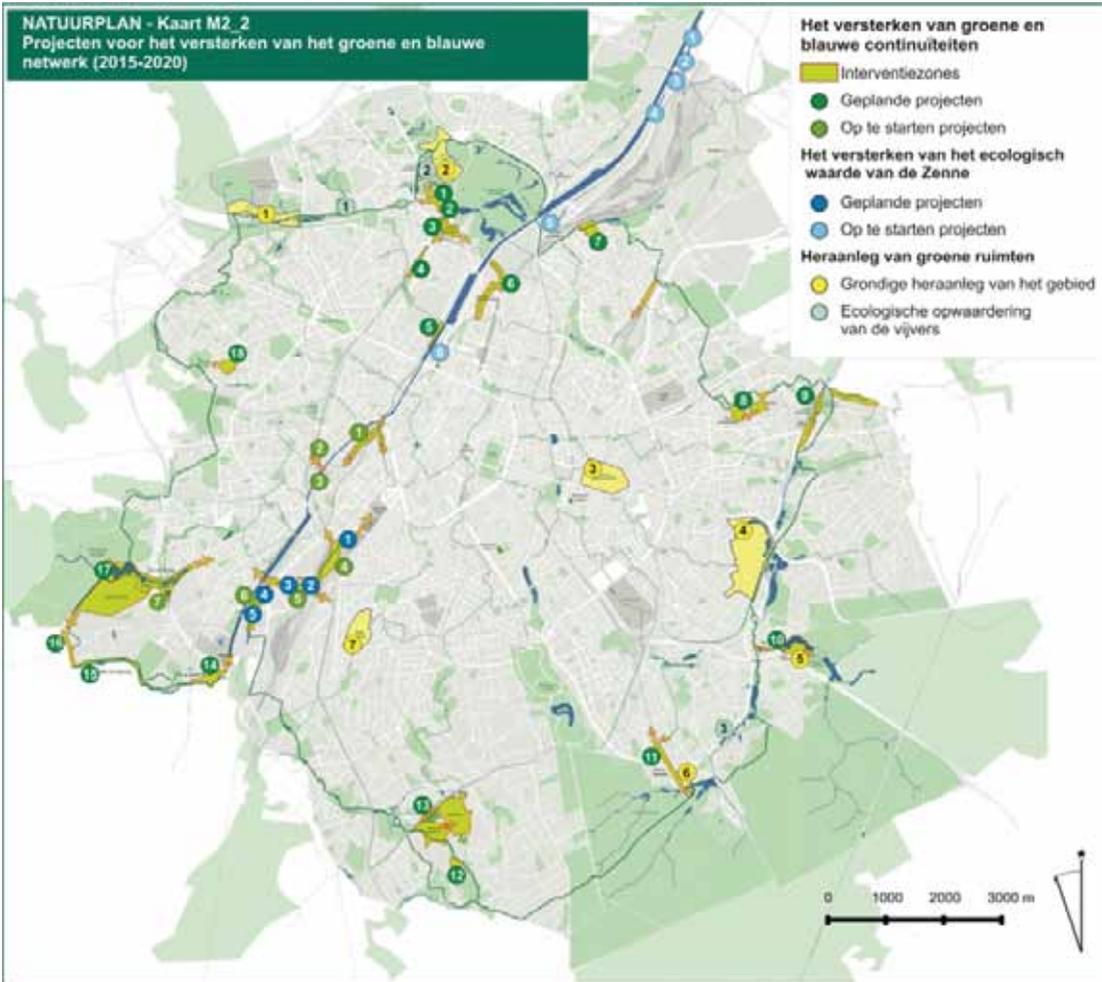


Figure 2: The Neerpede as one of the intervention zones in the Brussels' ecological network

First, there's no clear site-specific design of the networks on the local level. Conceptually and graphically, these plans make use of green surfaces, blue lines and arrows, projected on maps of the scale of the region, but they neglect dealing with contextual specificities. This ignores the impact of the conditions of the terrain since the Brussels' landscape, especially the 'landscape of valleys' at the western border, is not a vast and uniform landscape, but a patchwork of diverse built and open spaces, consisting of different biophysical systems, cut up by (rail)road infrastructures and the ring.

Second, it's unclear how these regional plans and designs for the ecological network will relate to the daily practices of the inhabitants living

in the surrounding communities. In these planning documents, citizens are considered to be passive consumers rather than active contributors of the ecological network. However, Brussels does have a strong tradition in citizen participation in the neighborhood contracts (Doucet, 2015). These contracts focus on the 'revitalization' of disadvantaged neighborhoods and are undertaken by the Brussels Metropolitan Region in conjunction with the municipalities. Yet, this multi-level governance instrument has not yet seeped through into the planning and design of ecological networks.

What is needed is a dialogue between urban design, landscape design and ecology, but also between (regional) experts and actors on a

local scale. The cross-border, cross-disciplinary and cross-administrative design exercise of *Metropolitan Landscapes* (Mabilde *et al.*, 2015) was a first exercise in this direction. In this study, the blue and green networks crossing the regional borders are envisioned as backbones for structuring urban development. In analogy to Rayner Banham's four ecologies of Los Angeles, the design team of Bas Smets and List defined four ecologies for Brussels (Bureau Bas Smets and List, 2014), for which specific design proposals were formulated by various design teams. However, also as a result of the duration, set-up and process of the design study, most of the design proposals remained on a rather abstract level.

Kristiaan Borret, the Chief Architect of the Brussels' Metropolitan Region, refers to the neighborhood contracts when discussing ways of embedding designing on the landscape scale locally. Even though existing exercises as *Metropolitan Landscapes* introduce new design paradigms derived from landscape urbanism, he claims, they lack the local embeddedness of the 'urban' projects in the neighborhood contracts program and thus lack citizens' support (De Block *et al.*, 2018). Even though there are experiments on a larger scale, the *contrats de rénovation urbaine* (CRU), there is little experience with the involvement of citizens in the construction of ecological networks.

By focusing on 'green' rather than 'relational' aspects as a point of entry, the ecological networks are envisioned as "autonomous metabolisms" (Boie, 2016; De Block *et al.*, 2018), around which other (socio-economic) substrates on which the Brussels' society is built largely disappear. In following, we will explore more practice-based and citizen-oriented planning initiatives and will claim that an 'embedded' development of ecological networks could profit from activities in

Brussels' fringe that already incorporate citizens' initiatives, and more precisely urban agriculture.

THE REGIONAL PLANNING OF ECOLOGICAL NETWORKS IN THE NEERPEDE VALLEY

The Neerpede valley is one of the few remaining larger open areas in the Brussels' fringe. In the Neerpede, productive relationships between man and environment have historically been shaped around productive processes of farming (de Waha, 1979). Due to the proximity of the capital, the rural character of the Neerpede valley has been exposed to urban pressure through the centuries, from early industrialization processes in the 18th century, to the recreational use by the end of the 20th century (Ectors, 1982; Remmery, 1992). In the 1960s-1980s, this has resulted in a peak of protests by the 'Boerkozen', denominating the local horticulturalists (Ectors, 1982).

The Neerpede receives special attention in the regional planning documents discussing ecological networks. In the RSPD, it is highlighted as one of the main green attraction poles, next to the Royal Park and the Sonian Forest. In the RNP, it is prioritized as an 'intervention zone' (Figure 2) in the development of the ecological network. In both plans, citizens are to a large extent addressed as recreational consumers rather than active producers. Exemplary is the naming of the Neerpede as 'West Park' in the RNP, demonstrating the urban-recreational desires that are being projected on this site.

Figure 2. The Neerpede as one of the intervention zones in the Brussels' ecological network (Source: Regional Nature Plan)

Nonetheless, according to the Regional Zoning Plan, the Neerpede is one of the last remaining productive agricultural areas in the region, which gives it an exceptional status in the



Figure 4: Location of the Site de Chaudron among other test sites in the Neerpede Valley

ecological network. Whereas other large open spaces mainly rely on nature and forest reserves with a high biological value and less receptive to changing practices in time, the practices in the agricultural environment of the Neerpede could be evolved into active development processes in the construction of the ecological network.

However, design visions for the Neerpede valley, such as the *'Plan Directeur Interregional Neerpede-Vlezenbeek – St-Anna-Pede'* (SumResearch, Dujardin and Hydroscan, 2014), doesn't give any clues on how this exceptional status could be put into use in the development and maintenance of the green and blue networks on a daily base. Even though this design study set up a valuable interregional collaboration between Flemish and Brussels administrations, the developed proposals for the design of the blue-green network clearly limit themselves to natural

systems, without relating the ecological to a social dimension. Moreover, the neighboring environments are simply missing from the design drawings (Figure 3).

BOERENBRUXSELPAYSANS: URBAN AGRICULTURE AND COMMUNITIES OF PRACTICE

Different from the planning initiatives of ecological and green networks in the RNP and RPSD, planning initiatives related to urban agriculture in the Neerpede are actively linking communities of practice to the construction of landscape. In the wake of a renewed interest in urban agriculture, the region has launched 'BoerenBruxselPaysans', a program offering guidance and infrastructure to starting farmers, including test sites where they can start up their farming practices (Leefmilieu Brussel, Brussel



Figure 5: Plan and section of the design proposal for the Ferme de Chaudron

Economie en Werkgelegenheid and Fremault, 2015).

One of the pilot projects in the Neerpede is the Site de Chaudron (Figure 4), for which the region envisions a 'Food Transition Hub'. In this hub, all activities related to food processing are pictured: from growing, to processing, to selling and consuming. However, the actual practices happening on site will to a large extent depend on the communities that will host it in the future. In order to find these communities of practice, Leefmilieu Brussel launched two calls: one looking for agriculture practices to farm the field (Champs de Chaudron) and one looking for communities interested in the exploitation of the farm (Ferme de Chaudron). In addition, they also launched a call for designers, for the renovation of the farm.

The winning proposal for the renovation of the Ferme de Chaudron allows to develop a clearer understanding of the types of

communities and environments that are envisioned by BoerenBruxselPaysans, and how (landscape) architecture can play a role in accommodating these communities. Curious about the design, is that it is characterized by a typological shift from a classical farm to a hybrid typology in which indoor and outdoor spaces start blending into each other (Figure 5), spatially, but also in the way in which plantations literally become interwoven with the different architectural elements. As the site is supposed to host different communities related to food and farming, the designers chose to entangle these communities' spaces and trajectories in a number of interlocking buildings, fields and open spaces, organized around a central open 'square' under a pergola. This reveals a more active and ambiguous relationship between the citizen, the farmer and the landscape.

This hybrid typology not only allows the combination of different programs on one site in an interesting



Figure 6: Collages of the winning design proposal for the Ferme de Chaudron

way, but also the unification of conceptual categories that are often seen as opposite: the natural and the manmade, the urban and the rural, the utilitarian and the pastoral, ... The Ferme du Chaudron is imagined as a site of both leisure and production, essentially shaped around an active involvement defined by work: as plants are and crops are an essential part of the design site (Figure 6), its future development and maintenance depends on the practices of the communities it hosts. On a micro-level, we see the potential of these practices for the construction of ecological systems and networks on a larger scale.

To conclude, in the pilot projects of BoerenBruxselPaysans, a potential can be found to develop ecologically sustainable practices that could link multiple scales of the ecological network. However, even though having formulated a clear design vision on the potential contribution of the communities in the design of the

Ferme de Chaudron, the different pilot projects of BoerenBruxselPaysans still remain rather disconnected patches of available land in the Neerpede Valley as a whole. In one of the design drawings (fig. 5 bottom right) the agricultural land, the Ferme de Chaudron, the adjacent green-blue network and the city are imagined as the foreplan, middle plan and background of the future landscape of the Neerpede. A question for further research is how the relationship between these different plans can be shaped spatially and socially through design schemes that cross different scales.

DISCUSSION

In this paper, we addressed the potential of urban agriculture initiatives in the design and development of ecological networks. Urban agriculture initiatives are a booming phenomenon worldwide, moving from a fringe interest to the center of public attention

(Viljoen and Bohn, 2009; Lohrberg and Timpe, 2015). This interest results from changing attitudes towards sustainable development, such as the growing need to know how food is produced and the increasing relevance of ecological and social values (McClintock et al.; Doernberg et al.). In these initiatives, socially situated and practice-based knowledge is shared and transferred between the individuals of the communities of practice who work in the landscape on a day-to-day basis (Wenger, 1998; Omidvar and Kislov, 2014; Wenger-Trayner *et al.*, 2014).

Our hypothesis is that the implementation of ecological networks can benefit from the example of (designs for) urban agriculture landscapes. Urban agriculture initiatives are broadly understood as an expression of citizens' willingness to take the lead or at least add their voice to decisions on urban space destination and planning (Certomà and Notteboom, 2017). We are convinced that site-specific designs, embedded in the practices of a local community and characterized by an intertwining of the man-made and the natural are also at issue if we want to make the current abstraction of green and blue network of for example the RNP work in reality.

Even though urban agriculture in Brussels comes in many shapes and sizes, from historical allotment garden complexes to biological farming on a larger scale, they are all shaped by 'communities of practice' (CoP's). Crucial, we think, is the fact that in agricultural sites the relationship between communities and space is related to work, to active production of the landscape (Lefebvre, 1991; Crawford, 1999). Green and blue networks are today mostly designed by experts and managed by public agencies, and as consequence citizens are denied access, or their involvement is limited to passive recreational use instead of active practices that help shape (socio)ecological infrastructure.

However, the regional visions on the green and ecological networks still have a structuring capacity that urban agriculture initiatives now often lack.

The case of the Ferme de Chaudron illustrates how the Boeren-Bruxsel Paysans initiative aims to develop links between these new hubs and local communities and new hybrids between urban and rural communities. This way, urban agriculture initiatives generates designs in which a certain type of ecological infrastructure 'lands' on a concrete site by a hybrid solution of on the level of space, program and community.

Although the design under discussion still needs to be constructed, the images it produces for now seem to play a role in a symbolic, imaginative realm preceding the communities that still have to be built. Particularly relevant in the light of this paper, is the way in which the project will succeed to anchor the future communities of practice of the Ferme de Chaudron in the local context and in the ecological network (e.g. by organizing lunch classes around local food for neighboring schools, etc.).

However, elsewhere in the periphery of Brussels, there are already a number of existing communities built around urban agriculture, for example in historically grown allotment garden complexes. One of the future themes in our research is to investigate how this kind of hybrid landscapes, which are consciously designed in the case of the Ferme de Chaudron site, have developed in a vernacular context, spatially as well as socially. What can we learn from these existing 'communities of practice' for the design of future projects?

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Landscapes Reflexive Practices as Embodied Thinking for Gaps' Reduction between Human and Nature

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ABSTRACT

“Conflict and Opposition” refers to postures resulting from the progressive culture of the twentieth century that has worked for - disciplinary, territorial and professional - separations by fueling negative visions (toxic discourse E. Meyer) to benefit from such created differences and separations. On the contrary, the landscape culture which has operated since Olmsted for “the democratic man”, has dealt with the «Conflict» as an opportunity to appropriate the relations complexity (ELC 20001) or to overcome the limits (M. Corajoud) and to take a new start.

This contribution, based on experiences carried out in teaching & research and also through collaborative projects (with communities), describes the conflict critical reversal, that is, inverting the tools, settling in a project posture, and welcoming the complexity with effectiveness (bottom up) as a needed value to fight the impoverishment of territories where dividing/separating means simplifying to better govern and control (top down). The landscape design-approach was tested to interrogate/stimulate the citizen, but also to narrow the gap between the designer or the researcher and the inhabitant. The sketch of possible hypotheses-projects, touching the spatial, sensory and conceptual spheres, reactivated the imaginary production process and restored to the inhabitants the will to think the cohabitation contexts in a prospective and non-defensive way. This way of thinking by reversal or revolutionizing the system elements is particularly adapted

to the landscape design: to deconstruct in order to rebuild new balances. The project is the operating mode, but the triggered process is particularly effective in cooperation with citizens. The critical reading of these actions allows on the one hand, to restore the sometimes-forgotten links between theory and practice (D.A. Schön)² and on the other hand, to give credibility to design-based learning, used in education, but also - and more and more - in the dialoguing actions with the inhabitants. The project becomes non-rigid, flexible, ongoing, stimulating, open, adapted to the conditions of a moving society. This differs from the paralyzing interpretation of the project as a representation, a visualization tool, producing fascination instead of knowledge and awareness.

INTRODUCTION

The terms *conflict and opposition* often have a negative connotation in territorial readings. E. Meyer attributes this tendency to the development of a “toxic discourse” that distorts the legibility of real landscapes. She suggests reactivating critical readings of abandoned or illegible sites. This meets the objectives of applied research that this contribution relates to. The landscape is the generic subject which makes it possible to approach seemingly opposite and even incomparable realities: on the one hand, *abandoned places*, resulting from deindustrialisation (Liège BE) and, on the other hand, *peri-urban landscapes* saturated by slums (Kinshasa DRC). In both cases, the landscape, too often seen as an aesthetic superstructure that is poorly adapted to cases of impoverishment or territorial abandonment, offers both a highly efficient mode of common reading, and keys for analysis, understanding and action necessary to overcome the critical condition reached. History, as a tool for critically reading cultural mutations, recalls that the notion of conflict was fuelled by the principles of physical, spatial and moral sanitation of urban fabrics, which in the 19th

century led to transformation, even the destruction and complete reconstruction of cities and territories. The 20th century then exacerbated *contrasts*, supported by zoning policies. These practices, by breaking up the land and separating the functions, have also profoundly changed the relationships between the inhabitants and their territory. Indeed, games of opposites like *subjective-objective*, *private-public*, *order-chaos*, *full-empty* etc. have gradually nourished and reinforced the affirmation of a culture, or even a *vision/relation* of growing distance between the human and his environment. This phenomenon, seen by Olivier Mongin³ as a process of “*detritorialization*”, seems to be reinforced by forgetting the characters, constraints and limitations of existing landscape systems. This also explains the loss of territorial hold of the inhabitants. Often reduced to the role of mere spectators they are distant observers in the case of socio-political crises besides, or distracted users unable to act in a situation of rupture with their own contexts of life. *Distanciation*, interpreted as the gap between man and his environment⁴, is the guiding principle of the author’s research and it is based on studies and projects in different landscape settings, concerning the interdependence between landscape theory and practice. This contribution, based on experimentations, readings (analysis) and writings (projects) applied to the opposite contexts mentioned, transforms the conflict in a positive key-concept, referring to the forces and tensions that affect the balancing of the landscape. Thus, we find there the materials of comprehension of all the types of territory and the “*reasons*”⁵ of their states and then the elements for the understanding of the *interdependence between theory and practice or between culture and project*.

The conflict created between theory and practice comes from a violent process of forgetting and moving

away from the existing landscape-artifact, largely due to the development of *objectivation*: a posture that commands and governs everything *from the outside of living systems*. Under the blows of this objective vision, the places are transformed into heaps of objects (*anthroposage* according to A. Corboz⁶) simplified, fragmented and dislocated to the point of not holding any internal force of cohesion. The sanitized sites have become the field of application of technocratic practices, untied of the fundamental needs of real landscapes, marked by the living experiences of people, the complexity and the hybridization of materials. So, going back to the profound dialectics raised by the conflict-landscape relationship highlights the persistent organicity in the territorial systems. Their organics qualities are easily readable through knowledge approaches specific to *landscape architecture* practices: a discipline creating or reactivating holistic interrelationships between cultural systems and environmental conditions. What is defined in the New Landscape Declaration (2016), as the capacity to “*bring different and often competing interests together to give artistic and physical form and integrated function to the ideals of equity, sustainability, resiliency and democracy*”. This resonates today as a reminder to take again into consideration landscape approaches and existing skills, although they are still little known or forgotten.

The landscape approach, based on the *relationships between the materials of the territory and not on objects*, allows to reinterpret the conflict, to read it as *an open dialectic* or a game to understand and balance a system of flexible and mutable relationships between various elements. Their interactions condition and modify the state of the landscape. The preliminary reading of the project and the approach of intervention through scenarios of landscape transformation are interdependent, flexible and nourished

by the experimentation of the links to be reconstructed between theory and practice, as well as between collective imagination or “*imaginability*” (K. Lynch⁷) and landscape’s prospective or project.

MATERIAL AND METHOD

This reflection touches on the cultural components of the landscape, considered as tangible and intangible materials which, thanks to the factors time and history, determine and influence the characters of the bodies of the territories. According to the geographer G. Dematteis⁸, the negation or forgetfulness of temporal and historical dimensions, empties the geography of its living and evolving components. It passes from the art of recording the mutations of the earth (including the actions of domination and violence corresponding to the wars between populations) to the state of the technique of objectified and dispossessed transcription of time and movement of life. Dematteis introduces, also, the principle of the “*implicit project*”: geomorphological and human configurations of the environments testifying to the existence of multiple *actions/projects* inscribed in the soil. Therefore, to understand the earth means to know how to read the implicit project that every place bears inscribed in its body/matter: the fruit of natural actions sedimented, transformed also by human acts. Then, earth is like an open book, whose materials are landscape’s bodies shaped both by natural agents and by human actions (transformation’s projects).

The observation prepares for the understanding of these diverse landscape systems’ material with which one must relearn how to interact. This more attentive look at the material and its transformations makes it possible

to reconnect with lost landscape relationships. It transforms and reverses the meaning of the *conflict*: not a fight against a violent nature, of which one must defend oneself, but a *relation of co-action with natural forces* to know better in order to cope with, to take care of for better orient them in time towards the construction of new spaces of cohabitation (ELC 2000). Thus, landscape is both a *laboratory* and a *lever* to understand and reactivate the ever-changing relationships between human and natural actions. These have always nourished the cultural dialogue maintained by people with their territories. This dialogue, too often forgotten, determines characters, specificities and variations of inhabited environments, and is also the cultural essence forgotten or neglected.

The knowledge of landscape’s materials is also the ability to make them a means to understand how people have appropriated the environments and used them.

This recognition phase is the starting point for the implementation on one hand of reflexive practice and on the other hand, of project-hypothesis. Both serve to test environments: to test their resistance, to understand their saturation limits and ultimately to sketch possible new states by altering the relationships between the materials in the system under study. This also makes it possible to question the inhabitants’ ability to project themselves into new landscape conditions which they can remain guardians of over time (M. Corajoud)⁹.

By interpreting the conflict as a field of tensions in continuous action in the landscape, the method focuses on the search for existing dialectical and relational components, because they make it possible to intervene in the current systems of landscape forces to reorient and accompany their dynamic. However, all landscapes are the expression of relationships maintained and supported by choices and

policies of human intervention. Being able to distinguish (read) the human component in the process of territorial change is therefore an inseparable condition of the knowledge to act (write) for its development or for its protection. The adopted landscape approach first serves to observe in depth, to decode and to interpret the current movements to act, then, from within the systems and to accompany the changes. This posture is based on experimentations in teaching and research applied to the territories mentioned. They testify to the effectiveness of landscape reading methods, even in situations of mutations that transfigured the visible aspects of the environment. The landscape of the Meuse industrial in Liège (Wallonia-BE) is a perfect place-laboratory for our studies and experimentations. This one paradoxically renews to the peri-urban territory of Kinshasa in DRC because, one and the other landscape denounces the loss of relationships between the inhabitants and their contexts of life. It is thus two distant realities but suffering from the same human incapacity to know and live its places of life.

DISCUSSION

The Meuse valley, as the main case study, has been used to define the method concerning continuous documentary readings supported by maps, drawings and texts, allowing us to trace the landscape experience. From it we only knew the modern configuration, completely redrawn by the human will to dominate the river landscape to enslave it to the industrial needs and aesthetic 19th century city model. History is considered as an active factor of transformation. At each moment of the transformation, we have been able to re-associate objectives and intentions of communities who planned it. Then, we reconstructed and reinterpreted the major phases of the landscape's change history,

woven between Liège and the Meuse River. We have learned lessons based on sedimented knowledge (traces of ancient knowledge and wisdom of the territory) and foresighted elements. This knowledge travel also made it possible to grasp the points of rupture and loss of community relations that have been part of landscape construction over time. In its entirety, the landscape of the industrial Meuse in Liège has given us a *narrative* that shows how much the project of the economic becoming of a society could condition and dominate the context of the natural landscape to enslave it to purely economic needs leading until the disappearance of the fluvial character of the environments. This history shows a landscape conflict that has turned the inhabitants into operators who are unable to recognize to the river in its landscape role: the Meuse became invisible; deindustrialization added abandoned sites, while contact between residents and water has become increasingly rare. Now the river remains a silent witness of the fluvial and road mobilities that accompany its long urban crossing.

The memory of the original island and swamp landscape or the practice of walks along the tree banks of the 19th century are distant perceptions that no longer have any influence on the contemporary urban imaginary. The result of an outdated policy, the modern functions attributed to the water and the banks of the Meuse have marked the place of an urban culture in complete rupture and dissociation with respect to the aquatic characters of the site and the urban nucleus of origin. This history, reconstructed through the association of maps and texts published in the Guide of Modern and Contemporary Architecture of Liège, confronts the reader and the visitor to a global context where the natural landscape and the artifacts built by the man constitute a set. Traces and signs of the current crops, inscribed in this visible product which is the urban

landscape, testify to the complex and continuous association of architecture and nature. This experience of re-transcription or revelation of the existing, in the form of texts and maps, has also made it possible to reverse the common interpretation of industrial landscapes, which today are regarded as mere places of abandonment and environmental degradation in upstream and downstream of the city. These neglected sites, re-inscribed in the history of landscape mutations of the industrial valley, reacquired their driving role of development. The inhabited complexes which accompany each place of exploitation have become today orphan contexts. On the other hand, by re-registering them in the production process of origin, they find their reasons of implantation. In this way, the reflection emanating from this new reading makes it possible to completely reverse the functional visions, supported by quantitative and surface analysis, which threaten the future of these pending contexts. Indeed, from the study of the landscape mutations of the valley we have also made the intermediate stages emerge. From these emerge factors and structures that have caused the recovery of one layer (industrial) on the other (the rural). The emergence by point of the industry shows its rhizome nature, that is to say its dependence on natural resources. With the proximity to the water or the railway, the industrialization clearly shows the logics of implantation answering to specific characters related to the geomorphology of the places. These elements reveal the close link between industry and landscape.

Today, these places of resurgence are extinct. They left isolated habitat, floating near large arid areas. Considering the deep landscape reasons that linked the industry to ground and subsoil resources, it is possible to trace the cartography of the landscape, often underground, that structured these abandoned territories.

The knowledge of these relationships allows, on the one hand, to re-read these hybrid tissues as artefacts adjusted by deep landscape reasons and on the other hand, to imagine new development systems.

However, these links remain invisible and cannot influence the logics of planning. These impoverished by simplifying methodologies of economic efficiency, respond to requirements of filling and forced re-activation of places, without creative ambition of characterization or invention of new environment. This deviance is induced by the complete disconnection between landscape reasons for these lands in waiting and the productivist profitability culture of the territory that ignores relationships that still interact in these landscapes. The reversal of logic is possible on the condition of re-registering the inhabitant, the user and the decision-maker within these territories to revitalize. Their actions of re-appropriation of places make it possible to find or to create again local characters useful to the development. The case studies concerning the Meuse Valley have shown us that the project practice can be an effective way of renewing the links between man and environment, provided that it is an active approach: a strategy for accompanied driving, able to reactivate the imagination of inhabitants and decision-makers. The production of new imaginary becomes a necessary condition to ensure the involvement or the commitment to the establishment of prospective and voluntary dynamics. In this way, from the finer knowledge of the elements that characterize the landscape of the valley, can be proposed actions of inside environmental rediscovery and revelation. These spatial explorations stimulate the capacity to reconnect with sites, to act to accompany them, imagining making transformations by relying on the existing natural forces. Now, participatory procedures are far

removed from the level of awareness required for the solution of problems as complex as a vast and polluted landscape like the Meuse valley. Immersion and study operations from within these environments could be used to create the cultural preconditions for a *collaborative forward looking transforming a conflict situation into a landscape reconstruction project* that can be cared for. This approach has to adopt natural temporalities and must adapt to existing types and levels of local cultures to make them evolve. The project that is set up is thus to be conceived as a path punctuated by intermediate actions preparing the territory and accompanying it to reach sustainable and shared solutions.

In a completely different situation, in Kinshasa, in the DRC, the landscape conflict is represented by a peri-urban territory lined with isolated cell habitats scattered on a grid plot dissociated from the geomorphological logics of the environments. This landscape is the perfect representation of the lack of a collective project and the lack of knowledge of the setting environment.

Presenting itself as a carpet of monocellular constructions, this type of habitat is the result of the massive occupation of the territory by populations who ignore rules and conditions characterizing the lands' nature passively occupied. Here, much more than in the European territories, we can become aware of the significance and the impacts of the loss of links between natural and human actions. As in our territories in waiting, the solutions are not only at the economic and technological level, but they are primarily of a cultural nature. In fact, to clean up these environments means to connect the inhabitants with the rhythms and characters of the lands they occupy. Only a deeper knowledge of the potentials and boundaries of inhabited territory can be used to reconstruct sustainable anchoring systems. Thus, studying the suburban

environment requires first to know its inhabitants and their daily actions. Like the geomorphological agents (G. Vogt¹⁰) the inhabitants are the first resource for the accomplishment of a *landscape revolution* leading to stabilize and revive the dynamics of transformation of these neighborhoods. Our research currently focuses on the observation of some fragile sector of the territory to understand the basic natural writings, the links with the cultures of the inhabitants and the nature of imbalances in progress. Landscape recognition operates from natural strata and observes the modifications brought about by the constructive cultures imposed on the environment by new inhabitants unaware of the limits and characters of the territorial platforms on which they build isolated settlements. In these neighborhoods, everything testifies the cultural fragmentation of its inhabitants. The lack of a formal housing development policy is certainly one of the causes of the acute landscape crisis. However, for the reversal of this situation of break of equilibrium the deeper lack is undoubtedly the inexistence of human communities producing collective landscapes. Several ongoing experiments are looking for the causes of different environmental imbalances. However, the extent of the environmental damage and the difficulty of making people act together who have lost confidence in the community make the work long and difficult. Although this field of study is less well known to the former, we derive fundamental lessons that place the landscape issues at the level of the cultures that human communities can nourish.

CONCLUSION

The common aspects of these two case studies in so different types of territories show that major conflicts are often caused by environmental imbalances caused by the wear

and tear of environments subject to resource consumption behavior. These landscapes thus become the mirror of an in-sustainability generating waste areas. This degradation is more the symptom of a cultural loss than the expression of the lack of technical or economic means.

The conditions for overcoming conflicts and breaks in the landscape are largely due to the landscape awareness of the communities that shaped the environments. The active consciousness linked to the knowledge of the characters and the constraints of the landscapes becomes an indispensable element to reconstruct the conditions of will restart and capacity to project again towards possible scenarios of development of the living environments.

To have or to subscribe to a project means: to put yourself in a situation of potential change or "to be in a state of excitement" (M. Corajoud), to be open to all possibilities. Today, recovering the capacity to be in this posture of *forward-looking* (LEC) the future constitutes a crucial lack that penalizes more and more human communities having lost the hope of choosing, acting and accompanying actions of projection and becoming. This loss of hope does not only affect poor areas. This loss is also affirmed in territories like that of the Meuse, because after the phase of construction of the industrial wealth the inhabitant stopped recognizing himself in the landscapes which he built. This lack of identification installs the real landscape conflict, because the inhabitant has unlearned to understand and live the rhythms of its territory. This condition of landscape rupture, especially affecting the mental and cultural sphere appears therefore the common point between *deterritorialized* communities, wherever they are, in Africa as in Europe.

Relearn how to recognize environments by living them from their interiors becomes the main challenge of

change to promote through the practice of places and the landscape project. We deduce that to deal with complex issues such as those observed we can only act from a precondition: the involvement of the inhabitant his living environment and his willingness to relearn by experimenting continuously the landscape from inside. The methods of experimentation practiced today to dialogue and understand the cultures in actions in the territories, become very powerful means to bring out *visible and/or invisible* elements and problems that the authors of projects must reintegrate in the elaborations of their spatial scenarios. The goal of these *pro-jects* (A.Berque¹¹) is mainly to allow the inhabitant to restore lost relationships with the landscape in order to regain confidence and the ability to project in space and time. Therefore, the landscape approach can reactivate the establishment of *intermediate projects* (M.Desvignes¹²), *open and flexible*, in opposition to the paralyzing interpretation of the project reduced to the production of fictitious images. These landscape readings allow us to combine spatial experimentation in situ (personal and through the lived experience of the inhabitants) by linking it to the technical and theoretical knowledge that the reconstructed landscape narratives have allowed to emerge. The landscape approach thus offers itself as a powerful tool to effect a cultural reversal that is indispensable today to rebuild the cultural conditions that are essential for the reconstruction of community landscape hopes.

NOTES

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² Schön Donald Alan (1995). *The Reflective Practitioner. How Professionals Think in Action*. Ashgate

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Integration by Design

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Integration

ABSTRACT

Socio-spatial division has been ongoing in Northern Ireland for some 400 years, recently peaking during the so called 'Troubles', from 1968 to 1998. In particular the City of Belfast developed defensibly from 1968 onwards in an attempt to separate opposing Nationalist and Unionist communities and to protect the city's central business district.

Ongoing territorial association to space, manifested in the remaining 'Peace lines' and associated blighted, 'no-man's' land continues to restrict movement in the city. However, through positive approaches to barrier deconstruction to facilitate interaction it is possible to see interfaces as corridors of opportunity between currently isolated communities.

This paper illustrates the author's belief that a design strategy involving meaningful community and stakeholder consultation could initially facilitate a form of mediated interaction between communities leading to improved integration. Acknowledged is the unique situation at each interface and the need for reactive design in an attempt to circumvent political instability.

Within this paper 'design' refers to spatial interventions that can manipulate movement of people to encourage interaction with both the landscape and each other.

Sustainability of design at these fault lines is critical in the success of intervention and will be dependent on the involvement of both communities in co-design and co-creation of shared space. The concept of local involvement to encourage shared ownership of space is at the fore of this design proposal.

INTRODUCTION

Everyday creation of the surrounding landscape is a natural behaviour of

humans, which build it according to their needs and preferences. This inseparable connection and relationship between culture, man and the landscape is reflected in the concept of the "cultural landscape" (Bernat 2011), which is indwelled and built by people (Heidegger 1997) to adapt it to their needs and preferences and express their values (Tuan 1987, Gawryszewska 2013). It is demonstrated by the theory of three dimensions of places, namely: form, function and meaning (Rylke 2011) or structure, action and image (Van den Brink et al. 2017, Kuhlmann and Prominsky 2007). Following this logic, it is not only about tangible elements and functions but also image (meaning), which is "about perception, symbolism and the communication of content of the landscape" (Van den Brink et al. 2017: 15). A similar situation can be observed in the urban landscape, where "the gardener" may be a person or a local community of active inhabitants, and "the garden" - an open space in the city. However, because of mostly top-down and vertical type of decision making processes, this was almost impossible. "Big" ideas of architects, urban planners, politicians and developers were defining urban landscatc., scientific literature and available.

'The Troubles' refers to the violent 36 year period of sectarian conflict, during which nearly 3,600 hundred people died. This constitutional struggle reflected the culmination of several hundred years of community tension between the predominantly Catholic, Nationalist community and the pro-British, Unionist community.

Between 1969 and 1973 an estimated 60,000 people left their homes, concentrated in the working class areas of northwest and inner east Belfast. During this period, any rise in political tension or sectarian violence repetitively resulted in more intensive demarcation of borders, shaping much of Belfasts urban form. Remaining

mixed areas were sites of violent enactment. Peace lines were erected at interfaces to stabilise the conflict. These were physical barriers, designed to separate Nationalist and Unionist communities with conflicting loyalties. (Figure 1) The most imposing structures are the 'peace walls', first erected in 1969 by the Stormont government in conjunction with the British Army, initially delivered as a 'temporary solution'. (Byrne, J. and Gormley-Heenan, C. 2014)



Figure 1. Sketch of existing interface barrier. Authors own.

These structures aided the state in the physical prevention of violent attacks by either of the opposing sides. Constructed using materials such as iron, brick and or steel and with an average height of 20 feet, their continued existence is strong evidence of what is described by Thomson, C, W. (2002) as continuing 'spatial realities' of Belfast's 'political rhetoric.'

The notoriety of the situation in Northern Ireland was such that significant financial assistance of over £1600 million has been made available from the European Union to assist peace building from 1995 to 2020. (Carson, J and Pidgeon, C. 2010).

The successes and positive change as a result of this funding has however been 'uneven and at times unjust'. (Murtagh, B and Shirlow, P 2006) While this portrayal of Belfast as a city of peace is promoted alongside lingering negative socio-spatial relationships there is a danger that younger generations will believe these

divisions are natural manifestations, instead of the result of 'complex' and 'confusing socially-constructed histories'. (Murtagh, B and Shirlow, P. 2006)

DESIGN CHALLENGES

Timing and Resource

In the instances where resource is focused in the more deprived areas there is a tendency to focus on each of the two communities on either side of the landscape study area, reinforcing isolation.

Cross community regeneration is hindered by the intermittent flaring up of continuing community tensions where the peace walls have had to come back into an element of use. For example crossing points that are temporarily closed in response to issues such as contested Parade routes.

For the city to progress evenly an emphasis must now be placed on a strategic plan for the allocation of resource. Led by comprehensive design approaches this could pre-determine required resource and the cohesive phasing of interface removal over time. This is demonstrated in the case of the buffer zone in Nicosia, acknowledged recently as an opportunity for the city's cultural development.

'No-Mans Land'

The physical appearance of the study area reflects a land corridor where there is no community ownership or engagement. The challenge will be to encourage re-association of open space with opportunity to improve the quality of the local environment. However as revealed in a 2015 study by Abdelmonem, M. G. McWhinney, R. traditional open park space, even if activated can fall victim to extensions of territory. Careful spatial design consideration, dialogue between opposing communities during the design process and encouraged use by the wider population is necessary to



Figure 2. Diagram of existing conditions within focus area. Authors own.

mitigate this.

This poses the challenge of even access to shared open space once interfaces are removed. Spatial reconfiguration has potential to restructure the open/derelict space to reduce stronger affiliation from any single side. (Figure 2.)

Conflict Psychology

The deep-seated sectarian conflict and underlying paramilitary influences mean that a healthy disassociation from the contentious past may take several generations of the peace process. However building inter-community confidence through cross community co-design engagement, and increasing shared use of the contested space through purposeful design interventions that provide regeneration and aesthetic improvement will assist this process of addressing conflict psychology.

An anticipated challenge to this is the continuing self-interest of paramilitaries and attempts to control local communities through

perpetuating divisions. Described by Belfast's Planning Development Officer as 'gatekeeping' their involvement in co-design, as a recognition of the reality, along with the wider communities and stakeholders is therefore crucial to the acceptability of development.

A tendency of mutual distrust often exists in communities between disadvantaged local citizens and public administration, driven by a failure to allow people the opportunity to provide ideas to solve their own problems (Yang, K 2005). In Belfast, more so than most places, trust will be key to the success of collective action. An approach similar to that used in North East Tokyo in 2015 by a mobile workshop called the Community Innovation Forum (CIF), run by a team of designers taking on the role of enabler, aiming to build the confidence of community innovators to take on new collaborative projects may be necessary. (Dimmer, C and Ohtani, Y in Peña et al., 2017)

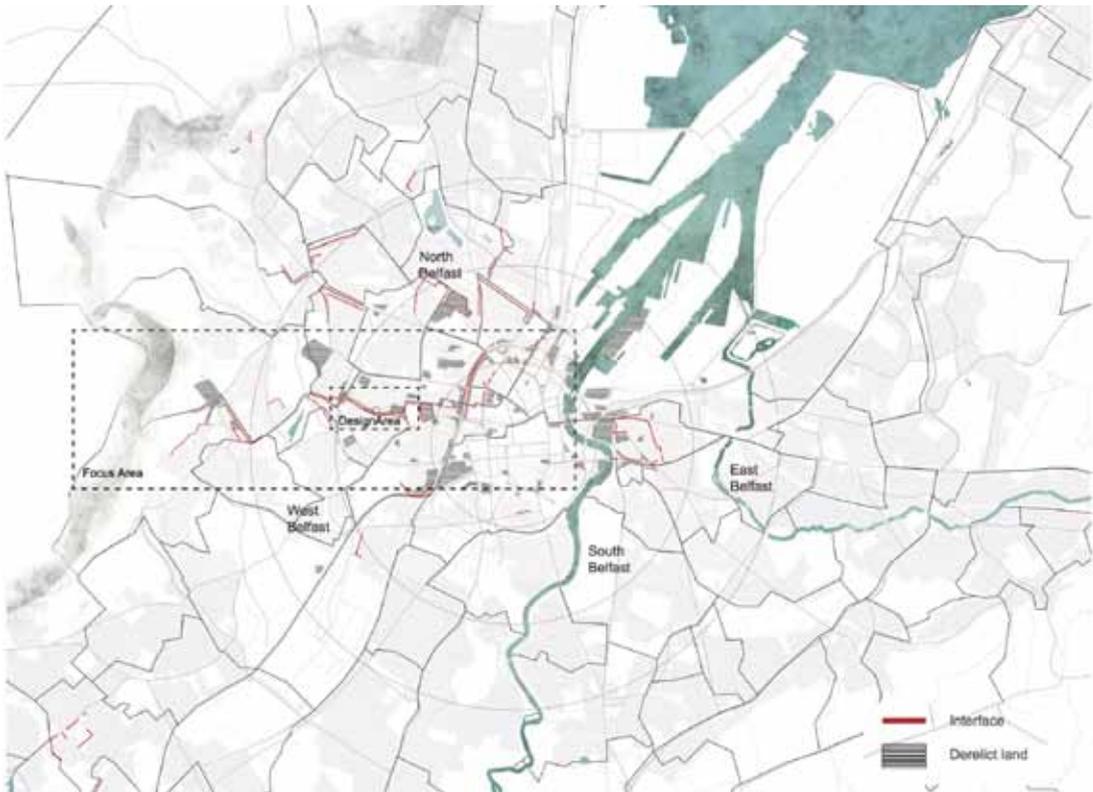


Figure 3. Map showing existing interfaces and derelict land. Authors own.

Funding and sustainability

Whilst funding has been channeled to specific local projects, eg; sports facilities, little coherent, strategic funding appears to have been channeled towards a holistic approach. Scope might exist to improve linkages through the land corridor to provide alternative transport routes and more functional uses of the space.

Drawing on cities such as Berlin, incorporation of the tourism industry can improve project sustainability and secure future funding, a highly appropriate option for Belfast as tourists already show interest in the city's cultural history of division. It poses a question however as to the extent there should be preservation of the existing conflict architecture?

Juxtaposition

Development and promotion of the city centre was expected to radiate

out to benefit the wider urban area. It is something of a delusion that Belfast is a city at peace. Instead the form of violence has shifted. Annual displays of culture, such as Parades and the display of traditional symbols, e.g. flags, can provoke inter-community conflict, and even rioting. Intervention in deprived communities should be appropriately contrasting to those within the city centre.

Feasibility and forces out with the designers control

In 2016 the Stormont Executive announced an aim to have all Peace walls removed from the city by 2023. Due to the unique combination of socio-spatial and political issues, no direct post-conflict precedent city exists for reference.

An example of a more focused and site specific design solution to this issue are the 'micro-alternatives' such as those proposed for Palestine



Figure 4. Visualisation, activation of derelict spaces, developing design palette. Authors own.

by Gazit, N. & Latham, R. in 2014. Through this form of co-design there is an increased likelihood of project success. Here independent activist groups are able to circumvent political instability, improve sustainability from community interaction and viability with little required economic investment from the government.

DESIGN OPPORTUNITY

Mapping of interfaces and derelict land reveals a high volume of derelict and vacant space often, but not exclusively in association with interfaces. (Figure 3) In addition to the structures themselves the associated buffer of 'no-mans land', is a strong barrier to integration. This contentious connection while challenging to design also creates design opportunity. The complex relationships between communities provides a focus for design, with mediated interaction critically required.

The linear nature of these divisions that fracture the urban form create an opportunity to transform linear

spaces into corridors of open space to relink parts of Belfast that have been disconnected from one another for many years.

Targeting the longer incisions in the urban framework will require a shared engagement between communities affected. Here the designer must make space for contention in discussions so that shared values may be articulated and conflicting values exposed. (Peña et al., 2017) Through this process a community's capacity to negotiate can be developed toward collective ownership of linear space.

The variety of conditions along interfaces within the city have evolved and changed over time, resulting in no two community interfaces being identical or suited to any single design intervention. The typology of interface changes through the city between urban fringe locations, historical or cultural zones and dense urban or residential areas. To initiate change it is possible however to identify points or places of comparatively reduced tension suitable for testing accelerated interaction.



Figure 5. Visualisation, proposed design concept. Authors own.

The exercise of mapping of vacant land (Figure 3.) revealed further areas or pockets of derelict space set back from interfaces. An opportunity exists to initiate a change of perception in these spaces, to challenge the current feeling of vacant space as a negative entity and promote a more positive perception that such spaces can be utilised for the benefit of the community (Figure 4.). During this process a design palette can be developed with community innovators where specific colours, graphics and planting become familiar and welcoming, with the intention that these are later used at interface zones.

DESIGN DRIVERS

Driving this design proposal is an understanding of the temporal requirements of the design process under such deep rooted socio-spatial conditions. A design concept is required that acknowledges the contested and dynamic social relationships. In answer to this the following concept for design is framed in three phases. (Figure 5.)

The initial is the activation of

derelict and unused open space following community engagement. Firstly spaces disconnected from interfaces should be targeted to allow the development of a temporary, low cost design palette, sustainable in more deprived communities. Following testing at these pocket sites and discussion with community members, successful materials and spatial programming will be brought to the interface itself at carefully chosen points of accelerated interaction. Here local communities will be encouraged to engage within these new activated spaces.

These interventions will then be adjusted, maintaining their same language, to facilitate a mediated interaction between opposing communities. This could for example be visually interactive design interventions that are then used at the interface to introduce visual permeability between communities.

Public safety must remain a strong consideration as the process of peace line deconstruction begins. To allow this, deconstruction should initially create reversible or lockable structures and elements that encourage

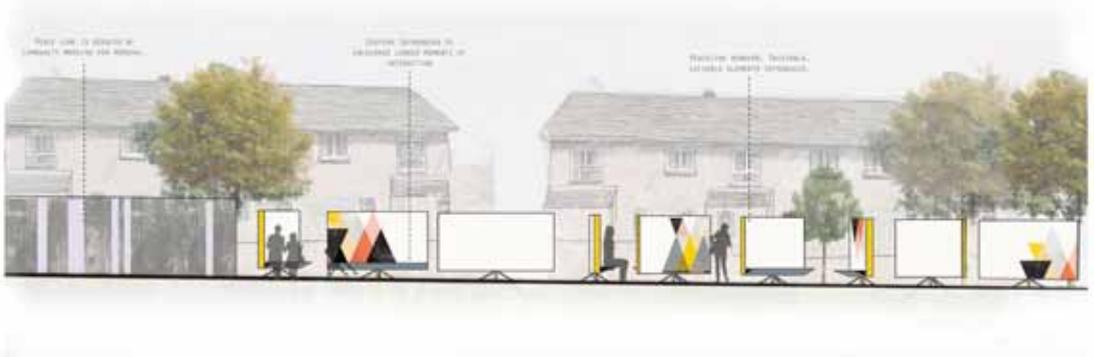


Figure 6. Editable and lockable elements to initially replace current interface barrier. Authors own.

interaction at the point of division but that, on occasion where political instability results in a breakdown of local communication on site can be adjusted to imitate a secure barrier.

These interventions should be continuously monitored and adjusted as such. Successful interventions will be repeated at other sections of interfaces with the potential to be retained to form a more permanent integral part of the urban infrastructure.

DESIGN METHOD

The sustainability of this proposal will rely heavily on the willingness of the local communities to participate in the transformation of their local environment. This situation provides an opportunity to better the 'citizen power' of the local communities.

Sherry R Arnstein 1975, describes in short how 'citizen power' is the means by which we can induce significant social reform, deliberately including them in the future political and economic process enabling them to share in the benefits of the affluent

society. This "community engagement" approach has evolved in recent years in terms of community planning, with the Local Government Act NI 2014 embedding the process for local NI councils in terms of the production of Local Community Plans and their spatial representation in Local Development Plans.

In the context of post conflict Belfast this can be seen as the means by which residents at interface zones can have an active hand in the restructuring of their social fabric and benefit as those in the more affluent areas of Belfast have in recent years. This could be achieved by introducing investment but allowing a degree of flexibility in the design of spaces, local residents can regain control over the language of their environment. Sustainability is also improved through this interaction of people and their local space.

It is proposed that any deconstruction and construction at the interfaces critically involves early consultation with local residents (Figure 7.). This includes the need for initial



Figure 7. Visualisation, proposed design method, community participation. Authors own.

on site discussion with community 'Gatekeepers'. Negative sectarian attitude towards a project may be determined by these members of the community. It is therefore important to ensure their support and accept their position within the community by interaction and clear communication at an early stage in the project. This does not however mean the wider voice of the rest of these communities is not listened to and incorporated.

The construction of this project has potential to socially activate the local communities by targeting the demographic of youth and unemployed, sourcing of materials, and construction offers an opportunity for the introduction of basic construction education programs, and employment. By doing so with mixed groups, both sides of the community can develop a pride in the construction of this landscape and the likelihood of anti-social or destructive behaviour is likely to be reduced.

Local Schools are divided by their community's affiliation, and children given little real opportunity to mix. Involving mixed groups of children in the regeneration through activities such as painting will ensure community relations are improved, and create a more sustainable environment for continued peace.

CONCLUSION - DESIGN PRINCIPALS

It is evident that twenty years on from The Good Friday Agreement there are still issues within

Belfast attributed to the manifestation of a lingering psychology of conflict. The city centre has seen high levels of investment, but the social integration in the communities beyond is still inhibited by low level tension.

In this paper core design challenges have been framed. In answer to these challenges design parameters have been proposed, in conjunction with existing methods of community relations

development.

The removal of interface barriers is crucial to an improved urban environment and social integration. A pre-emptive, phased design approach for Belfast at a strategic level, with a focus on interface areas could guide the allocation of resource to infrastructure and spatial activation could spatially prepare the areas for integration prior to interface removal.

With removal of these structures land corridors will be formed, and will require activation. This opportunity provides the potential for more spatial testing, including through imaginative design approaches, such as those that utilise low cost materials and repurpose existing elements in the urban landscape.

Co-design enables a chance to develop space with community involvement. Sustainability cannot be expected if design is imposed in these disassociated spaces and on the communities. By this process design acknowledges the social structure of isolation.

Acknowledgement of an intermittent need for security could be achieved through reversible interventions or re-sealable interfaces. Combining co-design with these methods encourage interaction and permeability.

Activation of these channels as green urban links will attract users from outside the local opposing communities. This is achievable through planting schemes and spatial design as highly permeable, coherent linear park space.

The demographic that have least association with the contentious past, namely young people are a highly appropriate focus. This has some influence on spatial program. Imaginative design of flexible play space and less structured leisure space will encourage interaction across community divides in this resilient demographic.

This paper acknowledges there are, of course, forces out of the control of the designer. The most detrimental of which is ongoing political instability and

its knock-on effect upon local community relations. Design to encourage the 'resilience' that can be built up among the community to these political tensions can be achieved by spatially facilitating permeability and integration Using small scale or 'micro-alternative' interventions that circumvent some of the political instability, this can arguably be achieved more quickly.

It is hoped that this paper goes some way to fill the space in the literature and research of the potential that spatial design has in the support of current efforts to facilitate cross community integration. The design parameters expressed in conclusion are hoped to be flexible enough to be of use for other cities if the concepts explored in this work were to be further dissected and locally applied.

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Conquering New Landscapes. A Contribution to the Narrative of Dutch Landscape Architecture

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professional practice, garden architecture,
Van Eesteren

ABSTRACT

In the early 1920s Dutch architects and urbanists started to worry about the lack of attention for landscape, such as the well-known urbanist Cornelis van Eesteren. This contribution focuses on major steps in the development of Dutch landscape architecture, as a particular, national narrative that distinguishes the profession in this country from other, surrounding countries. In 1919 landscape architecture did not exist in the Netherlands. As in more countries, one could trace the roots of landscape architecture in garden architecture, but in that time it was the private garden that occupied garden architects. In 1940 an exhibition organized by the Dutch garden architect federation wanted to show the work of leading garden architects. At this occasion, architect-urbanist Van Eesteren was invited for an opening speech. This speech, for long unknown, is remarkable, as Van Eesteren confronts the garden architects with the landscape scale, and urges them to wake up. This contribution, and a recently published essay, explores Van Eesteren's speech in relation to the development of Dutch landscape architecture after the Second World War. Its leading international position nowadays in the design of large-scale, strategic issues cannot be seen apart from this speech.

INTRODUCTION

'The garden architect, too, will need to prepare himself for undertaking a task in these developments. He will then discover large areas of undeveloped land. In

saying this, I do not only mean that the scope of his work will merely extend to include many new targets; I mean above all that he will have to conquer them'. (Van Eesteren 1940: 4) 'These developments' referred to the changes at hand in Dutch cities and landscapes. It was 6 April 1940, when leading urban planner Cornelis van Eesteren spoke these remarkable words, celebrating the opening of an exhibition showing the state of the art in Dutch garden architecture in the Stedelijk Museum, Amsterdam, displaying the projects of 27 garden architects. (Fig. 1) Van Eesteren noted that the discipline of garden architecture received 'relatively little attention'. A statement in stark contrast with the challenge for garden architects to reorient themselves: 'I have in mind here the new Zuiderzee polders where one is aiming to create landscapes that will be aesthetically pleasing as well as useful, [...]'. (Van Eesteren 1940: 4) The state of garden architecture at the time was regarded as almost irrelevant by Van Eesteren, whereas the future of the discipline was to be found in a totally different realm, a world in which landscape architecture was urgently *needed*, though most garden and landscape architects were hardly aware of this need. This speech by Van Eesteren, titled *Het werkgebied van den Tuin- en Landschapsarchitect* [The garden and landscape architect's area of activity] is largely unknown, having been mentioned by few authors. (f.e. Hemel 1994: 72) Reading this speech today, it seems to us that it has never been fully appreciated as a fundamental, transformative act within the wider scope of Dutch landscape architecture. We believe that this speech specifically could be considered the hinge between the rather dull milieu of Dutch garden architecture in the years before the Second World War and the highly innovative and dynamic years after the Second World War. Van Eesteren's speech therefore comes to be regarded as a unique document.

FROM GARDEN ARCHITECTURE TO LANDSCAPE ARCHITECTURE

When considered internationally, landscape architecture is characterised by a variety of approaches, related to particular geographic, political and cultural histories of countries. Dutch landscape architecture has often been associated with the large scale: polders, water works, and the making of new nature. (See Andela 2011, Smienk 1993, Van Dooren 2008) This offers a picture that is both true and untrue. The Netherlands does indeed have a tradition of water and engineering works, and this has certainly influenced today's landscape architecture. If we look at garden architecture as it was displayed in the exhibition, hardly any trace can be found of an interest in the large scale, in strategic and abstract thinking, and in problem-solving as it relates to the making of the land and the conquering of water. In other domains though, large-scale waterworks and land-making did happen, accompanied by the necessary strategic thinking. However, this was far removed from garden architecture. In this context, what makes Van Eesteren's speech important is that he *demand*s that garden architects start connecting garden architecture to the large-scale landscape, and therefore, this speech marks one of the essential overturning moments in the field's history.

Zef Hemel, in *Het Landschap van de IJsselmeerpolders. Planning, inrichting en vormgeving* [The landscape of the IJsselmeerpolders. Planning, construction and design] discusses Van Eesteren's speech in detail. (See Hemel 1994 : 72) He is interested in how urban planners and landscape architects became involved in the design of the new polders. Indeed, in 1940, the Netherlands faced a huge task. The use and function of the landscape in relation to the city was changing, and regional plans to

structure these developments were made. Van Eesteren stressed the importance of the involvement of garden and landscape architecture in the making of these plans, and thus the ability to think on the scale of national plans, such as the new Zuiderzeepolders. Van Eesteren said: 'One has not yet sufficiently realised that in creating important cultural works, making aesthetically pleasing landscapes is a programme objective of primary importance.' (Van Eesteren 1940: 1,2) Hemel's perspective suggests that Van Eesteren consciously linked the discipline of garden architecture to the polder design, with the belief that garden architects should be capable of caring for this important issue of 'land-schapsschoon' or fine landscapes.

RESPONSE POST-WORLD WAR II

Van Eesteren's vision did eventually become a reality after World War II, though it was realised slowly. The city became much more important as a field of action, thereby expanding their working area, which was previously confined to parks and gardens. The engagement of landscape architects in cities was new, and effected a shift in their professional situation. Prior to World War II, garden architects were mainly independent designers. Garden architects were strongly associated with private clients, and to the world of nurseries, often being nurserymen themselves. With a new focus on the large scale and the city, as opposed to the former situation of garden architects, the client became more and more anonymous. The new client was 'the public' or the citizen in general.

The rural area equally sought attention. Self-sufficiency became an important issue. This inspired a national project of large-scale land consolidation. Of course, the modernisation and expansion of Dutch agriculture were already on-going, but after World War II,

this accelerated substantially, creating new tasks for for landscape architects. (See Steenhuis 2009) Walcheren, in the province Zeeland, severely damaged in World War II and flooded in 1953, played a crucial role in the process of modernisation and landscape architecture's role in it. The landscape had to be reconstructed, but the landscape design was much more than a reconstruction; it was a new design that transformed the historic landscape into a modern one. The reclamation of Noordoostpolder, which started in 1936, is generally considered a *Gesamtkunstwerk* of architecture, urbanism and landscape architecture. The design was approached with the same high ambition that Van Eesteren had pleaded for in 1940: '(...) During the construction of a road, or when exploiting and reclaiming land, it is not sufficient to merely place vegetation in the various unused corners of the land; one has to understand the essence of the task and produce a landscape-based solution'. (Van Eesteren 1940: 2) Several garden architects were involved in the design of polders - think of Mien Ruys, Ellen Brandes or Nico de Jonge. It could be concluded that they responded to the challenge of Van Eesteren. An iconic example of this widening of the field of landscape architecture was the so-called *Eierenplan* [egg plan], drawn in 1967 by Alle Hosper. Built to store drinking water, the *Eierenplan* proposed a very technical intervention in the landscape, designed as a remarkable and bold gesture. It marks how landscape architects started to apply their knowledge of design on an entirely new category of objects.

Van Eesteren's entire speech wavered between future challenges and the shortcomings of his era. Thus, he also stressed the importance of changes in education: 'I feel the need to address myself to this circle of garden and landscape artists, especially those who show interest in fine gardens and landscapes, in order to strongly

emphasise these changes. It goes without saying that these changes will greatly influence not only how others regard the garden architect's field of work, but also his studies, his interests, and the methods of training future garden architects.' (Van Eesteren 1940: 3) In that perspective, the installation of a chair for landscape architecture in Wageningen in 1949, was important. Bijhouwer, the first professor, combined a feeling for the rural area with an insight into the city debate. He had already developed close contacts with architects and urbanists due to his engagement with Rotterdam and his work for the Wieringermeer.

Van Eesteren's agenda to put the landscape at the centre of the urban field became a tangible concept with the help of urbanists. Delft-based urbanists such as Rein Geurtsen, Frits Palmboom and Maurits de Hoog, with an interest in morphology, explored a new interpretation of the relationship between the landscape as a foundation and the urban pattern. For example the 1990 *Rotterdam, verstedelijkt landschap* [Rotterdam, urbanised landscape] was an instant success, demonstrating that there was a demand for such reading material. (See Palmboom 1990) Even as an urbanist discourse, it ultimately supported landscape architects in taking a leading role in the design of the city.

AFTER 1985: AN ACT OF EMANCIPATION

The rash developments around 1985 can be seen as an act of emancipation. The office of Bakker en Bleeker was a key player in this process, and the fact that they established their own private office was in itself a remarkable shift. (See Steenhuis, Darley, Van Dooren, Licka, Wiegersma, and Voerman 2010). In 1977, Bakker and Bleeker started to engage in projects that were highly unusual for landscape architects, such as the re-design of promenades



Figure 1: A report on the exhibition in the Dutch newspapers, april 1940. Collectie Rijksarchief voor Nederlandse Architectuur en Stedenbouw Het Nieuwe Instituut): Van-Eesteren-archief IX-72

and inner-city shopping streets. As landscape architects, they were able to understand the scale of an entire inner city, to consider its history, to understand how these spaces operated, and to translate this knowledge into attractive design. These designs *could* be green, but not necessarily - landscape architecture changed colour. The approach to landscape had also changed. For most of the twentieth century, landscape was seen as a useful 'setting'. Landscape was now regarded as a valuable element in its own right, one that could play a pivotal role in articulating relationships between different parts of the city. The competition for Parc de La Villette embodied this shift towards the use of landscape as a structuring element in an urban setting. Bureau Bakker en

Bleeker won the competition along with eight other designers. It was to be a park that shared the dynamics of the city and provided for a pluriform character. The competition had an emancipating role for landscape architecture as a discipline. Landscape architects globally proved that they were a group of serious designers in the urban realm and intended to be a permanent fixture in the field.

Landscape architects made revolutionary steps in engaging with the technical problems of large-scale landscapes. *Plan Ooievaar* showed that the design of nature was possible - not as an image, but as a stimulus for a dynamic process. (See De Bruin, Hamhuis and Van Nieuwenhuijze 1987 and Sijmons 1998) It presented an idea about the future of rivers, of nature and of agriculture that immediately led the way forward. An important feature was its acknowledgement of uncertainty in the development of the plan over time. No final image was given, but rather a series of processes were set to work. The recent programme *Ruimte voor de Rivier* [Space for the river] clearly evolved from *Plan Ooievaar*. The regional scale became the new work field and landscape architecture took a leading role. (See Van Dooren 2016)

Following this, landscape architects gained a leading role in both rural and urban areas, and on different scale levels. West 8, for example, made an urban plan for two peninsulas in the eastern part of the Amsterdam docks, Borneo Sporenburg. They orchestrated the urban development and zoomed in to the scale of the dwelling; West 8 influenced the new district at every scale. The work of landscape architects also started to appear in publications. In 1996, *Landschapsarchitectuur en Stedebouw in Nederland 93-95*, was published as the first of a series of yearbooks. Offices for landscape architecture like West 8, H+N+S, Lubbers, Hosper, Karres en Brands, and Quadrat were some of the most profiled

offices in those yearbooks, having only been founded a few years previously. It demonstrates the highly fertile condition of the discipline around 1990. The position of the landscape architect surpassed every expectation and there was no reminder of the 'relatively little attention' that garden and landscape architects had had in 1940.

BOLD AND FAR-SIGHTED

Van Eesteren performed one last rather improbable rhetorical jump. We cannot escape the feeling that he spoke about garden architecture with cynicism, and that he judged the scale of gardens as being irrelevant in the light of the challenges faced by the Netherlands. But then, at once, the garden returned to his narrative: 'If, in this way, cultural landscapes can be liberated from their physically coarse character, as I have shown here and there, they will be able to develop into large 'culture gardens' which will be fine places to inhabit'. (Van Eesteren 1940: 5) This notion of 'cultuurtuin' or culture garden did not survive Van Eesteren, but perhaps we should not take it too literally - it probably indicates the need to understand design at landscape scale as a cultural act, as has indeed become embedded in today's landscape architecture.

Van Eesteren's speech must have caused some uncomfortable feelings in the exhibition hall of Stedelijk Museum Amsterdam. Although big names in Dutch garden architecture showed their projects, none of the exhibited projects gave even a slight indication of the area of work referred to by Van Eesteren.

'Although one can certainly conclude from this exhibition that the construction of private gardens still plays the most significant role in the practice and existence of our garden architecture, it will certainly be obvious to those who understand the signs of the times that those involved in this discipline will in future be placing more

emphasis on other types of gardens and on another sort of work' - this is how Van Eesteren presented his vision, one which did transpire. (Van Eesteren 1940: 3) Areas in which landscape architects were active broadened substantially. Landscape architects became engaged in assignments much earlier in the process and even started to take the lead; they did not concentrate exclusively on the green aspects within assignments, but on the central ideas in the assignment itself. Van Eesteren stated that 'the new garden architect' had to understand how his new area of working operated; he had to understand the functionality of areas, and then 'to breathe life into these areas'. Post-war landscape architecture *did* understand the signs of the time, but our opinion it is the emancipation of landscape architecture after 1985 that fully answered Van Eesteren's call.

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The Organization Form of the Edible Landscapes in the Public Space of the Residential Area in China

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ABSTRACT

Along with the rapid urbanization, edible landscapes especially those locate in residential areas has become more and more favored by urban residents in China. However, the edible landscapes in the public space of residential areas (ELiPSRA) often suffers from the resistance of the management departments. This research aims to find out the causes of this conflicts, and further reveals which organization models could avoid them and contribute to their successfully implementation in Chinese urban area. Case studies and field surveys on 7 selected ELiPSRA cases in Beijing, China were carried out. The investigation indicated that the ELiPSRA which easily lead to conflicts are mainly those built in individual mode, and they are resisted mainly because of land tenure controversy and the negative impacts from visual, managerial and environmental aspects. Meanwhile, the ELiPSRA which can be implemented smoothly are usually built in organized forms, including self-managed mode of group organization, official organization, commercial organization and designer led mode. The professional designers might play an important role in catalyzing and guiding the construction of ELiPSRA. This research shows that an organized form is the necessary condition of the development of ELiPSRA in China. Urban authorities should consider edible landscaping as an ordinary urban practice and try to improve and lead the existing ELiPSRA with conflicts to a

proper way through uniform guide, organization and assistant, rather than just demolish them in a crude and oversimplified way. This research provided experience and references for an effective organization of the future ELiPSRA within the context of rapid urbanization in China.

INTRODUCTION

Edible landscape could be defined as the landscape integrating food-producing plants, such as crops, vegetables, fruits and herbs, within an ornamental or decorative setting (Creasy 2009). Edible landscapes within the urban area is an international popular topic in the field of landscape research. Facing with the two global challenges of urbanization and food security, the integration of urban agriculture is suggested to be used as a strategy for the sustainable and resilient urban development and providing a productive green infrastructure for the future cities (e.g. Giseke, 2011).

China has been experiencing an unprecedented urbanization, which lead to many social and environmental problems especially in the urban core. Within this context, in 2010 a statement of “returning to productive landscapes” was declared by a Chinese landscape architect with the aim of improving the health of people and ecosystem (Yu, 2010). In recent years, edible landscapes especially those located in residential areas, has become more and more favored by urban residents in China. A survey in Beijing indicated that growing edible plants in or around the residential area is a common phenomenon (Wang 2016). P.R.China implements the socialist public ownership, which means the land is possessed by the state or by peasant collectives. Thus in city real estate developers “lease” land from the government and obtain the land use right, after the residents moving in, the land use right of the public spaces in residential area is transferred to the residents collectives. According to

the land law above, residents should have the rights for growing ELiPSRA, however, the edible landscapes in the public space of residential areas often caused conflicts between urban growers and management departments: they usually suffer from resistance, such as being cut down and cleared away by the staff of the property management



Figure 1: The guerrilla garden in Mudan Yuan Residential Area

companies or community neighborhood committees.

Through analyzing the forming process of the selected ELiPSRA cases in Beijing, the research aims to address the following two questions:

- 1) What's the causes of the conflicts between growers and urban authorities?
- 2) Which organization forms could avoid the conflicts and contribute to the ELiPSRA's successfully implementation in China?

RESEARCH METHODS

The research selected seven representative cases of ELiPSRA (three cases with conflicts between urban growers and management departments, and four were carried on smoothly without the conflicts) in Beijing, China for case studies. Through field surveys, observation and semi-structured interviews to three different types of interviewees, including growers, neighbors and staffs in community neighborhood committee and property

management companies, were conducted for collecting data. Through qualitative analysis, the organization forms of the ELiPSRA cases were analyzed.

CONFLICTS OF THE ELiPSRA AND REASONS

Four ELiPSRA cases with conflicts

Case 1: Guerrilla garden in Mudan Yuan Residential Area

This guerrilla garden is located in Mudan Yuan Residential Area, which was built with multi-storey buildings in the 1990s (Figure 1). Since the residents' moving in from bungalows, they have no space any more for food growing although many of them still want to, therefore, some of them started growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs in the public space of the residential area and on the balcony windowsill using containers, for entertainment, physical exercises and producing organic food. For example, one interviewee aged 70 said, he is an old man now and need to do some physical exercise to keep strong and healthy. However, because the growing activities are informal and there is no secure land use right on the public land, these guerrilla gardens were often destroyed by the property management company of this community: their edible plants were usually cut and uprooted, and the fences were demolished together, which usually dishearten and irritate the growers.

Case 2: Guerrilla garden around No.6 Haidian South Road Dwelling

This guerrilla garden is located around the No.6 Haidian South Road Dwelling, which is a single high-rise slab-type building built in the 1990s. Some residents started growing herbs, spices and vegetables in containers such as bubble chambers and flower



Figure 2: The guerrilla garden in No.6 Haidian South Road Dwelling (Before and after in October 2012 and October 2013)

pots, and put them in the public flower bed in front of the building, or on their windowsills. The vegetables in the containers around the building were mainly cultivated by some old people, and they grew them mainly for producing natural, pollution-free and tasty food. Meanwhile, the edible landscapes also provided food supplement and chances for physical exercises for them, and also promoted neighbors' encounters and communications. However, this guerrilla gardens were destroyed because of a facade decoration in 2013 (Figure 2).

Case 3: Family garden and guerrilla garden in Wan Quan Xin Xin

Residential Area

This is a garden located in a modern wealthy residential area with multi-storey buildings built in 2003 (Figure 3). The landscape in the residential area was planned, designed and constructed with a high standard. Many residents living on the first floor usually grow herbs, spices, vegetables and fruit trees in their private courtyards for producing pollution-free food. Since the urban households are usually lack of knowledge and skill of growing vegetables, they sometimes employ time-workers who come from countryside and have farming experience to help them grow vegetable in their family gardens. In which, one household has made use of the public green space adjacent to her house for

growing edible plants, but they were criticized by the property management company through circulating a notice of criticism on the community information board, and were ordered to eliminate the edible plants immediately.

Organization forms and cause of the conflicts

3.2.1 Organization forms

The three ELiPSRA cases with conflicts mentioned above have a common feature, that is they are all guerrilla gardens with illegal land requisition which were organized in individual mode, in which the edible landscape is initiated and built by the individuals of the urban residents spontaneously, personally and independently. With the individual mode, the whole farming process, including sowing, cultivation, maintenance, management and harvest, is completed independently by the urban citizens themselves, and the harvested food belong to the urban growers themselves.

3.2.2 Cause of the conflicts

The interviews to three different groups of people, including "community neighborhood committee and property management companies", "urban growers" and "neighbors", indicated that the conflicts between urban growers and urban authorities are usually caused by the following reasons:

1. Conflicts of land tenure

The land-use right of the public space in residential area should be owned collectively by all residents. However, because the residents have not formed a conscious sense of participating the public space management, and do not know their rights and responsibilities to the public land either, the land use right of public green spaces are often naturally handed over to the urban “residents committee” or property management companies for management. Therefore, the “collective right” becomes “collective non-right” (Liu et al. 2017).

According to the *Property Management Regulations*, any of the following acts without permission are forbidden, including changing the land use of the residential area, occupying



Figure 3: The guerrilla garden in Wan Quan Xin Residential Area

the public land, damaging the public greening and landscape, etc. Most of the management departments in residential areas affirm that guerrilla gardening, which is encroaching on the public green space, is against the Regulations, therefore, they usually resist ELiPSRA unhesitatingly.

2. Conflicts from visual and spatial aspect

— There is a lack of uniform planning and necessary guidance for the farming activities; therefore, people usually plant edible plants chaotically.

- The edible plants cannot keep evergreen. The ground surface becomes bare when the edible plants are harvested or wither in autumn and winter, which likely cause messy scene and dusty haze.
- Difficult to access. The vegetables are often enclosed with fences, which make ELiPSRA difficult to access for entertainment.

3. Conflicts of organization and management

- Poor time management of ELiPSRA could create a messy and unsanitary urban environment.
- Even there is a uniform organization, there arises the issues of distribution difficulties and high management costs.
- Without a proper management, the pesticides sprayed on the edible plants in public spaces might cause food safety problems.

4. Conflicts from environmental and technological aspect

- The biological fertilizer might produce unpleasant odors and cause unsanitary urban environment.
- There is a shortage of water for irrigation.
- There is a lack of agricultural knowledge and skills.

FOUR ELiPSRA CASES WITHOUT CONFLICTS AND THEIR ORGANIZATION FORMS

Four ELiPSRA cases without conflicts

Case 1: 20 m² Courtyard Garden Experiment

The garden is a private courtyard attached to an apartment which is located in one modern residential area



Figure 4: Four ELiPSRA cases without conflicts-1) 20 m² Courtyard Garden Experiment 2) Community garden in No.30 Minkang Residential Area 3) "Happy Farm" in Jia-zhou Shui-jun Residential Area 4) Community garden in Zhongguancun Yuyuan Residential Area. Source: 1) Fu et al. 2012; 4) ©Jian Gao

built in the 1970s with multi-storied buildings in Haidian District (Figure 4-1). When the apartment was rented out, the garden was abandoned and occupied by weeds. In 2010, the garden was reconstructed by 5 tenants of the apartment who are 5 designers. Aiming to create a communal space with good environment, the garden and its adjacent area outside were planted with both ornamental and edible plants in the form of chessboard, including wheat, pumpkin, bottle gourd, white clover and safflower clover. The crops planted in and around the garden created a communication space for the 5 designers. The garden locates at the intersection of two roads, with low vegetation around the garden forming a good visual and communication interface, it particularly attracts retired elderly people in the community who often stop and chat with them about the

agricultural scenery (Fu et al. 2012).

Organization form: Self-managed mode of group organization

People who have the same idea of beautifying the living environment by edible landscaping sometimes just start farming activities together in the residential area. The growers in the group might cultivate a piece of land, maintain it and share the harvested products together.

Case 2: No.30 of the Minkang Residential Area

The "No.30 of Min Kang Residential Area" is a relatively antiquated modern residential area, which was built in the 1980s, with a deteriorated environment. In order to deal with the problem of landscape deterioration and deficiency of management of the public green space,

from 2009 to 2012, the community neighborhood committee and the property management department of the residential area divided the public green space into 75 small plots and distributed them to the residents for growing herbs, spices, vegetables and fruits to achieving greening. Environmental experts in the Environmental Protection Agency of Xi Cheng District were invited to give training of gardening and farming skills to the residents. Since 2013, the plots were retaken and uniformly cultivated by the staff of the property management department with edible plants. Collaborating with the local neighborhood committee and the Academy of Agricultural Science, a community ecological demonstration garden was established for greening and beauty through transforming the public space into edible landscape (Figure 4-2).

Organization form: Official organization by community neighborhood committees or property management companies of the residential area.

Case 3: Renting Farming Gardens (called “Happy Farm”) in Jia-zhou Shui-jun Residential Area

This residential area with high-rise buildings was built in the 2000s in a satellite town, locating at the 6th ring zone of Beijing. In 2013, an area of around 14,467m² greening reserved land of the residential area was developed into a “Happy Farm” enterprise by the property management company (Figure 4-3). In the “Happy Farm”, the land is divided into small plots and rented to the residents as vegetable gardens. Renting a plot of 30 m² annually costs 900 RMB, which contains two carts of cow dung, usage of the tools, bamboo partridge for building fences and irrigation water. As the staff said, most of the urban growers are old people, who from the

interviews mainly aim for body exercise and entertainment. The project created new employment opportunities and improved the staff members’ income of the property management company.

Organization form: commercial organization by companies

This is an organizational form of the edible landscape built with a commercial purpose. In some newly built residential areas especially those located in urban fringe or satellite towns, part of the public spaces might be developed into “Happy Farm” by developers or property management companies.

Case 4: The community garden in Yuyuan Residential Area of Zhongguancun

This is a community garden that jointly built by the residents in Yuyuan Residential Area of Zhongguancun, through a community activity in May 2018, which was led by the landscape architect in Gaiya Design Office and cooperatively organized by the community neighborhood committee. They made full use of the public land and improved the environment through building a communal productive garden. The participants range widely from 6 to 86 years old. In less than one month, the community garden has become a wild profusion of vegetation (Figure 4-4).

Organization form: professional designer led mode

The edible landscaping activities are led by the professional designers and cooperatively completed by multiple participants, such as community neighborhood committees and residents. This is a new organization form of ELiPSRA recently appeared in Beijing, and is still in its initial period and being explored.

Organization forms
The four ELiPSRA cases

mentioned above were all built in an organized mode, including 1) self-managed mode of group organization, 2) official organization by the community neighborhood committees or property management companies of the residential area, 3) commercial organization by companies, and 4) Professional designer led mode. In addition, there are also some ELiPSRAs initiated by volunteer associations, which was not explained in this research (Table 1). Since the organized edible landscapes are usually built under a uniform organization or a professional design, which was built on the organizers' common judgments, therefore, they are usually built with the security of land use right and also can give people an impression of neat, uniform or design sense.

The role of professional designers

The professional designers, such as architects and landscape architects are important actors in the organization process of the ELiPSRA. Designers usually have more professional knowledge of ecology, planning, designing and aesthetics, therefore, their presence during the planning process usually could make the edible landscape more sustainable and beautiful. In addition, because designers understand the significance of the multi-participation in community construction, they have ability to lead a cooperative participation of different stakeholders, including urban residents, community management departments and governments, etc., and jointly complete the community construction.

RESULTS

The three selected cases with conflicts indicated that those ELiPSRA with conflicts between growers and urban authorities are usually organized in individual mode. Because the residents' ignorance, their rights of utilization of

the public land are usually hold by the community neighborhood committee or property management companies. Therefore, the edible gardens they built individually are considered as guerrilla gardens with no permission. These guerrilla gardens are resisted also because they easily lead to negative impacts on urban management, urban residents and urban environment such as violating the residential property regulations and encroaching on public green space, bringing negative visual and environmental effect as well as management difficulties on communal landscapes, etc. In current China, most of the ELiPSRA are built in individual mode.

Meanwhile, the ELiPSRA which can be implemented smoothly are usually those built in organized forms, including self-managed mode of group organization, officially organization by community neighborhood committee/property companies and volunteer associations, commercial organization by companies and professional designer led mode. Professional designers might play an important role in catalyzing and guiding the construction of ELiPSRA.

DISCUSSION

Currently, edible landscape in the residential area are favored by Chinese urban residents because of the environmental, healthy, social and economic services they could supply. However, edible landscaping in the public space of residential areas often suffers from the resistance of the management departments. Through studies of seven representative ELiPSRA cases, this research found out the causes of this conflicts between growers and urban authorities through analyzing the forming process of the contemporary Chinese ELiPSRA, and further reveals which organization mode could avoid the conflicts and contribute to their successfully implementation in

China.

The investigation indicated that those ELiPSRA cases which easily lead to conflicts are mainly guerrilla gardens built in individual mode, and they are resisted mainly because of the land tenure controversy, and the negative impacts on urban management, urban residents and urban environment such as violating the residential property regulations and encroaching on public green space, bringing negative visual and environmental effect as well as management difficulties on communal landscape. On the issue of edible landscape, there is a lack of communications between the urban growers and urban authorities each other. In order to make the landscape maintenance and management easier and also to meet the rules and regulations, the staff of urban management departments have not considered urban residents' demands of food growing, but simply adopted the approach of "one size fits all" and excluded edible landscape from the urban landscape. Meanwhile, the ELiPSRA which can be implemented smoothly are usually those built in organized forms, including self-managed mode of group organization, officially organization by community neighborhood committee/property companies and volunteer associations, commercial organization by companies, and professional designer leaded mode, and the main reason is that only through an organized way, there is a possibility to obtain the collective land use right from the community neighborhood committee for growing ELiPSRA. Moreover, professional designers might play an important role in catalyzing and guiding the construction of ELiPSRA, and they have great potential to act as the bridge between people's demand of food growing and decision making on ELiPSRA. This research shows that an organized mode is the necessary condition and inevitable trend for the

smooth development of ELiPSRA in China.

Urban authorities should recognize the benefits of foodscapes and give rights of edible landscaping to urban residents. For the abundantly existing guerrilla ELiPSRA with conflicts, urban authorities should try to improve them and lead them to a proper way (such as cooperative way) through uniform guide, organization and assistant, rather than just demolish them in a crude and oversimplified way. Hereby, the professional designers have great potential to act as a bridge between growers and decision makers, and also promote more sustainable edible landscapes. This research provided experience and references for an effective organization of the future ELiPSRA within the context of rapid urbanization in China.

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TABLES

Table 1 The organization forms of the ELiPSRA in Beijing, China

Organization form	If it is legal land requisition	Stakeholders/Participants
Individual mode	no	Urban residents
Self-managed mode of group organization	no/yes	Urban residents
Official organization by community neighborhood committees /property management companies	yes	community neighborhood committees/property management, urban residents, (experts)
Official organization by volunteer associations	yes	Social volunteers, community neighborhood committees/property management, urban residents, (experts)
Commercial organization by entrepreneurs for commercial benefits	yes	Urban residents, property management companies
Designer leaded mode	yes/no	Professional designers, urban residents, community neighborhood committees/property management

Note: The stakeholders/participants with “()” means they might exist in some cases but not all the cases.

5.6. THEORY AND PRACTICE

GROUP P

Environmental Conceptions, Nature,
and Landscape Planning and Design

Tal Alon-Mozes

An Interdisciplinary Framework for
Spatial Quality: A Vertical Living Kids'
Perspective

Jo Boonen

The Sociobiological Method: Conceiving
Urban (Landscape) Theory Through the
Influence of Biology

Koenraad Danneels

Illustrating How Research-by-Design
Can Inspire a Transition when Dreams
are in Conflict with Reality

Aurelie De Smet

Towards a Taxonomy of Design
Approaches in Landscape Architecture

Kevin Raaphorst, Sanda Lenzholzer

Sad Janka Kral'a Park, Bratislava -
An Approach to Planning, Design and
Management of 19th Century Public
Parks

Martin van den Toorn

Environmental Conceptions, Nature, and Landscape Planning and Design

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Keywords:

Environmental Conceptions, Landscape Planning, Urban Nature, Parks, Israel

ABSTRACT

This paper examines the intricate relations between environmental conceptions and landscape planning and design. It inquires how environmental conceptions influence the planning and design of contemporary urban nature parks in Israel.

At the heart of this paper lies the notion that environmentalism is a complex and dynamic concept which includes a broad spectrum of ideas and values and reflects the reciprocal relations between humankind and its environment. Between anthropocentrism, eco-centrism and the current notion of civic environmentalism, the work of landscape architects deserves re-evaluation.

The paper examines the design of two urban parks: Gazelle Valley Park in Jerusalem, and Kiryat Sefer Park in Tel Aviv. Nature is celebrated in both parks. It is created in Tel Aviv; and preserved and enhanced in Jerusalem. In both cases the community set the design process in motion and brought to the materialisation of the parks, emphasising social justice alongside environmental justice.

Through site analysis, scheme interpretation and interviews with both designers, the paper reveals the intricate relations between theory and practice, highlighting the ambiguity of landscape architects' notion of nature.

INTRODUCTION

In the last decade, the municipalities of Tel Aviv and Jerusalem established two new urban parks, which garnered

public and professional appreciation long before their official opening. Both parks celebrate urban nature, creativity, and public participation, challenging the common Israeli pastoral, banal urban park, which was often an unattractive open space that became dominant as cities expanded. In these spaces, standards for recreation tyrannised design, and financial and management considerations became key factors in the emergence of these parks.

Inaugurated in 2013, Kiryat Sefer Park is a 1.2-hectare park located at the centre of densely populated "old" Tel Aviv. The park was established on what were formerly a parking lot and a Eucalyptus grove, which were intended as a site for a high-rise residential complex. After a long and successful struggle of local activists to change the land designation, the area became a recreation area and community gathering space, a unique oasis of running water.

Inaugurated in 2015, Gazelle Valley is a 20-hectare open space at the centre of Jerusalem, home to dozens of mountain gazelles that inhabit an abandoned apple and cherry orchard. After a years-long public campaign against building plans, in 2009 the city's Planning Committee decided to officially declare Gazelle Valley a nature park. Currently, the park is based on a stormwater management system which collects runoff from the adjacent neighborhoods to an annual pool. The pool and its surroundings became a paradise for the gazelles, birds, and vacationers from near and far.

Both Kiryat Sefer Park and Gazelle Valley Park reflect the current notion of urban nature in Israel. The paper presents both parks in light of the contemporary theory on environmental conceptions and the actual practice. The first part discusses the role of environmental conceptions among landscape architects, and the idea of urban nature. The second part examines the emergence of both parks,

with emphasis placed on the notion of urban nature. The concluding part integrates the first two parts, situating the diverse interpretation of urban nature within the local and the global environmental discourse.

MATERIALS AND METHODS

The paper is based on an in-depth investigation of both parks. Through scheme and site analysis, interviews with parks' designers and archival research, I will interpret the meaning of urban nature within the framework of the environmental discourse.



Figure 1. Kiryat Sefer Park, source; REED

THEORETICAL BACKGROUND; ENVIRONMENTALISM, NATURE AND LANDSCAPE DESIGN

Till the new millennium, the association of the work of landscape planners and landscape designers with environmental conceptions received relatively little coverage in the body of critical literature on landscape, ecology and sustainability (Conan 2000:1). The exception was I. H. Thompson, who discussed the relations between environmental conceptions and landscape planning and design explicitly in his seminal article *Environmental Ethics and the Development of Landscape Architectural Theory* (1998).

Basing his arguments on Anglo-American practice, he points to the pioneering work of F.L. Olmsted (1822-1903) in Yosemite Valley (1864), and in Boston (late 1880s) as ecologically sensitive (Thompson 1998:182). Olmsted's visionary ideas were numerous, and although his primary interest was human wellbeing, "he demonstrated that caring for human health and enjoyment was synonymous with caring for the landscape" (Ndubisi 1997:13).

Generally speaking, most scholars agree that prior to the 1960s both British and American landscape architects were very firmly identified with the homo-centric camp and served as accommodators in recruiting technology for the benefit of human beings (Thompson, 1998; Treib, 1994; Walker & Simo 1994).

During the mid-1960s, environmentalism gained increased attention and ecological planning became more prominent. Ian McHarg's work (1920-2001) and his seminal book, *Design with Nature* (1963) outlined an ethos and methods of ecological planning and design, and as argued by Spirn, "made ecology not only an explanation, but also a command, conflating science and ethics and opening the way for a moralist attitude among landscape architects" (Spirn 2000:112). According to Thompson, McHarg's position was essentially eco-centric, but also sensitive to human concerns – reconciling humanistic values with ecological ones. (Thompson 1998:184). Interestingly, the ecological approach was justified by social and financial reasoning and was seen as integrating both eco-centric and homo-centric perceptions. Within the community of landscape architects, this approach dichotomized the definition of the profession as either an art or a science and reinforced the modern conceptual separation between nature and culture.

The sustainable discourse,

which permeated the planning arena in the late 1980s and has been playing a dominant role ever since, is essentially a homo-centric concept. But as Thompson argued earlier, it is ambiguous in that “it can be given a technocratic slant or a more radical ecocentric spin” (Thompson 1998:189). For landscape planners and designers, sustainability offers more than a set of working tools; it dictates a new framework of beliefs in the role of technology in landscape, as elaborated by Thayer (1994), and Lyle (1994) – a quest for new aesthetics (Nassauer, 1995; Meyer, 2008) and a re-evaluation of the role of ecology in planning and design (Benson & Roe, 2000; Corner, 1997; Hill 2001, 2005). Consequently, the dichotomies between nature / culture, science / art, city / wilderness became blurred and gave way to the new emerging paradigm of Landscape Urbanism (Corner, 2006; Reed, 2007; Waldheim, 2006; Mostafavi & Doherty, 2010).



Figure 2. Gazelle Valley Park, source; Rachelle Wiener Landscape & Architecture

The contemporary oxymoronic concept of “urban nature” represents this current tendency to “emphasize the linkages and relations that knit our world of interdependent systems together” (Karvonen & Yocom, 2011:1305). As part of the ‘relational turn’ in cultural geography, which moves away from modern dichotomies between subject and object, artificial and natural;

urban nature is neither an eco-centric approach to urban development nor a socially sustainable framework that centers on nature’s services. It is practiced through civic environmentalism (ibid) as will be demonstrated in the following.

FINDINGS PLANNING PROCESS, STAKEHOLDERS AND THE INFRASTRUCTURE FOR DESIGN

Both Kiryat Sefer Park and the Gazelle Valley Park emerged after civic struggles against real estate initiatives in the already overcrowded Israeli cities. They reflect the convergence of two central movements within the Israeli society of the late 20th century: the need to protect open spaces from intensive, uncontrolled development and preserve them on the one hand, and the growing importance and influence of the civil society, struggling for environmental justice, on the other hand.

Kiryat Sefer Park was a municipal scale initiative, once the community of affluent residents of Tel Aviv discovered the national authorities’ plan to establish a high-rise residential complex in the parking lot and Eucalyptus grove that they were already using as an unofficial recreation area. They established a local grass roots organization called “Green instead of Cement”, and from 2008 onwards organized more than 160 events at the site, including picnics, exhibitions of children’s drawings and other activities. Supported by members of the municipal council, they appealed to the court to block the real estate developer and *Israel Land Authority*. In 2011 the building proposals were denied, and the community engaged a community facilitator and Landscape Designer Ram Eisenberg to materialize its common vision.

The Gazelle Valley area is a remnant of the British pre-State of Israel planning scheme for Jerusalem, which



Figure 3. The course of the stream in Kiryat Sefer Park, source; REED



Figure 4. The Park's scheme, source; REED

advocated intensive building on the city's mountains, leaving its valleys as protected green belts, in line with British tradition (Cohen, 1994). However, with the establishment of the State of Israel in 1948, the area was leased to the nearby agricultural settlements (kibbutzim), which planted apple and cherry orchards on site. Due to various construction projects along the original green belt, the continuity of the valley was interrupted, and a herd of gazelles became separated and prospered in the orchards. The idyll of man-made agricultural landscape and wild fauna was threatened as agriculture became unprofitable and the kibbutzim preferred changing the land use to construction of residential buildings, offices and educational institutions on site. The first to oppose this initiative were the locals,

residents of the adjacent low-income neighbourhood. They were supported by environmental and social NGOs, the local urban community's administration, a Green party within the city council, and the Ministry for the Protection of the Environment. The above established an action force for the Gazelle Valley and proposed an independent master plan. Their proposal was approved by Jerusalem's Planning Committee in 2008 and was the first-of-its-kind urban nature reserve. Their common struggle reflected the dominant Israeli environmental discourse of the late 20th century; a discourse which perceived open space as an endangered resource which needs to be preserved according to a certain set of criteria. Ecological considerations were dominant parameters, as manifested in State



Figure 5. The course of the stormwater in Gazelle Valley Park, source; Rachelle Wiener Landscape & Architecture



Figure 6. The unique amenities of the Park's scheme, source; Rachelle Wiener Landscape & Architecture

Master Plan, Israel 2020 (http://surveys.sni.technion.ac.il/files/events/israel2020/heb_takzir.pdf). The design of the valley was entrusted to Landscape Architect Rachel Weiner and Architects Shai Weinstein and Gil Vaadia.

The starting point for the design of both parks was different. In Tel Aviv, it was the civil society that led the process, and community values (including environmentalism, among others) directed the design of the park. In Jerusalem, environmental NGOs, state and municipal organisations advocated the establishment of the park, focusing its attention on the disturbed habitat. While the area was defined in municipal schemes of the late 1950s as a green open space (in general), it became the first natural urban park, fulfilling the municipality's vision and its new statutory plan. The park was intended to preserve and cultivate the site's remaining natural amenities, including the fauna, flora, topography and ancient terraces. Its intention was to integrate these into the urban environment and invite the locals to enjoy nature. The scheme proposed a delicate balance and an integration of human activity and nature preservation without much construction (<http://www1.jerusalem.muni.il/GazelleValley.asp>).

URBAN NATURE

In a recent documentary, Ram Eisenberg, Kiryat Sefer Park's designer, explained what he perceives as nature: "Nature is not a pristine wilderness. It is not necessarily green, and it is not necessarily alive. Nature is anything where natural processes take place.... where there is no separation between objects, where everything interacts with everything else. It can be in the desert, it can be in a forest it can also be in a garbage heap" (https://www.youtube.com/watch?v=Mp7o_W-7N-0)

In Kiryat Sefer Park, **nature** is suddenly emerging as weeds germinate between the cracks in the asphalt of the

former parking lot. Nature resonates and is magnified by the wind, the sun and the shadows. But its dominant agent is the artificial river that flows, once a day, from the fountainhead and along 70 metres, before reaching the park's lily pond. Eisenberg regards the artificial river as the heart of the park. Every summer afternoon children follow the delicate stream in a ceremonial procession to the point where the water reaches the biofilter. This filter brings clean water to the lily pond through a set of vegetated pools and rapids made of concrete debris, re-used from demolished buildings in the neighborhood.

In addition, the park includes a table where thirty members of the community can celebrate birthdays or gather. A dead Eucalyptus tree which was restored as a play structure, inviting children to climb up and ride its branches. The park's surface was carefully designed for various uses. Next to the spacious lawn that follows the stream, uncovered soil was intentionally left in order to allow children to build and destroy dams, to create everchanging landscapes. Other parts of the park were planted with herbs for public use, and the community grows its own vegetables in defined beds on the park's outskirts. There, an old shack was renovated, serving as a storage area, also equipped with a lavatory, and including a small office for the garden manager.

In Jerusalem, the **natural** infrastructure dictates the design of the park. However, due to the unique function of the park, which drains the adjacent neighborhoods, the stormwater management system became its core element. The open drainage channel becomes a raging river in winter time, flowing into a small retention pool, and after undergoing filtering by vegetation, continues to a central pool. The interior of this pool was treated to avoid water infiltration, to enable it to serve as an attractive water



Figure 7. Ultraorthodox Jews watching birds in the Gazelle Valley Park, source; Rachele Wiener Landscape & Architecture



Figure 8. Nature in Kiryat Sefer Park, source; REED

amenity for both nature and people. Basically, the park was divided into two parts: the eastern part includes walking trails, and the western part, the core area, is closed off to visitors but can be observed with the aid of binoculars that visitors receive when entering the park. During summer time, the pools, which separate the two parts of the park, dry up.

DISCUSSION

Both parks were designed with the intention of providing an experience of being in nature within the city. In both cases the pristine nature was lost long before the contemporary park was established. However, in Jerusalem, as a result to years of neglect, nature returned. Ecosystems were naturally

restored, and the site became a refuge for the unique flora and fauna of the region. The natural amenities became the cornerstones of the new park, and the design gives preference to nature-oriented activities such as bird and rodent watching, hiking, guided tours, and activities focused on the environment and on sustainability. The park encourages environmental awareness and literacy. It invites urban inhabitants to experience the outdoors. As such, the park is a miniature reserve, a museum-like representation of “wild” nature. For members of the ultra-Orthodox community of Jerusalem, who rarely venture into natural areas, bird watching is an exceptional experience. The park also serves non-human populations and restricts people’s activity to defined areas,

leaving untouched areas for the gazelles and other species. No spacious lawns, barbecue stands, or sport fields are found in the park. For pastoral recreation, visitors need to visit Sacher Park, located one kilometer.

Ironically, the only original natural component of the Tel Aviv site was the Eucalyptus grove, a non-native species that was densely planted in order to hide the activity of a former military base that occupied the site. According to Eisenberg, nature was restored at the site due to the natural processes that take place in the park and to the interactions between people and place. However, with the establishment of the park, and especially its water amenity, more traditional elements of nature also returned to the park. Black-crowned Night Heron, White-throated Kingfisher, Mallards, and other species made the park their preferred resting area.

CONCLUSION

Contemporary environmental discourse perceives urban nature as civic environmentalism (Karvonen & Yocom, 2011). In both parks, the community was the driving force in the decision making that resulted in the establishment of the park instead of another housing complex, in determining the character of the development, the design components, and later – its management and the daily activities taking place in the park. As such, these case studies walk hand in hand with the contemporary theoretical discourse among environmentalists and landscape architects. Furthermore, these ideas support Israeli environmental conceptions as formulated by Dr. Eilon Schwartz, former Head of the *Heschel Centre* –an NGO dedicated to building a sustainable future for Israeli society through education and reflective activism. Based on his discussion of the history of dominant environmental paradigms in Israel, Schwartz suggests that former environmental concepts,

such as nature conservation for the sake of nature, and nature conservation for the sake of human well-being, are currently replaced by a more holistic environmental paradigm based on three components: place, community and values.

While both theory and practice are in agreement on the general comprehensive concept of civic environmentalism, the interpretation of the concept of urban nature is much more complex and deserves further investigation. Both Kiryat Sefer Park and Gazelle Valley Park demonstrate two case studies of the rich possibilities of experiencing nature in our cities today.

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An Interdisciplinary Framework for Spatial Quality: A Vertical Living Kids' Perspective

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ABSTRACT

Today, many children grow up in different contexts of vertical housing. Even though this type of environment has never been the preferred housing option for families with children in Flanders, it can be expected that the number of children in this type of housing will grow because of a spatial policy that increasingly focuses on densification and urban core consolidation. However, little is known about spatial quality in terms of liveability, meaningfulness and opportunities for self-development according to children and teenagers in vertical housing. To further research this matter, there is a need for a multidisciplinary approach of space, since space cannot be seen as a purely physical layer but has a clear experiential and socio-political layer as well. We found the approach of space as an interaction of mind-, matter- and powerscape by M. Jacobs (2004) to be comprehensive in including the different meanings that can be given to space. Using this framework and further operationalising it, we formulate 18 building blocks for spatial quality that can function as a node, tool and forum for analysing a space and intervening in a space.

INTRODUCTION - CHILDREN AND TEENAGERS IN VERTICAL HOUSING: QUESTION AND FACT

Vertical living families in Flanders, Belgium

In Flanders, many families with children live in different contexts and types of vertical housing (numbers vary between 8,8% and 17,3% according to different surveys, table 1). Even though this reality is more explicit in cities (e.g. in Ghent 17% of children between the ages of 0 – 18 grow up in apartments, table 2, in the centre of Ghent this number rises to 44%), vertical housing is becoming more relevant in rural municipalities as well (CIBweb 2016). At the same time, vertical housing is often considered to be less suitable or safe for families with children than the traditional single family house away from the city (DUSArchitects 2005). Vertical housing is suspected to have an impact on children's individual mobility (Whitzman & Mizrachi 2009) and even health (Oda et al. 1989; Fujiwara et al. 2014). The general attitude towards vertical housing in Flanders is rather reluctant. This can partly be explained by the history of housing in Flanders. Throughout its history, the focus of the Flemish housing policy has mainly been on individual ownership (De Decker & Meeus 2013). Vertical housing has therefore only been scarcely considered as a good housing option, often in times when there was a housing shortage and construction had to be quick. On top of this, failing international vertical housing projects like Pruitt Igoe (Fiederer 2017) or the French 'Grands Ensembles' (Bertho 2014) have been used as arguments against vertical housing. Examples of good Flemish vertical housing projects are rare.

Today, the Flemish housing landscape is mainly shaped by individually owned housing stock: 85% of the property market consists of single family housing, spread out over the entire Flemish area, causing many problems in its turn (Grietens 2009). However, some things are moving on the property market as housing policy is shifting its focus and apartments are

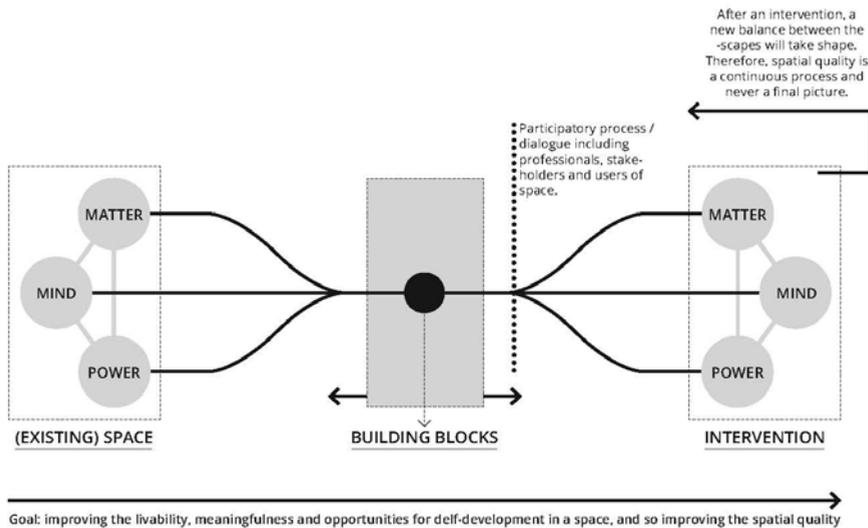


Figure 1. Space as mind-, matter- and powerscape

becoming an economically interesting alternative for single family housing. We can already see a rise in the building of apartments, mainly by property developers (Departement Omgeving 2016). Ideas of centralisation and densification are now being put forward as essential strategies in solving the problems caused by decennia of non-planning.

In keeping the left-over open space unbuilt, vertical housing can offer a typological solution. However, the quality of the housing and its environment must be guaranteed (Bouwmeester 2012; Vlaanderen 2018). In the light of these evolutions, we can assume that the number of families with children in vertical housing environments will only grow in the near future. In our research project we focus primarily on the perspective of children and teenagers growing up in these environments, the so called vertical living kids¹.

Spatial quality in vertical housing environments

It is generally recognised that the housing environment of children

and teenagers plays a major role in their socialisation, the opportunities they get and even their identity (De Visscher 2008; Hauge 2009; Sacré et al. 2016; Karsten 1995). Taking into account 'liveability', 'meaningfulness' and 'opportunities for self-development' of a space when planning or designing housing environments, should therefore be evident.

In our study we don't focus on the question whether or not it is desirable that children live in an apartment, but we start from the observation that an increasing number of children already lives in vertical housing conditions. We are interested in how the 'spatial quality' of these vertical housing environments can be increased, specifically according to children and teenagers themselves. The fact that space in Flanders is becoming a scarce good and the resulting need for spatial densification only add to the importance of this issue. This brings us to the question what exactly can be understood by 'spatial quality'. It is a term that, even though many have written about its meaning (Dauvellier, De Jonge, & Puylaert, 2014; Jacobs & Van Assche, 2003;

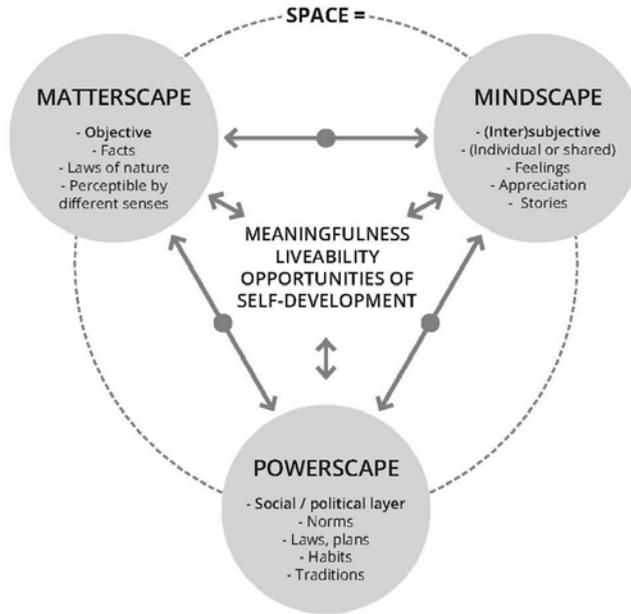


Figure 2. Building blocks as node, forum and tool for analysis and intervention in space

Janssen-jansen, Klijn, & Opdam, 2009; Segers et al., 2013, etc.), has in some way become vague or even an empty term because it is over-used and often unfounded.

In this paper, we propose a theoretical framework of spatial quality which we believe is comprehensible and can help to create a forum for dialogue between the different stakeholders, professionals and users of a space. Before we can set this framework, we need to define the meaning of 'space' itself. In the first part of this paper we use, adjust and add to Maarten Jacobs' (2004) multidimensional framework of space, which we think is needed to be able to talk about the quality of space. In the second part of this paper, we combine this concept with what we call *building blocks* to create a framework not only for analysis and discussions on spatial quality, but also to intervene in a space.

PART 1 - A MULTIDIMENSIONAL FRAMEWORK OF SPACE

The multidimensionality of space

Space is a concept that is used in many different professions, and each of these can give its own disciplinary meaning to the term. Moreover, each individual person gives a particular meaning to space as well (Khan et al. 2013) we start from the proposition that space, its uses and transformations are multi-significant and that their study requires an interdisciplinary approach. However, the elaborate division of labour in the sciences has also led to the compartmentalization of knowledge about space in different disciplinary fields with their associated, often idiosyncratic concepts, methods, and theoretical approaches. As a result, there is no shared conceptual system of space and different disciplines mobilize very different conceptions, perceptions, and experiences of space, often leading to mutual misunderstandings and incomprehension, also on the same terms (e.g. social space, urbanism. This can cause a lot of misunderstanding and confusion in discussions about space. So if we want to talk about the quality of space, we need a clear multidimensional definition of space. In this paper, we will use the framework developed

by Jacobs (2004). We believe his suggested way of looking at space is interesting since it approaches space not from a specific (disciplinary) point of view, but as an integrating concept that takes into account physical as well as psychological, sociological and political dimensions of space.

In his conference proceedings for *Metropolitan Landscapes*, Jacobs partly transposes Habermas' (1984) framework of communicative action to a new way of looking at the landscape (space). By analogy of Habermas, there are 3 'dimensions' in which statements can be considered correct: the mind-, matter- and powerscape (figure 1). We can give the following meaning to the different scapes:

- **Matterscape:** this is the physical dimension of space. It is the layer of space as it can be observed by the different senses, and it also contains 'factual knowledge' attached to space. It is in some way the objective dimension of space, since it exists outside of the individual and is not affected by cognitive or emotional processes. For example: imagine an oak tree of 20m tall, it casts a shadow and it grows throughout time, it is planted according to a plan or spontaneously grows in a place with specific features. All of this is true in the matterscape.
- **Mindscape:** this is the personal, individual dimension of space, defined by feelings, stories and personal appreciations connected to space. It can be seen as the (inter) subjective layer of space. A feeling for a space can be shared by more persons, but this still remains a very much personal feeling. For example: a child loves the oak tree since he can climb in it and finds it beautiful, his grandmother, however, dislikes the tree since she once slipped over its leaves.

- **Powerscape:** this is the sociological and political dimension of space. It is defined by rules, norms, laws, plans or traditions connected to a space. More than one set of rules can exist in the same space, since it can also be culturally bound or bound to certain groups of people. This dimension defines a lot of the behaviour in space, as some of these norms are explicitly written down and non-obedience can be punished. For example: cutting the oak tree is illegal since there are laws protecting trees whose radius at 1m height is bigger than 1m.

It should be understood that (1) each space holds all three of these scapes, (2) to understand a space therefore, all scapes should be considered, (3) each scape directly or indirectly influences the other scapes, (4) observations in one scape cannot serve as a ground for conclusions in another scape, (5) a 'problem' that occurs in one scape does not necessarily ask for a solution in the same scape. Further use of the term 'space' in this article should be understood as described above.

Towards a definition of spatial quality

The framework of space as presented above can be useful in the analysis of space. It helps, for instance, to understand some disagreements that arise when talking about spatial quality. Conflicting preferences in different scapes of the same space can create disagreement or feelings of injustice, especially in processes of change. Creating a new road connecting two municipalities, for example, can have a clear use in terms of traffic-flow (matterscape), but can be much opposed by people living in the area since it will disrupt the landscape they feel connected to (mindscape). In this

example, a proposed intervention in the matterscape conflicts with opinions in the mindscape. To reveal these type of conflicts, discussions about the quality of space should always take into account information about all three scapes and consider them in equal value.

Although the concept of mind- matter- and powerscape has demonstrated its usefulness in giving us a more comprehensive language to analyse, describe and discuss space as an integrating concept, the framework is not readily applicable in practice when working towards an intervention. It will never answer the question on how to actually change space to increase its meaningfulness, liveability or opportunities for self-development. In the following part of this paper, we therefore suggest a way to operationalize spatial quality based on different 'socio-spatial themes' distilled from a literature study. We started to call these 'themes' *building blocks* of spatial quality.

The most important characteristic of spatial quality might be that it will never be reached as a sort of final picture but should always be conceived as a process. Since space itself is constantly changing, as well as its users, stakeholders and their personal preferences, spatial quality itself should be a continuous process as well.

PART 2 - SPATIAL QUALITY AS A FRAMEWORK FOR ANALYSIS AND INTERVENTION

Many different architects, urban planners, sociologists, anthropologists, etc. have already made suggestions on how to increase (specific characteristics of) the quality of space (Blokland, 2009; Coeterier, 1996; Gehl, 2011; Gibson, 2014; Hall, 1988; J. Jacobs, 1961; Kaplan, 1987; Newman, 1972; Segers et al., 2013; Soenen, 2006; Van Damme, Matthyssen and Foré, 2014;

Van Damme et al., 2017, etc.) The list below gives an overview of some of these ideas, which we hope can be an anchor or starting point while discussing and deconstructing the complexity of spatial quality.

18 Building blocks of spatial quality

1. **Complexity:** the variation, diversity, amount and density of elements in a space influences its experience. Complexity has a direct influence on the readability (10) of a place.
2. **Useability:** the way in which a space offers opportunities for different uses. Can and may one do in space what one wants to do? It is also the perceived usefulness of space for oneself, others or groups of people.
3. **Coherence:** the way in which different elements in space function as a whole. This means biotic and abiotic elements, as well as the activities and uses of a space: are they in the right place? Coherence can also mean whether a space feels as one coherent entity or not.
4. **Mystery:** the promise for new information when moving through or exploring a space. Depending on the general atmosphere or feelings, mystery can be perceived as positive (a potential new vista in a walk) or negative (an unknown sound in a dark forest at night).
5. **Manageability:** the ease with which a space and its functions can be sustained in a controlled way over time, without asking for excessive maintenance.
6. **Accessibility:** the freedom with which a person can enter, move through, or leave a space. The presence of physical, social, or mental barriers or processes of exclusion. This should always be seen in the light of desirability of accessibility of a space.

7. **Uniqueness:** the way in which a space is different than other spaces; what makes the space a place. Uniqueness is also the (symbolic) meanings a space holds and the stories that are connected to it. Typical physical characteristics as well as the history of a space can also be part of its uniqueness.
 8. **Ownership:** the opportunities that a space holds for people or groups of people to be able to (temporarily) claim a space, and the desirability of this opportunity. A sense of ownership helps in creating a sense of responsibility for a space.
 9. **Beauty:** beauty has always been recognised as one of the main things to influence the appreciation of space, but is often written off as subjective in discussing space. Beauty might be in the eye of the beholder, but it is certainly something that needs to be considered.
 10. **Readability:** the ease with which one can easily orient and move in a space, and with which one can memorise a space. Also: the correlation between the physical manifestation of a space and how one expects a certain space to look.
 11. **Green and water:** the presence of natural, green elements, water and organic shapes in a space can improve its appreciation.
 12. **Resilience:** the capability of a space to function properly during and after natural, societal or environmental shocks, stresses or changes.
 13. **Sustainability:** the way in which a space has use for the current generation, without endangering the needs of future generations. One meaning given to sustainability is putting 'planet' before 'people' before 'profit' in any given question.
 14. **Sensory qualities:** the experience of space is not only visual but multi-sensory. If a space can offer a pleasing experience in all of the senses, this adds to the appreciation of it. A negative experience of one sense can diminish the quality of the multi-sensory experience.
 15. **Social contacts:** whether or not a space creates, supports or denies desired opportunities for social contact of different kinds, influences the appreciation of a space.
 16. **Vitality:** the amount of 'activity' or 'life' in a space, not only caused by human activity but also movement by fauna, flora or abiotic elements like water. Appreciation depends on the desired amount of activity: is there need for a quiet, still place or rather a stimulating, vibrant place?
 17. **Scale / context:** the way in which a space is tuned to its broader context, and the way the smaller elements of a space are well adjusted to each other (A house for example cannot be seen as a detached entity, but needs to be considered in relation to its broader environment and the facilities provided). A correct scale also means attuning the proportions of a space to its use and users (the human scale).
 18. **Safety:** the objective or experienced safety of a space has a direct influence on the appreciation of a space and people's behaviour.
- Building blocks as node, forum and tool for analysis and intervention in space**
1. The building blocks can be considered as **nodes** between the analysis of space and the intervention in space. Their specific meaning in a space can be defined by all three scapes.

2. The building blocks can also be seen as a tool for analyses and intervention. On one hand, a building block can be used to investigate a place as it is currently perceived and appreciated. On the other hand, the theories from which a building block is composed can be used to formulate interventions in order to achieve higher spatial quality. An intervention in a space does not need to be physical (matterscape), but can also be regulatory (powerscape), activities or change of perception (mindscape).
3. Intervening in a space usually involves or affects many stakeholders. Because all building blocks focus on a certain aspect or characteristic of space, they can be useful as an interdisciplinary and participatory forum for dialogue. Different perspectives and ideas, can be brought together for discussion by all users, stakeholders and professionals involved. This means that the content of each building block needs to be understandable by all parties involved.

CONCLUSION AND FURTHER RESEARCH

We started this paper by stating the need for meaningful, livable and supporting environments, especially for the so called vertical kids. Since we are interested in how to increase the 'spatial quality' of these vertical housing environments, we have suggested the use of a multidimensional framework of space (Jacobs, 2004) and subsequently explained our building blocks of spatial quality for analysis and intervention in a space.

In the next steps of our research, we plan to give these generic building blocks for spatial quality a more

context-specific interpretation by conducting participatory research with children and teenagers living in vertical housing environments. By coding these conversations, we will further refine and adjust the building blocks, so they will become more applied to these types of environments and the children and teenagers residing in them. We hope this applied framework of space and spatial quality can contribute to the meaningfulness, liveability and opportunities of vertical housing environments.

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NOTES

¹ By analogy of Whitzman and Mizrahi (2009) the terms 'vertical living kids' and 'vertical housing environments' are used, referring to any type of 'layered' housing, including low-, medium-, to high-rise environments.

TABLES AND FIGURES

Table 1. Amount of families with children and teenagers in Flanders according to 2 different surveys

GWO 2013		Type of households		Total
Households with children (-18)		Households without children		
Housing Type	Single family house	1 362	1 962	3 324
	Appartements (including service flats)	284 (17,3% of total households with children)	1 177	1 461
Total		1 646	3 139	4 785
Woonsurvey 2005		Type of households		Total
Households with children (-18)		Households without children		
Housing Type	Single family house	1 959	2 360	4 319
	Appartements (including service flats)	190 (8,8% of total households with children)	633	823
Total		2 149	2 993	5 142

Note: due to the small numbers of respondents involved in these surveys, it is necessary to interpret these numbers with a margin of error of 8%. The tables were acquired on the 8th of May 2018, in an email exchange with a policy officer of the Flemish agency of housing – department of strategy and research.

Table 2. Amount of children per housing typologies in the city of Ghent

	Other	Buildings and flats with apartments	Commercial buildings	Row houses	Half-open houses	Single houses	Undefined	Total
Total	836	8 556 (17%)	2 124	26 060	6 497	5 414	43	49 530

Note: the original table contains information about each individual area in the city of Ghent, which is not included in this abbreviated version of the graph. This made it possible to calculate the percentage of children and teenagers in vertical housing the 19th century area of the city. The table was acquired on the 24th of April 2018, in an email exchange with an officer of the department data and information of the city of Ghent.

The Sociobiological Method: Conceiving Urban (Landscape) Theory Through the Influence of Biology

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Keywords:

ecological urbanism, sociobiology,
landscape architecture, history, Belgium

ABSTRACT

During the immediate aftermath of the German invasion in Belgium in 1914, Belgian architectural and landscape professionals organized themselves in unoccupied countries to structure a common agenda to rebuild Belgium. During this exile period, Louis Van der Swaelmen, a landscape architect and self-proclaimed urban planner, wrote a book on the reconstruction of his home country, linking the rebirth of Belgium to the development of a so-called sociobiological urbanization theory. In this book, Van der Swaelmen proposed to develop a practice of urban planning based both on an objective and scientific survey method, and on a harmonious integration of the natural and man-made environment. By designing some garden cities around Brussels in the 1920s, he tested his theoretical framework, interlinking its spatial layout with the existing topography. Today, in the wake of an environmental crisis where landscape architects again envision a central role for themselves, these disciplinary questions resurface on the research agenda. This article therefore digs deeper into the issue of adopting biological methods and metaphors in landscape architecture by analyzing how this sociobiological theory was developed. By retracing the influences of biological work onto his design practice, it defines what it means to work with a biologically-based urbanism, and reframes some key question in ecology, urbanism and landscape architecture today.

INTRODUCTION

In a text called “the urbanistic science and its method”, Belgian landscape architect and self-proclaimed urban planner Louis Van der Swaelmen (1886-1929) outlined what he thought would be the basis of “urbanism as a science about the city” (Van der Swaelmen, ca. 1920a). Written during the 1920s, it showcases how architects, urbanists and landscape architects at work at the start of the 20th century tried to construct urbanism as a mature science. Van der Swaelmen criticized what he called the “historical method” in urbanism, as the chronological study of events that are of interest for urban design. This “backward-looking” method, did not offer any useful tools for direct application, and made it impossible to synthesize different viewpoints relating to the city. As a remedy, Van der Swaelmen put forward the application of the “natural method of the physical sciences”, as a way of scanning “the biology of the city”.

Louis Van der Swaelmen was particularly well placed to help shaping this scientific project. During the outbreak of the first World War, Van der Swaelmen fled to the Netherlands, and ‘turned’ towards urbanism as his main professional business. This turn was ignited by his wish to ‘rebuild’ Belgium after the large-scale destructions caused by the war, also rethinking the structure of Belgium cities in the process. In 1916, he purposefully wrote the book “*Préliminaires d’Art Civique*”, related to the “clinical case of Belgium”. This clinical case both referred to the problem of destruction by war, as well as the problem of urbanism and urbanization in the country ignited by the industrial revolution. Van der Swaelmen believed that during the industrial revolution, the bond between the ‘subject’ and its surroundings had been lost and should be re-established (Notteboom, 2009). In this book, he linked this recoupling of people and

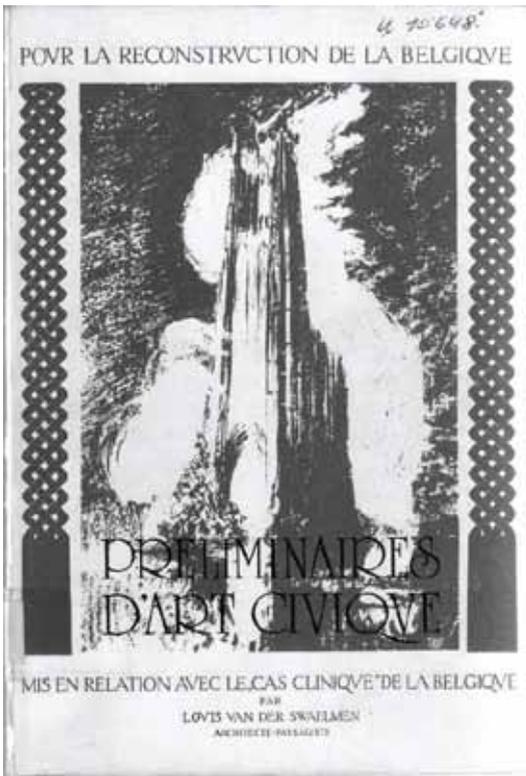


Figure 1. Cover of *Préliminaires d'Art Civique*.

their environment to the formation of a 'sociobiological' urbanism, connecting both social and environmental sciences to achieve a holistic urban theoretical framework. Practically, he based the design of cities on biological laws and on geographical topography, connecting the layout and growth of the city to its topographical infrastructure and environmental surroundings. During the 1920s, Van der Swaelmen tested this framework as a practicing urbanist and landscape architect by designing some noteworthy *quartiers-jardins* around Brussels, like *Le Logis*, *Floréal* and *Kapelleveld* (Smets, 1977). As his sociobiological theory instructed, the creation of these *quartiers-jardins* would be based on the movement of the terrain, while in addition, Van der Swaelmen thought that extending the historical city of Brussels by garden suburbs would be an organic way of enlarging the city (Van der Swaelmen, 1929).

In this essay, the theoretical

framework made by Van der Swaelmen is used to question the "organistic perspective on landscape" (De Block, 2016, p. 369) that is present in contemporary ecological design theory. Indeed, also today different forms of landscape architecture in conjunction with urbanism-like ecological urbanism- are trying to "incorporate and accommodate the inherent conflictual conditions between ecology and urbanism" (Mostafavi and Doherty, 2010), but although some attempts have been made in writing a history of ecological design, David Haney pointed out that generally there appears to be a form of "historical amnesia", because "advocates [of ecological design] want to appear new and innovative, acting as a kind of avant-garde" (Haney, 2010, p. 5). Similarly, other authors have stressed the fact that ecological design implicitly seems to have a "nostalgia for the present", with a "lack of patience for the past" (Adams, 2010, p. 2). This article therefore runs counter to that historical amnesia and retraces the long-existing linkages between ecology/biology and urbanism in history. It shows how during the end of the nineteenth and beginning of the twentieth century the sciences moved towards a more context-driven analysis of biological life, opening the way for landscape architecture and urbanism to use these theoretical frameworks to reinvent and re-fuel their discipline, culminating in the design of multiple garden cities around Brussels and throughout Belgium. This analysis shows how organicist thinking and philosophical naturalism that are present in ecological design today, are also lingering in the early history of ecology and design. In this essay, firstly, a short biographical introduction to Van der Swaelmen and his work will contextualize the case. Secondly, Van der Swaelmen's work will be linked with a history of ethology, a sort of proto-ecological theory developed at the end of the 19th century. The conclusion

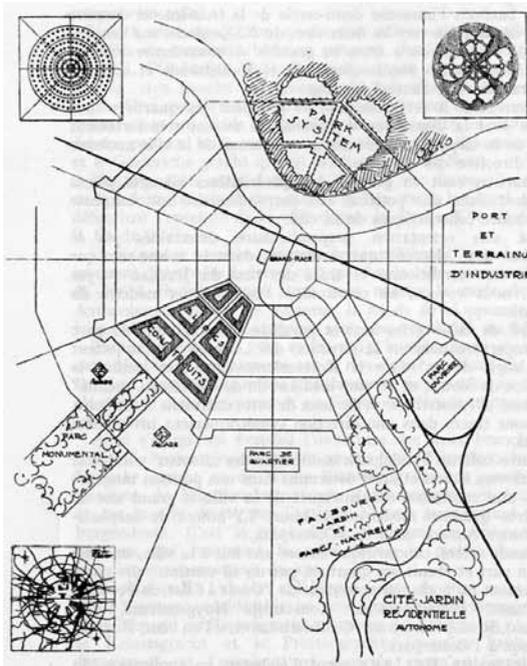


Figure 2. the concentric city as an organism in *Préliminaires d'Art Civique*.

will relate Van der Swaelmen's work to some present-day questions in ecology and design.

LOUIS VAN DER SWAELMEN AND HIS TURN TOWARDS URBANISM

Before the First World War, Louis Van der Swaelmen was active as a landscape architect and a writer, outlining new theoretical frameworks for landscape architecture (see: Notteboom, 2009). He for example founded an association called *Le Nouveau Jardin Pittoresque* (Notteboom, 2012), and tried to redirect the practice of landscape architecture towards a more societal role, “[educating] the workers’ class by means of the garden” (Notteboom, 2017, p. 3).

At the start of the First World War, Van der Swaelmen fled to the Netherlands. During this exile, he started to consider certain ‘urban’ questions like the housing problem, and wrote the book *Préliminaires d’Art*

Civique (Van der Swaelmen, 1916), where he compared cities to organisms, explaining that houses were like cells, parcs like lungs, streets like veins. The city therefore grew like an organism, following biophysical laws. This is the basis of his *sociobiological* theory, intermingling biological and social sciences to better understand the functioning of cities. Secondly, he used biological sciences, in conjunction with geography, to be a basis for urban design. Urbanism and planning should be guided by the knowledge that was constructed by other disciplines like biology and geography. These two layers in his biological conception of the city were linked to the development of biology during the end of the 19th, and beginning of the twentieth century, which constituted a shift from a laboratory-based to a more contextualized scientific practice. In the next section, I will explain why these new practices were in a certain sense ideal to be translated into urban design.

INTERLINKING ETHOLOGY AND URBANISM: FÉLIX LE DANTEC AND JEAN MASSART

During the 19th century, biological sciences were in the grip of the laboratory. As a critical reaction, a “new type of field biology” came about, called ethology, criticizing these “excesses of late nineteenth-century laboratory culture while at the same time integrating some aspects of its methodology” (De Bont, 2010, p. 4). De Bont explains that ethology was not a unified scientific theory, but rather a shared “scientific attitude” that put “the interactions between organisms and their environment on the agenda” (De Bont, 2010, p. 4). Alfred Giard, a French zoologist, was the central figure in the network that formed around ethology, and their research centred around the influence of the milieu on living beings, which also meant that form and function were equally important (De Bont, 2010,



Figure 3. Geobotanical map of Belgium, by Jean Massart.

p. 8).

One of the most famous students of Giard at that time was Félix Le Dantec. Le Dantec was not a practicing 'ethologist', but a philosopher of science. He was a neo-Lamarckian, and favored a distinctively mechanical comprehension of natural processes (Loison, 2011). Le Dantec's world-view assumed that the environment was the key influencer in biological evolution theory: the organism was a "a passive object modelled from the outside" (Loison, 2011). The individual could therefore never be understood outside of its milieu (Aubry, 1909). Although he is largely forgotten today, he was an important publicist and popularizer of biological science in the French speaking community at the turn of the century. In a short article promoting

Van der Swaelmen's work, André De Ridder stated that the "application of the definition of life to the city" was based on the biological theory of Le Dantec, who Van der Swaelmen "loved and followed with much conviction" (De Ridder, 1920). In his notes, Van der Swaelmen also stated that urbanism needed an "experimental base of certainty, [so] we need to impose a way of studying that runs parallel with the natural order" (Van der Swaelmen, ca. 1920b), p. 10). It is therefore necessary to understand the "biology of cities", by making a report about the "anatomy and the physiology" of the city, without forgetting "life". To do this, the "biological theory of Le Dantec" should be applied to the city. He quotes Le Dantec, saying that "life, in living, creates a specific form". Van

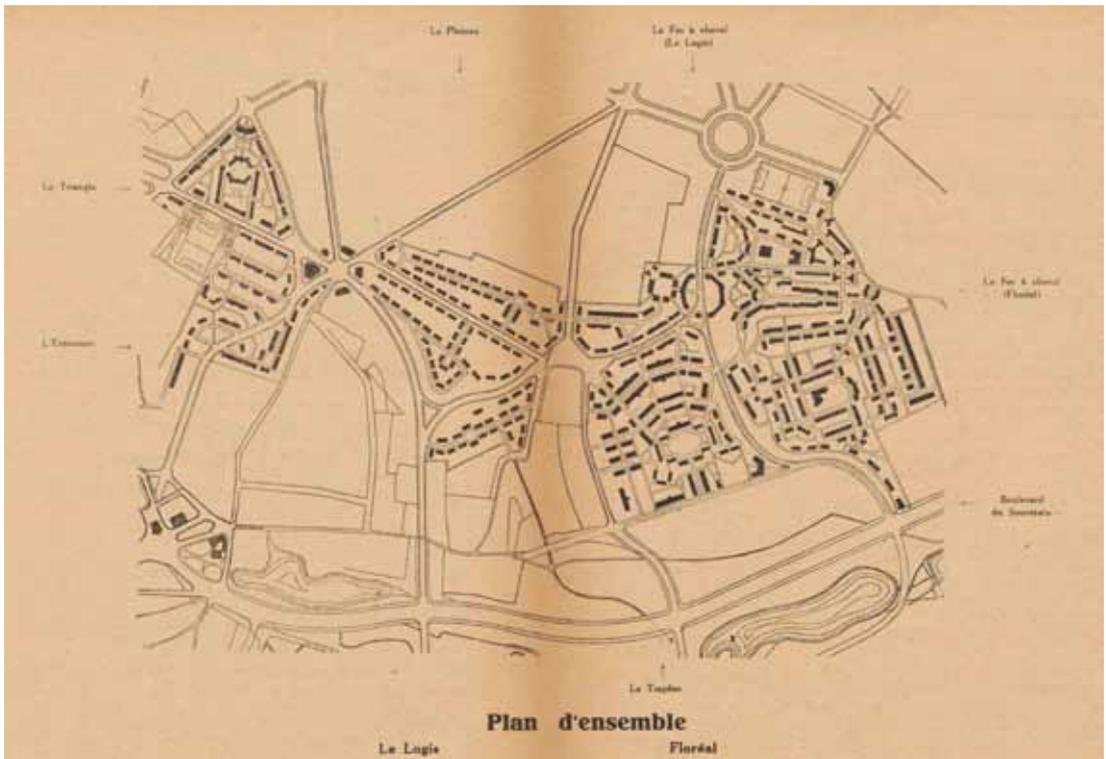


Figure 4. The Garden Cities of Le Logis-Floreale.

der Swaelmen understood that this implied an “absolute determinism”. In a few guidelines that he made for these classes, he also stated that he should compare all this with the creation of a habitat by social animals, like anteaters, clearly relating his work to that of the ethological movement in biology (Van der Swaelmen, ca. 1920b, p. 10).

In his magnum opus, *Préliminaires d'Art Civique*, Van der Swaelmen is less inclined to make references to the sources he uses to create his biological theory of the city. Still, the ethological basis of Le Dantec's theories are apparent throughout the book. He for example states that the importance of the geographical context, which has its “imprints” in the future destiny of the city, “fatally determines the internal law of its subsequent development” (Van der Swaelmen, 1916, p. 9), giving the same importance to the *milieu* as ethology does. Interestingly, Van der Swaelmen also adhered to a teleological worldview by imposing

these biological theories on the city. By looking at the theories of Lamarck and Darwin, the notion of progress towards an ideal (although an ideal that could never be achieved) was clear: “all things change like they are evolving towards a perfected state”. Van der Swaelmen stated that also in human history this was the case, and two basic human instincts fuelled this evolution: “the wish for the useful and the need for the beautiful” (Van der Swaelmen, 1916, p. 9). Like the ethological movement, he therefore thought that usefulness was linked to beauty, as function was linked form. Both instincts were letting the organisms (or cities) evolve towards a *état de perfection* with its surroundings.

In this context, for Van der Swaelmen, knowledge about the ecological infrastructure to study of the city was key to determine the form of spatial design. Therefore, he used the work of another ethologist and botanist, Jean Massart (1865-1925), to rethink future urban design methods.

CONCLUSION: SOCIOBIOLOGY AND THE ORGANIC SYNTHESIS

Van der Swaelmen proposed to anchor spatial development in what he called the “physiognomy” of the territory, determined by physical circumstances, in interaction with the need of man. This system was based on a classification of the Belgian territory that Massart made of the Belgian territory in geobotanical districts (Van der Swaelmen, 1916). Massart his work was fixated on the development of the concept of geobotanical regions, connecting vegetation to geographical location. In a series of publications Massart divided Belgium into these geobotanical regions, documenting it further with photographic material (Notteboom and Uyttenhove, 2018). In his conception of the geobotanical region, Massart also included cultural practices, exemplified by the extensive use of human-made landscapes in his photographic material. Massart was also at the forefront of more explicit surge towards a sociobiological conception of science. Together with sociologist Emile Vandervelde, he wrote a book called *‘parasitisme organique et parasitisme social’*, tracing analogies between organic and social parasitism (Massart and Vandervelde, 1893; Thomas, 2003, p. 113). Although Massart never explicitly used the term sociobiology, and Thomas refers to his work as ‘social parasitism’, it is clear that this kind of holistic thinking influenced the use of biological science in urban theory by Van der Swaelmen. Only in an article written some years after *Préliminaires* did Van der Swaelmen started using the word *sociobiology*. In this article, stating that urbanism should rest on two pillars: the *sociobiology of cities*, and the *paysage urbain*, the urban landscape (Van der Swaelmen, 1921) which was an expression of the “organic synthesis of functional elements” (Bodson *et al.*, 1919).

Van der Swaelmen tested his ethological approach throughout the 1920s, when he designed some noteworthy garden cities around Brussels like *Le Logis*, *Floréal* and *Kapelleveld* (Van der Swaelmen, 1929). Here, he based his designs on the natural topography, resulting in road network that “was, to remain organic, dictated by the conditions of the terrain,” which lead to a “spontaneous, unsearched and picturesque layout” (Van der Swaelmen, 1925). This essay showed that behind this picturesque and organic lay-out, a complex translation of theories and ideas from biology to landscape architecture and urbanism took place. Van der Swaelmen used biology to conceptualize the city as a *sociobiology*, but also as a resource during the act of designing, by basing his work on the topography of the sites that he intervened upon. This divide in his use of biology also matches the different influences unto his work: the sociobiology of cities looks at the city as a biological organism, thinking of the house as a cell, of the parc as lungs, etcetera, which can be related to the work of Le Dantec. Secondly, the *paysage urbain* is related to the work of Massart, who documented this organic synthesis by combining cultural and natural images in his work on the geobotanical regions from Belgium.

This recoupling of city and environment is also reminiscent of today’s design modus. Adams (2014) argued that “under ecological urbanism, form now ‘emerges’ as an extrusion of the patterns and textures ‘naturally’ delineated on site” through a design logic that liberates “form from the ‘artificiality’ of human design”. Recent design practices, like *Metropolitan Landscapes* in Brussels, are examples of this recoupling of design and ecology, where the ecological structure

is again the fundamental anchor of the urban project (De Block *et al.*, 2018). In this project, open landscapes are reframed as a new paradigm for urbanization, bypassing the sociopolitical reality of planning in a complex city like Brussels. Although the ecological frameworks of these kinds of designs appear to be straightforward, and remain unquestioned, a reconstruction of the knowledge transfers and influences from other sciences that precede their production are essential if designers and academics try to grasp and produce meaningful ways of coping with the present (and future) environmental and social questions of the increasingly urbanized world.

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Illustrating How Research-by-Design Can Inspire a Transition when Dreams are in Conflict with Reality

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Quadruple Helix innovation model, sustainable land use, academia, gardenscape, landscape architects

ABSTRACT

Flanders is facing a conflict between the traditional housing dream and the need for a more sustainable land use model. In order to address this conflict, an integrated, multi-sphere approach is necessary. Referring to the Quadruple Helix innovation model, we claim that this will entail working at the same time on adjusting people's housing dream, re-orienting spatial policies, providing valid alternative housing typologies and developing new strategies and typologies and educating the professionals of the future. As landscape architects are to be pre-eminently involved in the realization of the necessary transition in thinking about and dealing with space, at the Erasmus University College Brussels, the course of landscape and garden architecture and the Centre of Expertise tuin+ are focusing strongly on the interaction between research & education and between academia & practice. In this contribution we are presenting three cases of research-by-design carried out with students and relating them to the Quadruple Helix innovation model. We are showing how introducing questions from the field into the design studio and using the theoretical frameworks developed in the Centre of Expertise as a basis in the search for innovative and future-oriented spatial design and management solutions with the students, can help addressing our conflict.

INTRODUCTION

Context

Flanders is facing a conflict: as the majority of the Flemish still cherish the ideal of a detached house with a garden in the countryside (Pisman et al., 2011), we understand today that this traditional housing dream is becoming harder and harder to realise. From a financial point of view rising labour costs, new (energy performance) regulations and scarcity of building plots are increase the building costs and also rents are rising significantly. From a spatial point of view Flanders can be considered as one large (sub)urban area (Kesteloot, 2003), finding a piece of 'genuine countryside' in this 'nebular city' becomes harder and harder. However, not only is the traditional housing dream becoming more and more difficult to realise, we are also starting to see that it is even irresponsible to keep on 'consuming' our landscape in this way. Apart from causing mobility as well as logistic problems, our current land use model also endangers the functioning of the ecological system and the performance of green and blue networks. Amongst others, this is leading to a loss of biodiversity, water management problems, urban heat-island effects and it is even being related to health issues such as respiratory problems, an increasing number of allergies and phycological issues, like the 'nature-deficit disorder' described by Richard Louv (2005). As the population density of urbanised areas in the Flemish region is rather low compared to that in other Northwest-European regions (Kesteloot, 2003), the problem is not so much that there are no open and green spaces left, but that the remaining open and green spaces are very scattered and that these green shreds are seldom recognised as natural areas, leaving them unprotected form further allotment. We have reached a point where we do not have big cities, nor compact villages and almost no nature

left (Vilt, 2015). And, while striving to realise the traditional housing dream, residents tend to continue further and further shredding our landscape.

To get rid of this conflict and make the transition towards a more sustainable land use model, an integrated, multi-sphere approach will be needed. Contemporary society becoming more complex, the number and scope of spheres to be included in innovation-generating processes are increasing (Cavallini et al., 2016). This complexity forms the basis of the Quadruple Helix model of innovation (van Winden and de Carvalho, 2015; Cavallini et al., 2016) (Fig. 1). The thesis of this model is that, in order to realise innovation, industry, academia, government and civil society, while still fulfilling their traditional roles, also need to collaborate dynamically and structurally with each other. The

Applied to the issue at hand in this paper, in order to address the conflict between the traditional housing dream and the need for a more sustainable land use model, we will need to focus at the same time on: adjusting the traditional housing dream (civil society sphere), gathering the political courage to re-orient the spatial policies that supported suburban sprawl ever since the 19th century (governmental sphere), providing valid alternative housing solutions (industrial sphere) and developing new visions and strategies and educating the professionals of the future (academic sphere).

Focus

In this paper we are zooming in more closely on work to be done in the academic sphere (in relation to the other spheres). Moreover, we are specifically looking from the perspective

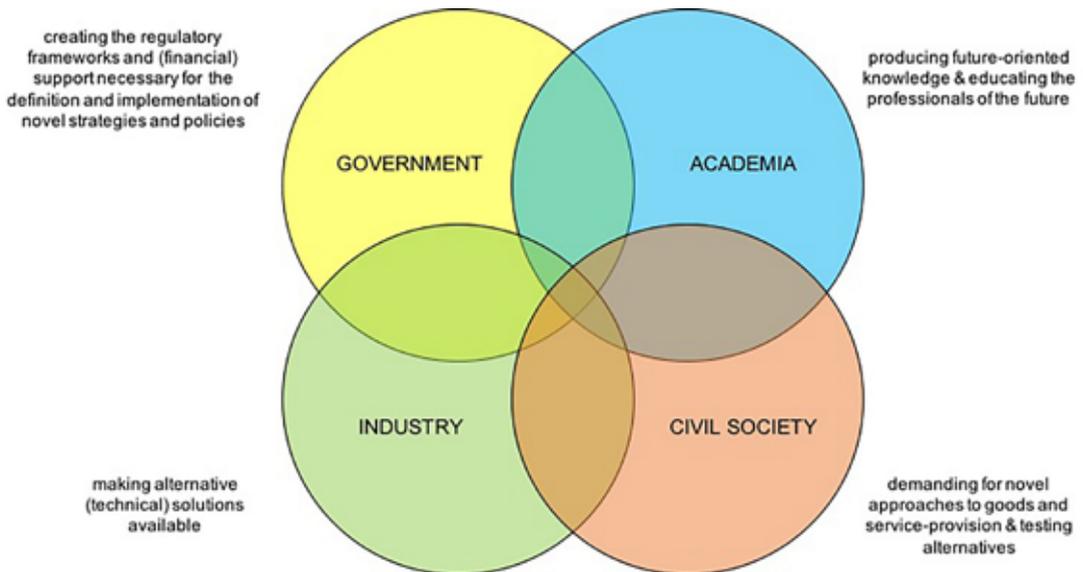


Figure 1. The Quadruple Helix innovation model: an integrated knowledge creation system in which all four spheres are taking up active roles. Image adapted from Cavallini et al. (2016).

helix (referring to the structure of DNA strings) is used as an image to illustrate the complex network of relationships between these different spheres in this trans-disciplinary, more reflexive, non-linear, complex and hybridized mode of knowledge creation (Yawson, 2009).

of garden and landscape architecture. All too often open space is seen as 'what remains besides and in-between the built-up space', as 'the surplus' (Van Damme et al, 2017). But actually, the landscape is the very basis we are working on. And we should therefore instead take this as our starting point.



Figure 2. Current situation of the Tarzanboskes (study-area marked in yellow, project-area marked in red, city owned part marked by striping). Image from Google Maps, adapted by the authors.

We have to start thinking from within the open space and take into consideration the natural systems and structures in all our interventions. Based on this idea, we claim that garden and landscape architects have an important role in addressing the conflict between the traditional housing dream and the need for a more sustainable land use

model and that they are thus to be pre-eminently involved in the realisation of the necessary transition in thinking about and dealing with space. One of the aims at the Erasmus University College Brussels is to educate garden and landscape architects who are aware of the crucial role they can play in planning, shaping and managing the semi-public, semi-private and private open and green spaces - or the gardenscape - of the future. Therefore, within the course of landscape and garden architecture, together with the Centre of Expertise tuin+, we are focusing strongly on the interaction between education, research and practice. In this contribution we are presenting a number of cases of research-by-design projects carried out with students, that fit in this interaction, and we are situating these within the afore-mentioned Quadruple Helix innovation model.



Figure 3. Student design proposal for the Tarzanboskes: integration of a water element and a cycling and walking path, constituting a separation between the semi-public zone along the private gardens and the completely public wooded zone along the road. Image by Jeffrey Thijssen.

MATERIAL AND METHODS

Based on the finding that 9% of the Flemish land is used as private gardens (Dewaelheyns, 2014; Van Gossum et al., 2016), the research at the Centre of Expertise tuin+ is focussing on the 'gardenscape', which is consisting of the diversity of private, semi-private & semi-public open and green spaces so omnipresent in the Flemish 'nebular city'. We start from the idea that - if the energy of all the individual gardeners, owning, using and/or maintaining these spaces, would be steered towards a 'resource by small actions' (Dewaelheyns, 2014) - the gardenscape could, play a significant role in the transition towards a more sustainable land use. In order to activate this resource, tuin+ is developing innovative and future-oriented design and management strategies for private, semi-private & semi-public open and green spaces, through practice-oriented design research. The focus of the Centre of Expertise tuin+ is on (1) increasing knowledge on the gardenscape, (2) evaluating and defining which role exactly this could play, (3) formulating strategies and recommendations to realize this and (4) testing and illustrating these strategies and recommendations through pilot projects and action research. The final aim is to improve



Figure 4. Current situation of the garden surrounding the service flats complex in the Fonteinstraat, in Antwerp (project-area marked in red). Image from Google Maps, adapted by the authors.

the ecosystem-services delivered by gardens (in terms of biodiversity, climate, water, ... but also on a social level e.g. through shared and multiple use of space). In this light we defined three priority categories of 'gardens with a plus', namely: 'eco-shreds' (*eco-snippers*), 'institutional gardens' (*institutionele tuinen*) and 'collective gardens' (*collectieve tuinen*) (note that for each of these several sub-types can be identified).

Within the course of landscape and garden architecture at the Erasmus University College Brussels, several initiatives are being taken to link research & education and academia & practice. Examples are the practice-oriented research lectures that are regularly organised on the campus by the Centre of Expertise and that are open to both students and professionals and the possibility for students to do an internship at the Centre of Expertise. In addition, the theoretical framework developed by the Centre of Expertise tuin+ is also integrated in the curriculum of the course of landscape and garden architecture. This means for example that the above-defined priority categories are used as themes in design studios, in bachelor's theses and/or in theoretical assignments and that the knowledge gained through research projects is translated into the courses. When possible and relevant, questions from the field (government, business & civil society) are also integrated into the curriculum, in order to conduct the search for innovative and future-oriented design and management solutions for the gardenscape together with the students and the tutors. In what follows we will present 3 examples of this type of interaction and integration.

EXPERIMENTAL RESULTS AND DISCUSSION

The cases presented below are chosen to represent a variety of interactions: between academia and the government



Figure 5. Student design proposal for the garden surrounding the service flats complex in the Fonteinstraat: inclusion of the garden in the urban narrative: reorientation (the back of the site becomes the new front) and connection of the site to the local bicycle network, design of a public border, and creation of a semi-private character (through the design of a flower garden). Image by Björn Bracke.

sphere (case 1), between academia and the industry sphere (case 2) and between academia and the civil society sphere (case 3). Each of these fits in one of the three priority categories of 'gardens with a plus' defined by the Centre of Expertise (eco-shreds, institutional gardens and collective gardens). All of the cases also include a relation to the 'housing' theme.

Case 1

The first case is that of the 'Tarzanboskes' in Hoboken (Antwerp). This case is an example of an eco-shred. The issue at hand was brought to us as a question from the Antwerp government.

The subject of this exercise was the redesign of a residual urban greenspace, under great urbanisation pressure. The site is surrounded by transport infrastructures on three sides (2 busy roads in the North and West and a big crossroad, including the 'Hoboken P+R Schoonselhof' tram stop in the East). In the South it is delineated by a row of private parcels, with terraced houses. The ownership of project-area is divided amongst a number of private parties (including the NPO Natuurpunt, which owns and maintains a small part of it). The City of Antwerp also owns a small part of



Figure 6. Current situation of the gardens surrounding the Regentpark apartments in Antwerp (project-area marked in red). Image from Google Maps, adapted by the authors.

the site, but over the years owners of the adjacent private parcels have claimed parts of this area, expanding their backyards onto it. Besides this, inhabitants of the surrounding neighbourhood also claimed an area in the north-eastern part of the site for car parking. As there are also some 'shady activities' (like illegal dumping and drugs dealing) going on, the place is a bit a nuisance to the neighbourhood, hence name: Tarzanboskes (Fig. 2). The larger study-area (mainly the sports infrastructure situated in the northwest of the study area) is facing some water management problems due to improper handling of the natural run-off of water in the environment. Although, as a typical residual area, the site has few qualities today, it could potentially play a role as a 'green link' between the large and green Schoonselhof cemetery and the Sorghvlied park and programmatically, it could also play a role for the nearby school.

The aim of the research-by-design with the students was to formulate a future oriented vision for the study-area and to make a realistic design proposal for the project-area. The design had to take into consideration the expectations of the different stakeholders (the city, the site owners, the inhabitants of the surrounding neighbourhood, the school and the users of the nearby park, cemetery and sports infrastructure), the highly dynamic context (with roads, crossings and the tram stop) and the



Figure 7. Two student design proposals for the gardens surrounding the Regentpark apartments. Left: demarcation of private zones for the residents, for which the function is left to the residents, replacement of the above-ground car parking by terraces and gardens and accentuation of a public passage, resulting in a more (semi-)private character for the rest of the terrain. Right: provision of private gardens, situated near to the apartment buildings, surrounded a public (walking) park, separated from the private gardens massifs of plants). The private gardens are not programmed and can thus be used freely by the residents, also only a minimum of paths is defined (rather suggestions are made by mowing). Images by Ulrika Schouteren (left) and Wolf Rysbrack (right).

relationship between private and public use of space (specifically regarding the claimed public space areas).

Some student designs recognised and valued the site's role as a 'transitional zone'. In these projects, particular attention is paid to the circulation to, from and through the site. The core of these designs is often a path, to which some additional functions such as education, resting or playing might be linked (Fig. 3). In some proposals the informal zone between the private gardens and the public green space is included as part of the design. With the aim to facilitate various types of 'semi-public' uses in this area, it is upgraded through design, clever use of materials and strategic planting.

The result from this case is the development of an innovative and future-oriented vision on, and design proposals for 'eco-shreds', as a specific

category of the gardenscape. The designs show how residual open space shreds can be protected from further allotment by upgrading them to green stepping-stones, linking other existing (private and public) green spaces.

Case 2

The second case is that of the garden surrounding a service flats complex in the Fonteinstraat, in Borgerhout (Antwerp). This case is an example of an institutional garden. The issue at hand was brought to us as a question from the OCMW (the Public Centre for Social Welfare), who is the owner and manager of the space and who in this context we could thus classify as an actor from the 'industry sphere' of the Quadruple Helix innovation model.

The subject of this exercise was the redesign of this garden, situated in a

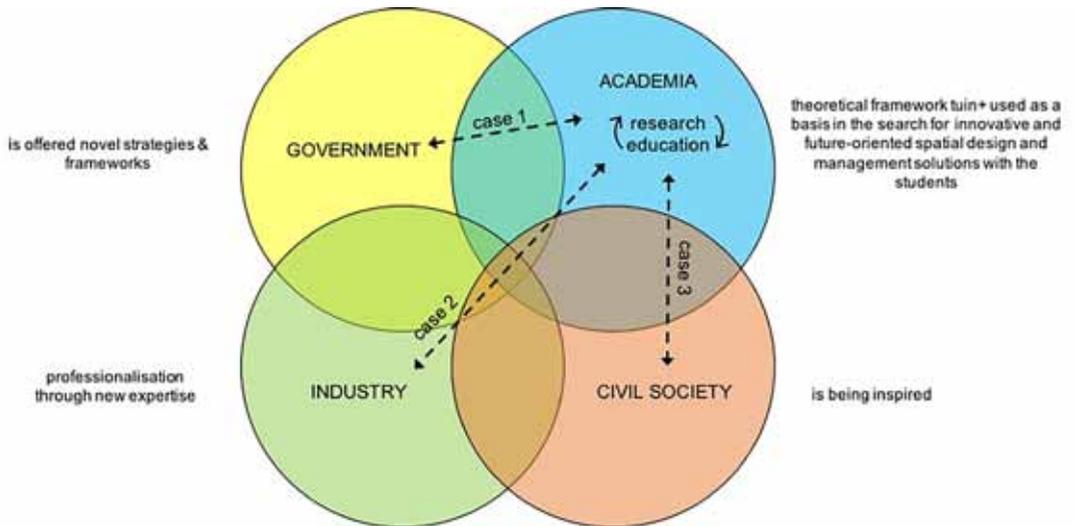


Figure 8. Results of the interaction of the academic sphere with the other spheres of the Quadruple Helix innovation model, in the context of the examples presented above. Image adapted from Cavallini et al. (2016).

densely populated neighbourhood, with a shortage of both private and public open and green spaces. The current garden is a very green but largely functionless space (Fig. 4). Although the place is in se a private property, there is currently an unofficial public use, as the OCMW tolerates young people from the neighbourhood who hang out in the garden looking for a place to meet and relax. However, this is creating a conflict with the service flat residents who (as co-owners and/or tenants) are the ones paying for the maintenance of the garden and are sometimes experiencing the loitering youngsters as a nuisance. The OCMW and the city of Antwerp are open to solve this conflict by making more official arrangements for sharing part of the OCMW garden with the neighbourhood, but they are in doubt about how this could be organised (spatially and practically).

The aim of the research-by-design with the students was to study possible ways of creating a balance between a private and a public use of the garden and to formulate a realistic landscape design proposal, integrating the expectations of the different stakeholders (the site owner, the city of Antwerp, the residents of the flats and the inhabitants of the surrounding

neighbourhood).

Starting from this question, all students tried to preserve and integrate as much as possible the existing greenery, while at the same time introducing more (bio)diversity and structural variation. Some students choose to create a rather clear distinction between more public and more private areas of the garden. These designs often consisted of a more private zone at the core, surrounded by a public outskirts (Fig. 5). The central private garden is often enclosed by a nicely designed fence and well-integrated fence or by a green buffer. But also, other design solutions are sought to separate public and private zones without fencing them, for instance by creating raised private terraces, overlooking the more public garden below. Also, practical suggestions were made on obtaining support for the maintenance of the garden by the city in return for opening (part of) it to the public.

This case shows a shift from the traditional garden design - usually oriented towards privacy and individual use - towards an approach, focussed on shared and multiple use of space. A result from this case is that the OCMW, as the owner and manager of the space,

is offered suggestions on how to keep a balance between sharing their garden with the neighbourhood, while at the same time keeping enough privacy for their residents. It is also interesting that, through this exercise, students are trained to become competent professionals, able to deal with the current challenges in the field.

Case 3

The third case is that of the Regentpark apartments in Berchem (Antwerp). This case is an example of a collective garden. The issue at hand was brought to us as a question from the inhabitants of the apartments, as such it is a question raised by civil society.

The subject of this exercise was the formulation of a vision and design for a former castle domain, redeveloped to a modernist housing area in the 60's (including the division of the garden into seven private gardens, each in shared ownership of the resident of one of the seven housing blocks) (Fig. 6). The reason behind the question is that the community of owners is in need of a clear vision and management plan for the historic trees (out of security concerns, but also due to the need for an unambiguous basis for answering questions from individual residents regarding to perceived 'nuisances' by the trees). Moreover, an underlying reason is that here too there are some conflicts arising in relation to the garden. On one hand there are tensions between the 'older' and 'newer' residents (as the formers see the gardens rather as aesthetic greenery, while the latter see it more as functional) and on the other hand also between the private ownership and management of the gardens and the, up until now, tolerated public co-use (as on the neighbourhood level the gardens are seen as a 'soft mobility link' to the nearby tram stop and the school).

An important objective of all student designs was to restore

unity in the former castle domain by formulating an integral vision for the seven gardens. Each in their own way, the designs were spatial translations of the search for a balance between the private and public use of urban green spaces, surrounding tall residential buildings. Some students carefully designed this balance by providing, often more enclosed, private zones for the residents, semi-private in-between zones and a number of public zones, either scattered throughout the site, or concentrated around a central axis. Planting design, use of materials and varying widths of the (walking) paths are of example used to create a gradient between public and private zones (Fig. 7). As such, in the design proposals the typology of apartment buildings in combination with a lush park that leaves semi-private space for appropriation by the inhabitants is forwarded as a valid alternative to the traditional detached house with a garden.

The result from this case is that society is offered inspiring alternative visions and proposals for their housing environment, inviting them to think outside of the traditional boxes and reconsider their housing dream.

CONCLUSION

The above-described cases show that interaction between education & research results in a mutually reinforcement and that introducing questions from the other spheres in the academic sphere helps developing and testing new strategies and approaches. This approach can thus indeed feed the debate around the necessary transition towards a more sustainable land use model.

The design proposals for the Tarzanboskes illustrated how residual open space shreds can be protected from further allotment by upgrading them to green stepping-stones, linking private and public green spaces. Case 1 thus shows how our approach can

provide the government with novel strategies and frameworks for the planning and management of the gardenscape, in the context of the necessary transition towards a more sustainable land use model.

The design proposals for the OCMW garden in the Fonteinstraat showed a shift from the traditional garden design towards an approach focussed on shared and multiple use of space. Case 2 thus illustrates how our approach can contribute to the professionalisation of the field through the development of novel design approaches and innovative expertise.

The design proposals for the park surrounding the Regentpark apartments are inviting society to think outside of the traditional boxes by offering inspiring alternative visions and proposals. Case 3 thus illustrates how our approach can directly contribute to the adjustment of the traditional housing dream.

Figure 8 summarises these conclusions, linking them back to the Quadruple Helix innovation model.

Finally, we can conclude that our approach is indeed resulting in the education of garden and landscape architects who are aware of the crucial role they can play in planning, shaping and managing the open and green spaces - or the gardenscape - of the future and who will be able to help addressing the conflict Flanders is facing today.

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Towards a Taxonomy of Design Approaches in Landscape Architecture

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ABSTRACT

One of the challenges for landscape architecture students is to determine which design approach is most appropriate for a given situation because each design context and brief differs. The goal of this paper is to guide students in their selection process by presenting a 'taxonomy' of design approaches using design literature and a variety of design projects in landscape architecture and urban design and discuss it with the academic community. We differentiate two main approaches: end-product oriented processes and open-ended design processes. Especially the latter show a broad range of approaches that can only be applied in specific circumstances. To help students get to grips with these circumstances we defined four criteria for discussing the suitability of design approaches for meeting specific design challenges consistently: levels of predictability of both natural and socio-cultural phenomena, spatial scale, and time scale. All approaches we distinguished can be mapped in so-called 'radar diagrams'. Using these 'radars' could help students of landscape architecture in applying the suitable design approaches depending on the project context. Generally speaking, they help the students (being future professionals) to apply design approaches more consciously by adhering to the demands posed by the context of the design project.

INTRODUCTION

During the past decades the work field of landscape architects has changed substantially. Nowadays, a large part of design practice covers

various spatial and time scales and deals with an increasing complexity in natural and socio-cultural contexts (Steiner, 2014). Practice also involves collective processes wherein different perspectives from different disciplines meet (Gailing and Leibenath, 2015; Thering and Chanse, 2011). We have developed a dedicated new BSc course at Wageningen University to cater to an adequate preparation of future landscape architects. This course, 'Concepts and Approaches in Landscape Architecture' (C&A), is taught at the end of the second year in the Landscape Architecture specialization. At that point in the curriculum, students have had a broad array of general courses on environmental sciences that provide substantial knowledge about natural and socio-cultural contexts. They have also gained practical know-how about planting schemes and construction, worked with visualization software and completed their first design studios. These studios are mostly conducted in a 'controlled' environment; students learn to design according to a specific design assignment for a pre-determined location.

The complexities increase, as well as the variety of time and spatial scales, in the subsequent studio classes. It is a challenge for students to determine which design approach is most appropriate for a given situation because each design context and brief differs. Therefore, the C&A course introduces a range of basic concepts and design approaches that address the typical issues that landscape architects, as designers, are confronted with in practice. The aim of the course is to make students aware of different design concepts and approaches. The course gives a rough overview of general concepts that can influence design procedures. Major concepts concern the 'internal factors', i.e. the designer's personal design cognition and the related types of creativity.



Figure 1: Exterior view of the 'Spacebuster'. Raumlabor, <http://raumlabor.net/spacebuster/>

Design approaches that relate to these 'internal factors' are intuitive designing on the one hand, and rational designing on the other. The second set of approaches concerns the 'external factors', or the design context: the type of design brief, the (urban) landscape context, its scale, the factor time, and (un)expected changes and types of stakeholders.

Concepts regarding the 'internal factors', i.e. design cognition and its rational and intuitive aspects, have been covered by the literature (Lawson, 2005; Cross, 2006) broadly. However, the external factors in relation to suitable design approaches in landscape architecture have been discussed sparsely. The external factors that influence a design process are diverse and often hard to anticipate. In the field of landscape architecture, a preliminary categorization of design approaches in the form of the 'landSCAPES typology' (Crewe and Forsyth, 2003) offers a good starting point. However, a more encompassing classification that is based on the variability of design paradigms and external factors seems to be lacking. Therefore, we tried to develop a categorization in the C&A course with which to classify, explain and discuss these approaches that covers various spatial and time scales



Figure 2: Zichizaghi park, Italy . OFL Architecture: <http://www.oflstudio.com/works/zighizaghi/>

and deals with an increasing complexity in natural and socio-cultural contexts. The goal of this paper is to present a 'taxonomy' of design approaches through the analysis of design literature and a broad variety of design projects in landscape architecture and urban design and discuss it with the academic community.

First, we will describe the main categories by which we can distinguish design approaches, i.e. end-product and open-ended focused design. Then, we explain the most common characteristics of open-ended design approaches in categories of predictability of both natural and socio-cultural processes, time scale and spatial scale. Third, we 'classify' and score seven design approaches according to the aforementioned four categories in 'radar diagrams'. In the concluding section we address the added value of our taxonomy for explaining and discussing the use of design approaches in the context of university course work.

TAXONOMY FRAMEWORK

We firstly differentiate two main approaches: end-product oriented processes and open-ended design processes. End-product focused design approaches assume a stable and fixed set of design determinants and do not deal with change explicitly. Built form is often considered as a 'finished' artefact. These approaches are related to the 'creationist' paradigm

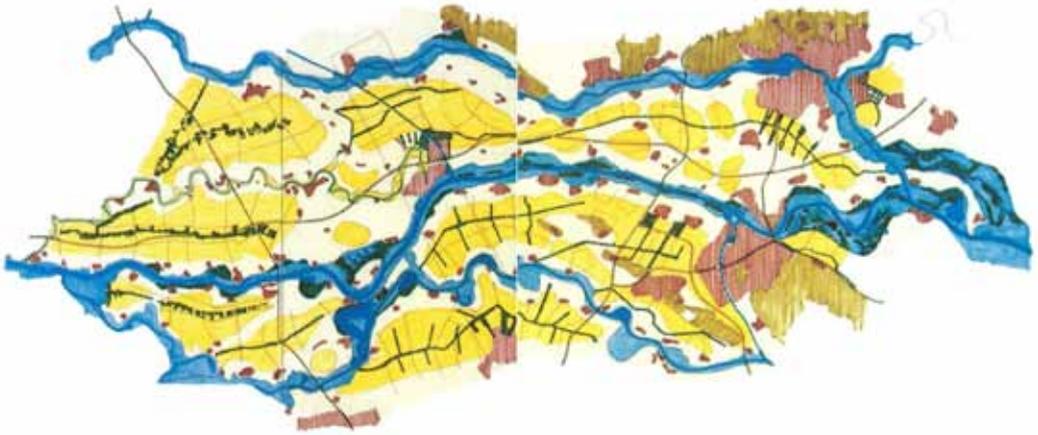


Figure 3: *Drawing of the Plan Ooievaar*. de Bruin, D., D. Hamhuis, van Nieuwenhuijze, L., W. Overmars, D. Sijmons & F. Vera (1987). *Ooievaar, de toekomst van het rivierengebied*. Stichting Gelderse Milieufederatie, Arnhem.

(Marshall, 2009). Part of designing within this paradigm entails that the designer has a specific end-goal in mind, the boundary conditions are controllable, and external factors are relatively predictable. Examples of such processes include design competitions wherein a specific design brief prescribes a desired outcome, the time span is short, and where the designer might have to persuade and seduce a jury by using metaphors and images that contain specific symbolic meanings (van Wezemaal, 2011). 'Iconic' buildings and parks, for example, are also considered end-products that are fixed in time once they are constructed. Such designs communicate a clearly readable message; they are 'branded' (Julier, 2005); they are iconic for a certain architectural style or for the work of a well-known design office. The type of representations that accompany end-product designs are often highly detailed, either in terms visual realism or construction plans.

Open-ended design approaches are process-oriented. These approaches have a strong focus on the factor 'time' because they respond to ever-changing processes in both the natural realm, e.g. climate, landscape ecology or hydrology, and the social realm. These approaches are

related to the 'evolutionist' paradigm (Marshall, 2009; Prominski, 2005) and can encompass, amongst others, incremental (Lindblom, 1979), 'casco/framework' (Kerkstra and Vrijlandt, 1990) or 'incentive' (Barnett, 2013) approaches. Designing within the evolutionist paradigm entails that the designer does not have a particular end result in mind, but that the complexity of the environment is a determining factor for how a design, or its parts, will function and possibly adapt in the future. As these open-ended approaches form a major challenge for students (and practitioners) we will focus the discussion in this paper on these types of approaches.

Criteria of external factors in 'open-ended design approaches'

The choice of appropriate open-ended approaches depends on the specific circumstances in which a design project is embedded. To deal with these circumstances, we defined a comprehensive list of criteria for discussing and evaluating the suitability of different design approaches for meeting specific design challenges in a consistent way. We distinguish four key criteria that influence the field in which these 'open ended' approaches can be applied: predictability in terms of natural



Figure 4: Barcelona urban renewal plan. Acebillo, J. (2006). Barcelona: Towards a new urban planning approach. *Spatium* (13-14).

and socio-cultural environments, spatial scale, and time scale.

Predictability relates to the complexity of the phenomena that the designer needs to deal with. Some natural processes are well-researched and can be predicted with relative ease, e.g. the growth of certain plants; the development of natural habitats for particular animal species; fluvial high water marks; or specific microclimatic processes that take place in a small-scale urban context. Other natural processes are far less predictable, e.g. climate change and its related extreme weather events; precipitation, storms; and risk of flooding and forest fires. Other unpredictable events include endogenic geological phenomena and their effects, e.g. earthquakes, volcano eruptions, and landslides. The unpredictability of these events is reflected in the scientific knowledge available. Consequentially, the designer has insufficient information about the environmental processes that take place in a project location. In those cases, open-ended designs can be the solution by allowing a certain margin of error and incorporating an adaptive capacity in the design. This is often the case when designing flood defence landscapes that need to deal with issues of resilience and robustness.

Various levels of predictability are also distinguished in the socio-cultural realm. For example, predictable social factors are, amongst others: habits and traditions of specific social groups;



Figure 5: Example of a temporarily transformed parking spot. Het Hofkwartier. <http://hofkwartierdenhaag.nl/van-parkeerplek-tot-groene-stek/>

gentrification processes that occur in tandem with urban redevelopment; and demographic developments, e.g. birth rates and economic migration. Unpredictable factors, on the other hand, arise when economies are struck with financial crises, or when migration is triggered by sensitive political situations or war. Similarly, rapid technological developments that pass a tipping point can accelerate engineering possibilities whilst public opinion - susceptible to manipulation - can change under the continuous influence of mass media. Other factors can be the socio-political context of the design project and the prerequisites that are set by a commissioner or bill of law. This can be the case whenever public participation is desired, or when political interests determine the scope of design solutions. Simultaneously, the inclusiveness of participatory processes enables the designer to benefit from a 'collective intelligence' and a network of stakeholders with whom to adapt the design to future requirements.

The spatial scale of interventions can differ and certain approaches are more suitable for and implementable on a smaller or on a larger scale. Apart from that, small scale interventions can have repercussions on the larger whole of a spatial system or network such as in 'incentive' design.

Time spans of the projected designs also influence the great variation of open-ended approaches. On the one hand, temporary



Figure 6: Bird's eye view of the 'Wadland' design. Doedens, B & SLem. <http://www.slem.org/projecten/wadland/introductie/>

experimental designs can cover a short time-span. On the other hand, projects can have strategic planning components or long term goals in general, e.g. when the objectives are based on climate goals for the year 2050. Large time frames also concern projects wherein landscape architects design with natural processes, using a perspective that regards landscapes as evolutionary systems.

In sum, a general feature of open-ended design approaches entails the acceptance of environmental disorder wherein designing is seen as an experiment or learning process. Taking into account an unpredictable environment the designer needs to embrace idiosyncrasies in the design process, for example, by allowing unintended new uses of space or by letting unforeseen natural processes evolve. This means that not only long term, 'no regret' interventions fall within this category, but also that short term temporary designs are considered open-ended.

CLASSIFICATION OF 'OPEN-ENDED' DESIGN APPROACHES

Based on literature, precedent studies, and practical experience we suggest a range of seven distinguishable approaches that can help to classify open-ended design approaches. Each approach responds to a specific set

of the four criteria of predictability of natural and socio-cultural processes, time frame, and spatial scale. We first shortly describe the approaches and provide a typical example for each respective approach. Then we provide an overview in radar diagrams of how the different approaches relate to the four criteria.

'Elastic/Unfoldable' designs involve designed spaces of which the built form is able to physically shrink or extend, depending on the needs and circumstances. An example is the Spacebuster in New York (Figure 1): a movable inflatable bubble that uses a transparent membrane to create indoor public spaces that use their surroundings as backdrops. The bubble can be enlarged, shrunk, or wrapped around a tree depending on the environment.

'Modular Design' contains interchangeable fixed elements adaptable to local and temporal requirements. Modular design in landscape architecture, from a very small scale, is seen in particular types of pavement, and from a larger scale in infrastructure designs such as bridges or flood barriers. A typical modular design example is the honeycomb-inspired urban park Zichizaghi in Favara, Italy (Figure 2), which can be (re-)assembled according to user needs.

Within the 'Framework/Casco' design approach a combination of high and low dynamic areas is distinguished. Fixed parts of linear or larger scale patterns form a low dynamic framework in which highly dynamic and changing developments can take place. A typical example is 'Plan Ooievaar' (figure 3), where Casco entails widening the floodplains within a dike framework, wherein natural and agricultural developments can take place.

Using an 'Incentive Design' approach, small interventions in a network achieve effects that reach further than the site of the intervention and often occur in a location

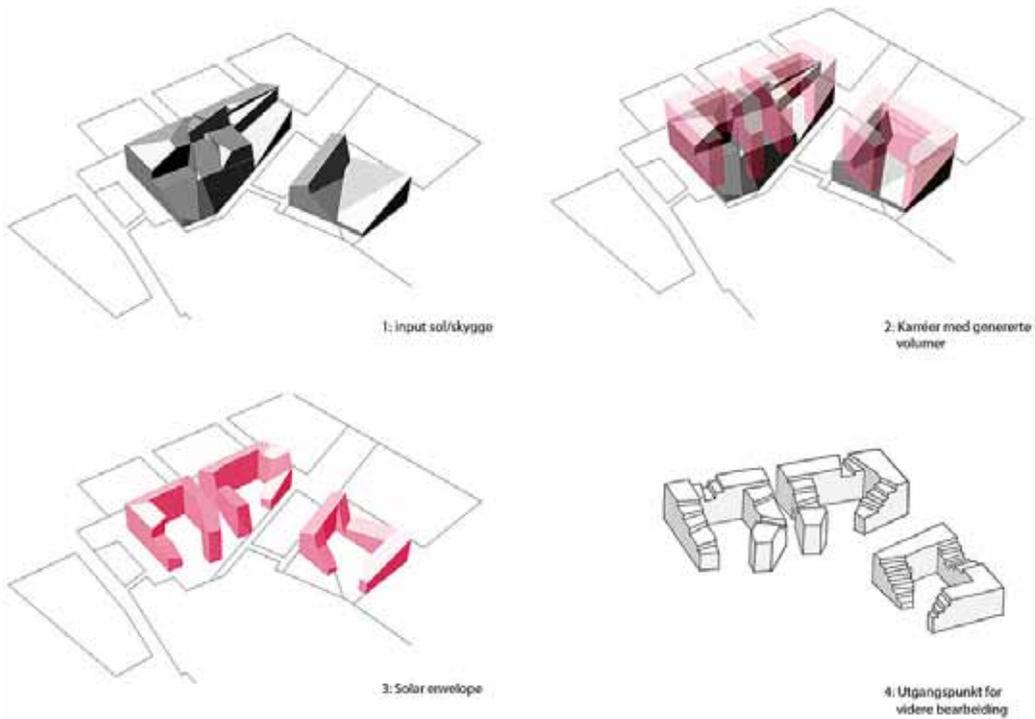


Figure 7: Calculating optimal forms for solar envelopes. PUSHAK. <https://www.pushak.no/bispevika-b6?lightbox=dataitem-ja2kow-cs3>

different from the intervention. Both socio-cultural as well as natural processes can be boosted. Typical examples are interventions in water systems or infrastructure networks. For instance, in the 1980's the urban renewal of Barcelona was kick-started by re-designing squares, streets, and parks (Figure 4), which improved both social cohesion and the accessibility of connected urban spaces.

'Temporary/Provisional' designs consist of interventions of different scale levels. They can be 'pop-up landscapes', but also refugee camps, music festivals and art installations. A typical example is the 'Park(ing) day' (Figure 5), which originated in San Francisco, on which parking spots are transformed into temporary public spaces. Such projects can also have critical social functions, e.g. by raising awareness of the vehicle-dominated way of life of many city dwellers.

'Incremental/Evolutionary' designs involve slow organic developments

driven by natural processes. The shape and form of the landscape is induced by external forces, not so much by the designer. Typical examples are the 'Building with nature'-projects, or 'the sand engine', which use natural processes of erosion and sedimentation. An example with an artistic twist is the 'Wadland' design on the Dutch island of Terschelling (Figure 6), which formed a 'Mondriaan'-like sediment distribution along the beach using structures made of reed vegetation.

'Parametric' approaches use algorithms to determine design shapes and thus remove the designs from the absolute control of the designer. This approach can produce unexpected outcomes, but is very useful for creating optimal forms for natural processes to take place. For example, calculating the shape of solar envelopes, or aerodynamics of bridges and buildings can bring about 'ideal' forms. In the competition entry for

CONCLUSION AND DISCUSSION

In this paper, we introduced a taxonomy of design approaches wherein we distinguish four key criteria that influence the field in which 'open-ended' approaches can be applied: predictability of natural and socio-cultural process, spatial scale, and time scale. For our students, it is important to raise awareness of these external factors, their suitable design approaches, and to make them 'reflectable' and 'discussable'. This distinction is meant to help students better understand design processes and to offer them tools to develop more flexibility and the ability to shift perspectives in their design thinking. The use of 'radar diagrams' helps students of landscape architecture in applying the suitable design approaches depending on the project context. Generally speaking, they help the students (being future professionals) to apply design approaches more consciously. In turn, the odds for conflicting perspectives to derail a design project can be lowered and consequential costs of failure (monetary or social) can be reduced. As the setup of this course is an educational experiment we look forward to discuss its setup with the academic community and based on the feedback, develop the course further.

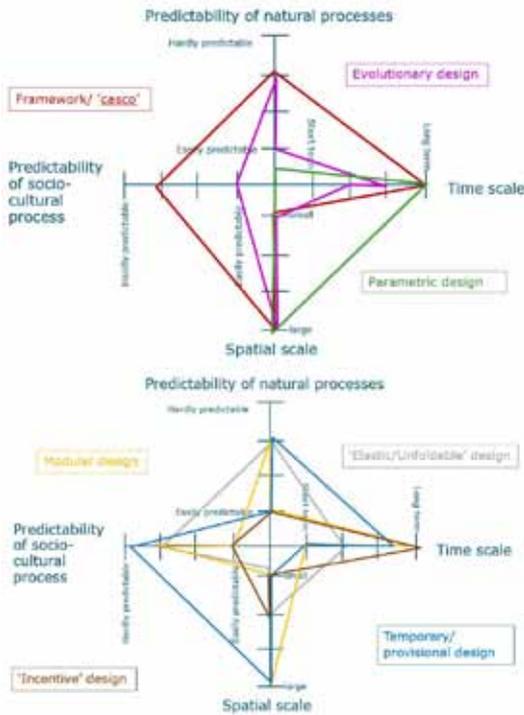


Figure 8: Radar diagrams for a taxonomy of design approaches. (own figure)

Bispevika Development in Norway by PUSHAK (Figure 7) the designers used parametric techniques to find optimal urban forms that enable passive solar heating and minimal heat loss.

All of the distinguished open-ended approaches can be mapped in so-called 'radar diagrams'. These diagrams indicate the degrees in which the different approaches are situated in levels of natural and social-political predictability, spatial scale, and time scale. Figures 8 and 9 show where the seven different design approaches are positioned on this radar diagram by showing the relative strength of each external factor.

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Sad Janka Kráľ'a Park, Bratislava - An Approach to Planning, Design and Management of 19th Century Public Parks

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Keywords:

design knowledge, historical continuity, transformation, parks as cultural monuments, research & design

ABSTRACT

In this paper we will analyse how historic urban parks from the 19th century can be redeveloped for contemporary use while making use of their historical characteristics. We use the Sad Janka Kráľ'a Park as case study, initiated in the 18th century and got its present shape as a public park in the 19th century. Goal of the analysis is to develop a design approach for the renovation of the Sad Janka Kráľ'a Park that can be used for a strategy in the long run in a later phase. In the first part we will analyse what characteristics determine the park based on the different system; the natural system, socio-economic system and cultural system. In the second part we will develop a design concept for development of the park, both in its context and internal structure based on program, site characteristics and design history. A first conclusion is the complexity of the design problem since the park is separated from the city by the river; access is a key problem. Another conclusion is how site, program and viewpoints can influence the approach between restoration and complete reconstruction in this special case where the river is in between the park and the old city of Bratislava, and finally the challenge of redesign of historic parks functioning not only as part of the urban landscape but also as cultural monuments.

INTRODUCTION

Sad Janka Kráľ'a is the first public park in Central Europe, which was already created as a publicly accessible green space in 1775 and 1776 (Hošťálková, 1973; Reháčková, 2012; Tóth, 2018).

The area is mentioned in city records already since the 15th century under different names: Bürgerau, Grünschachen, Wogram, Pfaffenau, Tuerung and Engerau. The area has been owned by the city since the end of the 13th century, when it was donated by the Hungarian King András III. It is located in the central part of the city on the Danube riverfront, opposite the historical city centre (fig. 1).

The study on Sad Janka Kráľ'a park is part of an international research project (HYPPE), initiated at the Faculty of Landscape Architecture and Urbanism in Budapest in collaboration with Departments of Landscape Architecture in Belgrade, Brno, Cluj-Napoca, Cracow, Ljubljana, Nitra, Vienna and Zagreb. The overall goal of the research is to investigate and analyse a series of examples of 19th century public parks in Central and Eastern Europe to give a first overview and insight into the design history and how that information can be used in the planning and design of future use of those parks. The research method is based on the principles of case study research (Zeisel, 2006). These generic principles are applied to the Sad Janka Kráľ'a park.

THE LANDSCAPE AS A NATURAL SYSTEM

The evolution of the landscape over time is dominantly influenced by the river Danube. Before 1775 — when the Danube was regulated and diked — there was an island in the river (fig. 2). The area, where Sad Janka Kráľ'a is situated, was once part of the floodplain forests along the right bank of the Danube River. Already before the

THE LANDSCAPE AS A SOCIO-ECONOMIC SYSTEM

After the regulation of the river, plan development took place thus indicating functioning of the park as leisure grounds for the citizens (fig. 4). The connection between the left and the right bank, be it bridge or ferry, created also a first possibility for urban settlement on the right bank.

THE LANDSCAPE AS A CULTURAL SYSTEM

The park has played an important role in the history of urban development of Bratislava. Its current name Sad Janka Kráľa dates back to the 1960s, when it was named after a famous Slovak romantic poet Janko Kráľ. His statue was placed in the central part of the park. During its history it was known under different names, e.g. in the 18th century it was Bruckenau, in the 19th century Aupark (Bottomland Park in German) and during the first Czechoslovak Republic period (interwar period) it was called Petržalské sady or Tyršove sady (Sad means Orchard in Slovak) (Hoš álková, 1973; Reháčková, 2012).

The park has been protected since 1907 when it was declared a state-protected park with a strict protection of some old or memorial trees and their groups. Today, it is protected as National Cultural Heritage (Hoš álková, 1973; Reháčková, 2012).

Due to the popularity of the park and the large number of visitors, the continuous maintenance of the park is of huge importance. Therefore, in 2006 tree felling and removal of shrubs was undertaken based on an inventory of woody plants. Other felling works and tree care is continuously taking place (Režná, 2010).

THE CONTEMPORARY SITUATION



Figure 1. Location of Sad Janka Kráľa Park in relation to the wider urban landscape, the historical city centre of Bratislava and the River Danube.

establishment of the park, the forest areas were used as a natural recreation area by the citizens of Bratislava.

For the geological material it means that the soils consist of river sediments which can vary substantially depending on former currents and islands in the river.

After the diking the island became part of the right bank behind the dike. In 1825, fifty years later, a first connection between the old city and the right bank was constructed in the form of a pontoon bridge (figure 3). Note that after the regulation of the river, the water system became autonomous and only indirectly related to river in case of drainage water being pumped into the river during the winter time.

In that same year the City Council decided to establish a park on the right bank (Hoš álková, 1973; Reháčková, 2012).



Figure 2. The area where Sad Janka Kráľ'a Park is situated, used to be a river island before the regulation of the Danube

There are several factors that urge the need for a plan development in the long run. First of all the protected status of the park as a cultural monument. All monuments need maintenance and sometimes reconstruction or renovation, so does Sad Janka Kráľ'a park.

A second important factor is that the park becomes increasingly important for citizens as a green space. All over Europe the pollution in cities is rising, sometimes to such an extent that the traffic has to be limited because of health risks.

Parks and green spaces can play an important role in creating a refuge with some fresh air and open space.

A third factor is the increasing importance of urban parks in cities for tourists. In cities such as London and Paris the tourist offices have itineraries for visiting their urban parks. For Bratislava as the capital of Slovakia, the Sad Janka Kráľ'a park offers a tourist attraction that has not been employed as such.

CONSERVATION OF LANDSCAPE - DESIGN

APPROACHES OF HISTORICAL SITES

People talking about conservation of landscapes are embarked on a trip to dreamland. Landscapes cannot be conserved like paintings, buildings or any other object; landscapes are living systems that change even if man does not interfere.

Three approaches to heritage in landscape architecture can be distinguished:

- *Restoration*; bringing back to an exact copy of a historical one, the new program will be in most cases in the category of museum, cultural landscape
- *Renovation*; partly restoring, partly renovating based on a new program
- *Reconstruction*; introducing a new program in a new form on the site of a historical setting, more or less a situation of 'tabula rasa' for the existing situation.

In the case of Sad Janka Kráľ'a park, renovation will be the choice for future development because of the program and of financial limitations.

NEW CHALLENGES FOR LANDSCAPE ARCHITECTURE

In the last decennia sustainability has been gradually replaced by three major issues; water storage, energy transition and the creation of healthy environments for people. Nowadays these new demands from society challenge all design disciplines in general and landscape architecture in particular.

- The problem of shortage of fresh water which will only increase in the future and the need for a different approach to water management.
In this case the existence of three

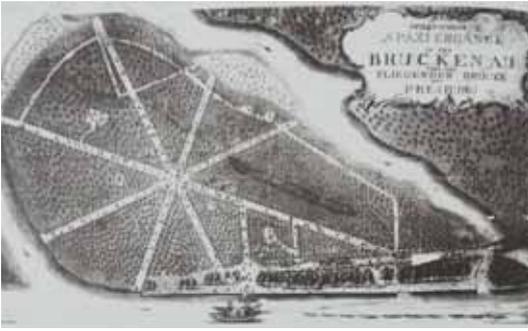


Figure 3. Original disposition of Sad Janka Kráľa from 1776 with a characteristic eight-armed star alley (Reháčková, 2012, p.76)



Figure 4. A plan from 1832 shows Sad Janka Kráľa after it had been rebuilt in the English Landscape Garden style (Reháčková, 2012, p.76)

water systems; the river, the city and the park is an important issue for planning and design since the park could also function as water storage for the city water system.

- The energy transition towards getting more energy efficient and use only renewable energy sources. Both local climate and site offer opportunities for these renewable energy sources that are especially interesting for landscape architecture. In this case the combination of water management and energy transition could also offer interesting opportunities.
- The creation of comfort and healthy environments for people demands for an integrative and long term approach.

For landscape architecture the research of Catherine Ward



Figure 5. Cadastral map of Sad Janka Kráľa from 1894-1895 (Reháčková, 2012, p.77)

Thompson offers plenty of material that can be applied in local situations (Ward Thompson et al., 2010; Ward Thompson, 2011).

Application of these factors to the Sad Janka Kráľa park takes a special study but is very important to elaborate on in applying these generic principles to the local situation. It seems that the creation of healthy environments for people is a key issue in this case, both for the park as such as for the system of parks and the river as an urban green system in Bratislava.

DESIGN CONCEPT - DESIGN AS A SEARCH FOR SYNTHESIS BETWEEN SITE, DESIGN HISTORY, CONTEMPORARY FUNCTIONING AND USE

In the working out of a design concept, a distinction is made between planning, design and management for the park. One of the conclusions from the analysis is the complexity of the design problem because the separation between the city and the park by the river. One of the key problem for the park is access; how to make the park more accessible for different types of users?

Without further investigation into the choice between conservation and development we could conclude that total conservation will be close to impossible because of the program for the future but also because of financial limitations. It results in a first

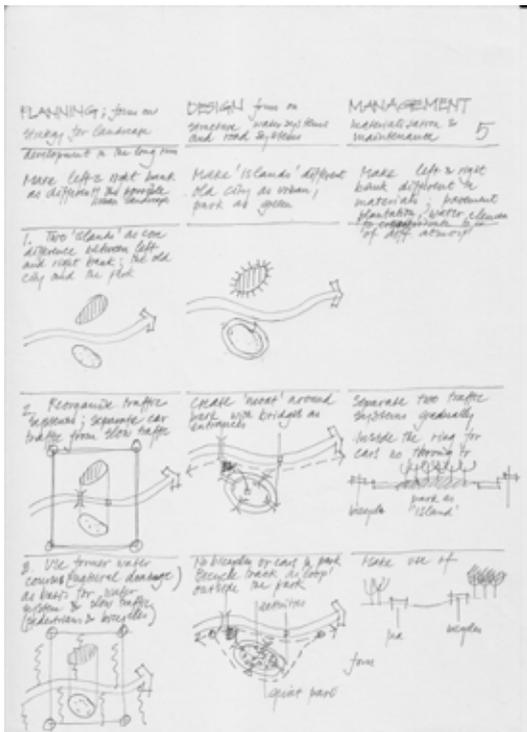


Figure 6. An overview of a conceptual framework for the planning, design and management of the park in its urban context

major choice in the design approach for renovation where the historical character of the park is used as a basis for development. Together with the above mentioned new challenges this will give further form to the design problem apart from a special investigation on the demands for use and users from the city and citizens of Bratislava.

Based on this first problem analysis we have worked out a first design concept by doing some design experiments related to access, future use and the park as cultural monument. The role of the future park in a larger context is worked out in series of steps that frame the overall design concept in three steps; a strategy in the long run worked out in a interventions on the structural level and the third step an elaboration of the level of elements and material form (fig. 6).

Core of the design concept is to improve the access by making two connections over the river, thus creating

a loop between old city and park. These two connections are further elaborated in special bike ways to make the park also accessible for bicycles which will the city make more attractive for new tourist groups that seek active forms of leisure in the city and its surroundings. Such a loop will also enable to create different experiences both of the park and of the river.

On the level of element and material form the existing building inside the park should be moved closer to the edge of the park so that it could function both as a visitor centre, a restaurant with a spectacular view of the ensemble of river and park.

CONCLUSIONS

A first problem analysis of the site and functioning of the park leads to one of the key problems of access; the park needs to be more accessible from the city.

In the search for a design approach between conservation and development, a choice for renovation seems to be most applicable.

Overall the function of the park as a cultural monument that contributes also to the identity of the city and its historical urban landscapes needs special attention in the design approach.

ACKNOWLEDGMENTS

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5.7. EXPERIENCE AND ECONOMY

GROUP N

Reconciling Natural Capitalism and
the Experience Economy Through The
Green Infrastructure Approach

Maria-Beatrice Andreucci

Use and Abuse: Reading the Patina of
User Actions in Public Space

Simon Colwill

Eco(nomi)logical Productivity:
Leveraging Precision Agriculture for
Economy and Ecology

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Interdisciplinarity versus Conflict:
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Economy of Landscape Services in
Ilgaz Region, Cenral Anatolia

Betül Tülek

INTRODUCTION

Reconciling Natural Capitalism and the Experience Economy Through The Green Infrastructure Approach

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Keywords:

Landscape Economy; Cultural Ecosystem Services; Economic benefits; Economic valuation; Urban Green Infrastructure

ABSTRACT

The concept of multi-functionality is utilized to emphasize the many services which our Natural Capital display in addition to their prime economic purposes, related to commodity outputs. In urban areas, the elements of the natural environment providing multi-functional ecosystem services are referred to as green infrastructure, into the perspective of leisure, education, health and well-being, reconnection to biodiversity, cultural and heritage landscapes, resilience-building. Numerous tools have been developed to explore different economic valuation aspects, adapting methodologies and designing new frameworks, especially in the emerging research area of the landscape economy. The contribution focuses on the relevance of the socio-economic values of cultural ecosystem services provided by urban green infrastructure, which are increasingly calling researchers, policy makers and practitioners' attention from new perspectives, mirroring the needs and claims of the growing population of urban dwellers. The often-conflicting socio-economic implications of the urban green infrastructure are presented, introducing major findings of an extensive repository of international case-studies. The conclusions suggest how a better understanding of urban green infrastructure's economic values would enable decision makers to successfully engage in trade-off analysis, promoting dialogue among stakeholders about the management of their landscape, ultimately helping them identify strategies for improved governance.

Most of the pressures on our natural capital are critically based in the socio-economic systems of production and consumption that provide for our material well-being. Economic and demographic projections suggest that these pressures are likely to grow. Natural capital sets the ecological limits for our socio-economic systems; it is both limited and vulnerable.

In urban areas, the elements of the natural environment providing ecosystem services are referred to as 'green infrastructure'. The opportunities that come from framing green infrastructure as a multifunctional network that forms a fundamentally vital part of the city are immense. This requires more than simply caring for the aesthetics of existing and future urban and peri-urban green spaces. Combining recreation with flood risk management, heritage with urban cooling, health promotion with economic growth and social inclusion imply re-consider the structural configuration of our natural capital, in terms of specific socio-ecological functions of the urban green spaces, just as we upgrade and adapt other forms of infrastructure. We also need to contemplate how to incorporate nature into buildings, districts and public spaces, and to define how the quality of the grey infrastructure of our streets and public realm could be improved through nature-based technologies and solutions.

Just as any other socio-ecological system, cities depend on ecosystem services to sustain long-term conditions for life, health, good social relations and other important aspects of human well-being.

Landscape architects, urban ecologists and planners are linking landscape design with ecosystem structure and functions to restore habitats and improve life quality in cities through adaptive transformations (Figure 1).



Figure 1: Shanghai, Adaptive urban transformation, Huangpu riverfront restoration, Houtan Park, CN. Source: Author, 2014

ENHANCING SOCIETY'S RESILIENCE: EXPLORING A RANGE OF VALUE DOMAINS IN A MULTI-STAKEHOLDER PERSPECTIVE

Urbanites bring various economic, moral, spiritual, aesthetic, and other values to bear on biodiversity and applying the concept of capital to nature, as in Natural Capitalism (Hawken, Lovins and Lovins, 1999), raises some difficulties. These include concerns about the growing commodification of the urban biodiversity and a lack of recognition of the intrinsic importance of a healthy built environment.

Values can affect attitudes, sentiments and actions toward ecosystems and the services they provide. These include emotional, affective and symbolic visions attached to urban socio-ecological infrastructure that in most cases cannot be adequately explored by metrics or standard evaluation methods.

Cultural benefits as key values for urbanites

Building on previous group identification of ecosystem services (Daily, 1997; de Groot et al., 2002), the Millennium Ecosystem Assessment (MA, 2005), and The Economics of Ecosystem Services and Biodiversity

classified ecosystem services in four major categories: provisioning, regulating, habitat, and cultural and amenity services (TEEB, 2010).

The importance of different ecosystem benefits varies significantly with spatial scale and according to stakeholders' groups (Darvill and Lindo, 2016). Because the built environment may be stressful for inhabitants, the cultural assets of urban ecosystems providing intangible benefits to the urbanites are, in principle, the highest valued ecosystem services in cities, enhancing human health and well-being (Andreucci, 2017).

The ecosystem services literature has defined cultural services as: "the physical, intellectual, spiritual and symbolic interactions with ecosystems, landscapes and seascapes" (CICES, 2013:16); and cultural values as: "aesthetic, artistic, educational, spiritual and/or scientific values of ecosystems" (Costanza et al., 1997:254), or as: "non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development,



Figure 2: Athens, Incommensurable cultural and historic values of the landscaping path of the Acropolis, EL. Source: Author, 2013

reflection, recreation, and aesthetic experience” (MA, 2005:7).

The social and aesthetic benefits from cultural and amenity services are acknowledged as key delivery of urban green infrastructure by local residents and visitors alike, and include recreational opportunities, improvement of the home and work environment, positive impacts on physical and mental health, as well as cultural and historic values (Figure 2).

A recent research (Andreucci, 2015) conducted on a repository of 60 international urban green infrastructure case-studies, highlighted that socio-cultural values were increasingly considered in policy development, land-use conflict resolution and planning decision making. Social benefits accounted for 28% of 560 total landscape performances identified, and key social outcomes, in particular, were found to be: Education and Safety (32%), Health and Wellness (24%), Increased residential green open spaces (20%), Increased number of visitors for recreational purposes (19%), and Social Equity (5%). Among investigated case-studies, particularly relevant for socio-cultural benefits provided are: ‘Sundance Square’, Fort Worth’s new civic *piazza* restoring a greyfield in the heart of downtown (Forth Worth, USA; Michael Vergason Landscape Architects, 2013); ‘Besòs River Park’, 13 ha of meadow landscapes for public use (Barcelona, Spain; Viaplana & Piñon Arquitectos, Martínez Lapeña y Elías Torres, Ábalos & Herreros, Beth Galí,



Figure 3: Rome, ‘Elsa Morante’ Cultural Center and Park, IT. Source: LC-Architettura, 2011

Alejandro Zaera-Polo, 2004); and the ‘Elsa Morante’ Cultural Center and Park (Figure 3) replacing a 3 ha parking lot for the benefit of 32,000 inhabitants of ‘Laurentino 38’ neighborhood. (Rome, Italy; Luciano Cupelloni Architettura, 2010).

Assessing intangible values of socio-cultural assets

Valuation of ecosystem services involves dealing with multiple, and often-conflicting value dimensions: cultural values, health benefits, economic costs, and resilience. In particular, while the GI approach directly addresses the three pillars of sustainability, economic valuation methodologies have been mainly focused on determining the value of ecosystem services primarily for provisioning of natural resources and regulating functions (Kumar, 2010).

The ‘public good’ nature of our Natural Capital implies that its full value is often not adequately reflected in management decisions that are mainly based on pure cost-based economic information, being conventional economic valuation restricted to priced goods and services, which represent only a limited subset of ecosystem services (i.e., those which are exchanged in markets). Consequently, benefits from ecosystem services with no explicit monetary value tend to be ignored. Forests particularly illustrate these issues. The socio-cultural value of urban forests, one of the key element of urban green infrastructure, mainly relates to the information functions (Table 1) and economic valuations assuming that all people use and value the same cultural ecosystem services have proved to be inaccurate (Menzel and Teng, 2010; Klein and Chan, 2012).

Social and cultural values are referred to in all prominent ecosystem service typologies (Daily et al., 1997; de Groot et al., 2002; MA, 2005). Yet, compared with economic and biophysical values, social, cultural, and

other intangible values of ecosystems and biodiversity have generally been neglected in much of the ecosystem services literature.

Conventional economic approaches that work with monetary valuation are not applicable for the majority of cultural services. Meta-analyses on economic valuations of cultural ecosystem services (Pearce, 2002; Noonan, 2003; Brander and Koetse, 2011; Andreucci, 2015; Reynaud and Panzanova, 2017) show that 'non-market' valuation methods - hedonic pricing and stated preference methods, contingent valuation, in particular - have been the most frequently applied in urban contexts.

Social and cultural values may be difficult to measure, often necessitating the use of more holistic approaches that may include qualitative measures, constructed scales, and narration (Patton, 2001; Chan et al., 2012). In some cases translating cultural values into quantitative metrics may be technically complicated or produce meaningless or insignificant results. In few cases, tools have been developed to measure these values using ad hoc constructed scales, as in the case of sense of place (Williams and Roggenbuck, 1989; Shamaï, 1991) and local ecological knowledge (Gómez-Baggethun et al., 2010a).

Although valuing socio-cultural benefits poses several conceptual and methodological difficulties, it is of growing interest and importance because of the linkages between cultural values, valuation methods, and the individual and collective decision-making that ultimately influence ecosystems and human well-being.

Enhancing society's resilience

Resilience refers to the ability to adapt to or tolerate disturbance without collapsing into a qualitatively different state (Holling, 1973).

To assess city resilience researchers must detect and

understand interactions between humans and ecological functions and processes in a non-equilibrium coexistence (Pickett, 1980) within the inherently unstable urban ecosystem which, in turn, requires consideration of heterogeneity and multiplicity in spatial and temporal dimensions (Wu and Loucks, 1995).

Enhancing society's resilience will only be possible by maintaining and enhancing systemic resilience because social, economic and ecological sustainability are interdependent. When we reduce nature's capacity to provide essential services, we undermine ecosystem resilience, putting growing pressure on the entire society and especially on most vulnerable individuals. Conversely, ecological resilience depends on socio-economic goals, as well as on specific decisions to protect the environment.

The complex nature of ecosystem degradation (multiple causes, pathways and effects that are difficult to disentangle) leads to challenges in translating the concept of systemic resilience into policy, thus the relationship between ecosystem resilience, decreasing environmental pressures, and improvements in quality of life is rarely defined.

PROGRESSING INFORMED DECISION-MAKING AND GREEN INFRASTRUCTURE IMPLEMENTATION THROUGH PUBLIC PARTICIPATION

Exploring trade-offs across ecosystem services and within socio-economic value dimensions

Managing ecosystem services across different spatial scales within a dynamic landscape context is challenging because the importance of different types of ecosystem services changes with different stakeholder groups, and with spatial scale. Identifying a broad range of ecosystem



Figure 4: Uutelan kanava forested settlement, Vuosaari, Helsinki, FI. Source: Author, 2018

functions, processes and components has proven to be feasible (de Groot et al., 2002) but benefit cross-comparison and trade-off analysis remain mostly unchallenged (Carpenter et al., 2009; de Groot et al., 2010).

Loss of green space may simultaneously involve health impacts and increased vulnerability to shocks for many people, but may (or may not) also provide additional economic benefits for few. Clearing a patch of forest to create a new settlement in a park (Figure 4) enhances recreational values – providing social and economic benefits - but generally reduces biodiversity. Thus, trade-offs arise not only across ecosystem services but also across the different dimensions of value of those services.

Evidence from a recent research (Andreucci, 2015) showed that in 25 international urban green infrastructure case-studies, 29% of total landscape performances presented conflicting relationships among the three benefits' categories (environmental, social and economic), attributable to economic



Figure 5: New York City, the High Line, a symbol of Manhattan's rising inequality, USA. Source: Author, 2015

(66%) and environmental (34%) landscape performances; while only 20% of total landscape performances presented synergic relationships, 32% of which attributable to social. Among the selected case-studies investigated, Manhattan's iconic 'High Line' is particularly emblematic with respect to the magnitude of socio-economic conflicts.

"When Robert Hammond (founder of 'Friends of the High Line') first conceived of turning a disused elevated railway on Manhattan's West Side into a high-design "linear park," he thought it would attract maybe 300,000 visitors a year. He and co-founder Joshua David didn't really think about what the High Line could do to the neighbourhood, apart from adding a little extra breathing room. In 2016, seven years after it opened, nearly 8 million bodies would flock to the High Line—that's more visitors than to any other destination in New York City. With those visitors came riches the park's founders never predicted: between the glossy condos, eateries, and museums that have flowered around its steel girders, the High Line is set to generate about \$1 billion in tax revenues to the city over the next 20 years. By these measures, the High Line is a runaway success. But by one critical metric, it is not. Locals aren't the ones overloading the park, nor are locals all benefiting from its economic windfall" (Bliss, 2017).

Sharing the landscape economy balancing synergies and trade-offs

Public participation has been most successful at acknowledging urban green infrastructure providing opportunities for cognitive development, and at identifying trade-offs and synergies leading to higher quality decisions (Brown and Fagerholm, 2015), even though the actual uses and characteristics of green and blue open spaces appreciated by differing stakeholder groups are rarely considered in the assessment of the intangible cultural ecosystem services.

Trade-offs become apparent when multiple stakeholder groups are considered, when there is divergence between competing interests involving financial resources' allocation, or where there are stakeholders that act and mobilise at local spatial scales relevant to the management plans (Howe et al., 2014). Avoiding conflict among stakeholder groups is an important part of environmental decision-making for land management (de Chazal et al. 2008; Brown and Donovan 2013; Brown et al. 2014), and active involvement of different stakeholder groups can highlight potential conflicts before they occur, or that might arise from uninformed land-use change decisions.

Progressing urban green blue infrastructure implies broaden the traditional focus of the ecosystem services literature on biophysical measurement and monetary values, and exploring a range of value domains in a multi-stakeholder perspective, including tangible and intangible values, i.e. biophysical, economic, socio-cultural, health, and insurance values, while advancing frameworks and tools through which they may be measured, understood and communicated. The challenges of urban ecosystems society-resilience capacity building sit at the nexus of an agenda of high priority issues, and long-term sustainable de-

cision-making will certainly require a combination of approaches, with public participation likely being the critical success factor.

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TABLES

Table 1.

Table 1: Urban Forest's information functions, processes and services. Source: Author, after de Groot (2006)

ECOSYSTEM FUNCTIONS	ECOSYSTEM PROCESSES	SERVICES OFFERED
INFORMATION FUNCTIONS		
Aesthetic information	Attractive UF features	Enjoyment of scenery
Recreation	Variety in landscapes with (potential) recreational uses	Travel to UF ecosystems for eco-tourism and (recreational) nature study
Cultural and artistic information	Variety in UF features with cultural and artistic value	Use of UF as motive in books, film, painting, folklore, national symbols, architect, advertising, etc.
Spiritual and historic information	Variety in UF features with spiritual and historic value	Use of UF for religious or historic purposes (i.e. heritage value of natural ecosystems and features)
Science and education	Variety in UF features with scientific and educational value	Use of UF for school excursions, etc. Use of UF for scientific research

Use and Abuse: Reading the Patina of User Actions in Public Space

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Use, misuse, underuse, overuse, deterioration, monitoring, vulnerability

ABSTRACT

One of the most aggressive agents influencing change to built landscapes is the user. This usage is influenced by many factors such as the activities and functions available, climatic factors, the time of day, the day of the week and seasonal variations. In structural terms, usage is a form of mechanical loading which can be static or dynamic and exerts force upon the structure. Repeated cycles of use therefore lead to wear and tear; the intensity and frequency of these interactions dictate the impact of these forces over time.

This paper will explore the conflicts between the built landscape and its users by analysing the evolving signs and symptoms of various forms of use, abuse and use appropriation throughout the city of Berlin. Abuse refers to the impact of wilful destruction which is a form of criminal vandalism. In addition, 'passive' vandalism in the form of use appropriation or unintentional destruction can occur.

The visible traces of use and abuse are embedded in the form of wear, erosion, organic sediments, pollution, dirt and vegetation growth on the surfaces of built works. By applying the principles of construction pathology this patina can be 'read' and deciphered, the influencing factors determined and optimisation strategies established. Current research at the Technische Universität Berlin is based on the hypothesis that it is possible to optimise design, detailing, construction and maintenance techniques through continued analysis of project development at regular intervals after completion. The data resulting from the research enables a detailed interpretation of the impact of use and abuse as well as a deeper

understanding of the causative processes involved. Case studies from the research project will be presented, illustrating and analysing the conflicts between user actions and the built landscape.

INTRODUCTION

'Science has not enabled us to predict the behaviour of people; which very many designers need to be able to do. ... We design failures chiefly because we cannot make reliable predictions about responses.'

(David Pye 1995: 27)

The actions of users are one of the most aggressive agents influencing change to built landscapes through time and are particularly difficult to predict. Many factors influence the patterns of use of public space such as the activities and functions available, climatic factors, the time of day, the day of the week and seasonal variations. In structural terms, usage is a form of mechanical loading which can be static or dynamic and exerts force upon the structure. Repeated cycles of use (cyclic loading) therefore lead to wear and tear. The intensity and frequency of these interactions dictate the impact of these forces over time.

Current research at the Technische Universität Berlin is developing a system for monitoring the development of built landscapes through time. A low-threshold anticipatory method is currently being developed to optimise future landscape projects already during the design and detailing phase. The processes of patination and subsequent deterioration highlight weak points of the design as well as deficiencies in detailing, construction and maintenance. Through comparisons between the original state and successive recordings process-dependent changes become visible and frequently occurring points of weakness can be pinpointed. The data resulting from the research

enables a detailed interpretation of the visible signs of deterioration and a deeper understanding of the causative processes involved.

This paper will explore the signs and symptoms of various forms of use throughout the city of Berlin.-Case studies from the research project will be presented, illustrating and analysing the impact of user actions on the built landscape.

RESEARCH RESULTS

‘Products and spaces, which - according to the criteria of professional design and its definition of meaningful use - are ‘misunderstood’ or ‘abused’, have a great potential for innovation and various new, other, multi-functional options of use’ (Brandes et al. 2009: 13)

The many problems associated with use such as **overuse**, **underuse**, **misuse**, **alternative use** and **appropriation of use** are difficult to predict and can lead to erosion, damage or destruction. In many projects, **imbalances of use** lead to the intense use or misuse of certain areas or objects whereas others remain disused.

Misuse refers to the impact of **wilful destruction** (criminal vandalism) and **appropriation of use** (usage of an object for a purpose or in a manner other than intended) breaking either legal regulations or social norms. Vandalism is defined by Maren Lorenz as a deliberate, anonymous and norm-violating act causing damage or destruction to third party property, which occurs without an apparent motive. (2009: 10). A student field study took place at the TU Berlin aimed at defining the main categories of misuse of open space in Berlin and evaluating user acceptance of the resulting condition. The signs of misuse in parks and city squares were mapped and five main categories were established:

Categories of Misuse

- Damage and wilful destruction
 - to materials and objects [Fig. 1a, b]
 - to vegetation [Fig. 1c]
- Street-art and guerrilla advertising:
 - Street-art and graffiti [Fig. 4a,b]
 - Street-advertising, billposting, stickers [Fig. 4c,d]
- Littering:
 - trash, rubbish [Fig. 2a, b]
 - dog and human faeces [Fig. 2c]
 - chewing gum and cigarettes [Fig. 2d]
- Appropriation of use:
 - alternative usage [Fig. 3a, b]
 - appropriation for sports e.g. skating [Fig. 3c, d]
 - alternative site circulation e.g. desire paths [Fig. 5c]
- ‘Guerrilla gardening’ [Fig. 1d]

Tessin claims that a tidy image of the open space gives its visitors a feeling of security and increases the awareness of users to care for the space: *‘Due to the concrete design, facilities and maintenance of the park, a standard and role- conforming behaviour is to be at least suggested. The more intensively designed, maintained, and more elaborate, for example the park, the more civilised the behaviour of users’* (Tessin 2011: 46). Furthermore, the principle of the ‘Broken Windows Theory’ dictates that a damaged or untidy area will lead to further occurrences of wilful damage in the future. Kelling and Wilson (1982), the founders of this theory, found through empirical studies that vandalism and other kinds of damage to property increase and accelerate in areas where signs of vandalism are already present. According to Tessin, *‘... Vandalism is best reduced by immediate repair and a generally high maintenance standard and, of course, by a vandal-resistant, robust equipment and design’* (2011: 16).



Figure 1: Forms of misuse. a.) Wilful destruction: year 01/ year 07. b.) Wilful destruction, littering: year 08. c.) Wilful destruction to vegetation. d.) Guerrilla gardening.

Various forms of misuse can be observed throughout Berlin ranging from physical damage to street furniture, to soiling by chewing gum, sticker tags and sticker art, graffiti, littering, desire paths, theft and skater damage. From a constructional viewpoint, misuse may lead to surface erosion, damage and destruction and therefore needs to be addressed in the design and detailing phase. Other factors, such as graffiti or stickers, form an additional surface protection layer and are not detrimental to the construction itself. All forms of misuse may however contribute to the 'Broken Windows Theory' and therefore may lead to a downward spiral of decline. Designers can address surface disorders (e.g. graffiti, stickers) by implementing appropriate materials with easily maintainable protective surfaces and coatings (Ross 2016: 399). Many research projects have focused on the prevention of misuse and vandalism in public space, strategies include:

- **Opportunity reduction measures:** e.g. improve design, aesthetics and maintenance; design in order to reduce opportunity (e.g. vandal-proof materials, anti-graffiti coatings, planting of dense vegetation in front of vulnerable surfaces, lighting and fences)
- **Enforcement measures:** e.g. prohibitive signs, visible security patrols, surveillance cameras

- **Collaborative measures:** stakeholder engagement and participation. According to Oscar Newman's 'defensible space' hypothesis (1972) offenders are discouraged from action if they perceive the space as being controlled by its users and residents.
- **Education measures:** e.g. education programmes in schools, community initiatives, mass media campaigns directed at high-risk audiences. (e.g. Barker & Bridgeman 1994: 6-13; Havârneanu 2017: 1081-1085)

Research indicates that the most effective approaches employ a combination of strategies (Barker & Bridgeman 1994: 37). The main focus for landscape Architects therefore lies in improving design, aesthetics and maintenance together with stakeholder engagement and participation in these processes.

'There are two types of objects in public space that are popular targets for destruction: objects which seem to be dispensable or whose purpose is not understood, and authoritarian objects that only allow for one prescribed kind of use'
(Brandes et al. 2009: 168)

Similar to Brandes et al (2009: 168), our research shows that authoritarian objects such as prohibition signs are especially subject to wilful destruction [Fig. 1a]. Stickers (sticker tags and art) have become an extremely popular means of spreading information in urban open spaces and are particularly difficult to remove [Fig. 4d] (Ross 2016: 398). Guerrilla gardening is the unauthorized act of gardening in public or private spaces often as a response to urban problems or as environmental activism [Fig. 1d] (Adams & Hardmann 2014: 1103-1116).



Figure 2: Misuse. a) Littering: year 05. b) Littering within a structure: year 07. c) Faeces and urine: year 5. d) Chewing gum trodden into surface: year 15.

The responses to guerrilla gardening are very mixed; most of these works take place without public consultation which can result in adverse impacts on the surrounding community (Adams et al. 2015: 1-16). Many forms of misuse, such as graffiti or billposting are controversial; on the one hand this can be seen as a form of positive cultural expression, social exchange, protest, or users simply identifying with the site. On the other hand, some may associate these works with deterioration or find the works visually offensive.

Littering, the behaviour of improper litter disposal, poses environmental, social and aesthetic problems. It occurs not only due to the behavioural characteristics of user's but may also result from an insufficient number of waste containers, insufficient emptying, poorly located containers or an existing presence of litter. [Fig. 2a, b] (Schulz et al 2011: 47-48). Receptacles without covers are particularly susceptible to storms, wind, birds, dogs, vermin and other animals. Large-scale research shows that the farther away the receptacles are, the more likely you are to litter (Ibid 2011: 35-59). Cigarette butt littering can be significantly reduced by providing additional ashtrays, especially in close proximity to building entrances where smokers gather due to indoor smoking legislation (Liu and Sibley 2004: 373-384).

In addition to the active form of

wilful destruction, 'passive' vandalism in the form of 'appropriation of use' or 'unintentional destruction' can occur. Appropriation is a form of misuse in which an object is used for a purpose, or in a manner other than intended which may result in conflicts between users, unintentional soiling, damage or destruction [Fig. 3, 4]. Psychologists Costall and Dreier (2006: 10) argue for '*... the need to think of design not as a separate stage prior to the use of things, but as a continuous process within the context of their actual use*' which can change and adapt through time. They explain that certain types of usage are foreseen by the designer and catered for in the design and detailing through employing specific affordances (characteristics that imply how an object should be used) (Ibid.: 46). Users are under normative pressure to use these objects for these 'proper' functions according to the designer's intention (Ibid.: 17, 32). The user, however, may recognise the objects 'accidental functions' and utilise built elements creatively in a non-standard or 'improper' way (Ibid.: 32). This creative **appropriation** of objects can therefore be viewed as part of the design development process which extends the functional diversity of the object (Ibid.: 24). For instance, a park bench may be viewed by a child as a playground element, by a homeless person as a bed, or by a teenager as a fitness device (Tessin 2011: 34-37). Each of these uses are mutually exclusive and may cause physical damage, soiling. These appropriated uses may also discourage others from using the bench for its intended purpose as a seat.

Appropriation of use and unintentional damage can also occur as a result of **failures or misjudgements in the design, detailing and realisation**. A few examples are listed below:

- Objects with very acute angles



Figure 3: Appropriation of use. a) Use as a bench or bed: year 5. b) Tree or bike rack: year 06. c) Tree or slackline support: year 4. d) Wall or skater ramp: year 8.



Figure 5: Damage due to design and detailing. a) Damage to acute edging: year 1/year8. b) Damage to bike stand: year 06. c) Visible signs of use: desire paths: year 7. d) Visible signs of use: year 9



Figure 4: Appropriation of use. a) Graffiti/public art: year 4. b) Public art: year 05. c) `Guerrilla advertising`: year 5 d) Sticker tags, sticker art: year 8.

results in an increased rate of surface erosion, damage and deterioration [Fig. 6a, b. Fig. 7]. Too intensive loading through use can cause structural or mechanical damage, deformation, ground movement or the displacement of a structure. The overpopulation of public space can also result in conflicts between individual users or groups for differing activities. The `eventisation` and `festivalisation` of public space for outdoor special events and festivals is increasingly becoming part of urban culture, generating intense periods of wear [Fig. 7] (Jung 2013: 50). This can provoke unintentional damage by multiple users who, for example, are then forced to walk on the grass adjacent to hard surfaces, thus causing compaction, physical erosion and damage [Fig. 6a]. These events and the resulting damage disrupt the patterns of usage by regular users which often

often become chipped or broken through use [Fig. 5a].

- Surface coatings for bike stands that are not impact resistant often become chipped through use (e.g. powder coatings) [Fig. 5b].
- `Desire paths` through grass areas (created by surface erosion) are often found due to a lack of paths in the preferred direct route (`short cut`). These paths follow fluid flowing routes that generally branch off at roughly 45° angles with rounded corners [Fig. 5c, d] (Loidl-Reisch 2013: 16).

Both **overuse** or **underuse** are problematic, each can lead to accelerated deterioration. **Overuse** leads to an increased frequency of loading and a greater intensity of wear, littering and soiling, which often



Figure 6: Overuse and Underuse. a) Visible signs of overuse: year 7. b) Erosion due to overuse: year 15. c) Increased succession due to underuse: year 01/year 07. d) Underuse: year 6.



Figure 7: Overuse in Berlin. a) Erosion due to a street food market in Preussen Park. b) Music event in Tiergarten Park.

leads to further conflicts. Damage through overuse is seldom ‘repairable’ through maintenance and often requires the increased stabilisation of surfaces and facilities. Therefore protective or preventative design and construction measures need to be taken in advance of events in order to limit damage. New projects can be implemented according to the requirements for specific events that are appropriate for the site (Jung 2013: 50).

Underuse accompanied by insufficient maintenance generally leads to an increased rate of soiling, spontaneous growth and material deterioration. For example, a reduced rate of trampling of paved surfaces through use results in the reduced suppression of surface growth which can lead to an increased rate of spontaneous vegetation growth (Lundholm 2014: 96). This needs to be counterbalanced by increased maintenance in order to avoid accelerated deterioration [Fig. 6c, d]. The underuse of a space also results in reduced social control which can increase the subjective feeling of being unsafe, which in turn can lead to a further decline in use (Tessin 2009: 18). Therefore, in an optimal situation, maintenance and repair operations need to be adjusted over time to the type and level of usage on site.

Usage is also an ‘indirect’ form of maintenance and should therefore be considered as a key aspect in optimising the long term development of the project. For example humans suppress spontaneous growth through trampling, oil wooden handrails through contact with their hands (Tanizaki 1998: 11) and remove dirt from benches

by sitting. This becomes especially apparent through the visible patterns of use that become evident through insufficient maintenance over time [Fig. 8].

DISCUSSION

‘It is safe to predict that during the life of the park, the program will undergo constant change and adjustment. The more the park works, the more it will be in a perpetual state of revision. Its ‘design’ should therefore be the proposal of a method that combines architectural specificity with programmatic indeterminacy’ (Koolhaas et al. 1995: 923)

Objects and spatial arrangements are not neutral. They demonstrate restrictions by allowing for certain uses by certain users and excluding others (Frers 2009: 177-191). Therefore a multifunctional design approach is preferable, allowing varying users multiple ways to use and adapt the object. Ideally, all possible forms of use need to be thought through and taken into consideration by the designer in the design and detailing stages. However, the **type and intensity of use** is difficult, if not impossible, to foresee in advance, especially when the whole project lifecycle is considered. The designer needs to gather a breadth of knowledge about the existing site with its specific context in order to make a judgement,



Figure 8: Use as an indirect form of maintenance. a) Year 2/year 9. b) Year 03. c) Year 6. d) Year 5.

including:

- Accessibility
 - site access and circulation
 - distance from user groups
 - catchment areas
- Urban quality (density etc.),
 - Surrounding land use
 - Living conditions
 - Spatial distribution of facilities within the region (e.g. public space)
- Climatic data
- Demographics (crime statistics etc.)
- Indicators such as:
 - existing signs of care or degradation provide an expectation as to the extent of use induced deterioration
 - the presence of women in public space - because women react more sensitively to 'unsafe environments' (Tessin 2009: 15)
- Possible future forms of use and events.
 - Events: Parameters need to be set for future events on the site e.g. type of events, maximum capacity, risk assessment, vehicular access, maximum weight of vehicles, protection measures and the provision of necessary equipment (Jung 2013: 50).
- It is also essential to know the level of maintenance and the skills of the available maintenance staff in the planning phase in order to achieve optimal maintainability.

If the type or intensity of usage is different to the prediction of the design team, the built landscape works may need to be adapted or optimised during occupancy. It is therefore necessary that Landscape architects monitor their built works at regular intervals after completion and report on project development. The current research shows that many problems related to use become visible within the

initial 2 years after completion, some however become evident over longer periods. In order to improve operation, optimise maintenance and to measure and optimise performance we would suggest a 4 step post completion monitoring system over a period of 5 years. We recommend that this should be implemented in year 1, 2, 3 and 5 after completion and cover the following topics:

- Technical analysis:
 - the identification existing and developing problems related to usage, design, construction etc.
 - the identification of performance issues
 - assessment of the consequential damage/effects if not improved or repaired
- Remedial works:
 - adjustment and or optimisation of maintenance regimes
 - planning of remedial works
- Optimisation suggestions
 - suggestions for design and/or constructional changes

The results of this monitoring also need to be published in order to provide feedback to the profession and thus optimise future projects.

*'As a spatial and temporal terrain, a landscape is continuously changing in an unpredictable way, steered by the relations of the site with its specific context - an evolving system instead of a static image.' ...
'Evolutionary processes are not exactly predictable. Thus, evolutionary design has to deal with uncertainty'
(Prominski 2005: 25, 33)*

As a response to the conflicts associated with use an evolutionary design, maintenance and strategic development approach seems appropriate, which is able to respond to

user demands through time.

The above mentioned student field research showed that, generally speaking (the results are not scientifically valid however show a distinctive trend), different user groups such as children, adolescents and elderly people, unemployed and employed people, cyclists, skaters, sprayers and homeless people, have very differing opinions in what is perceived as misuse and vandalism. User participation in site management from the initial conception through to the post occupancy phase allows for the development of a specific development strategy focussing on local views regarding the level of cleanliness (level of maintenance), tolerance towards 'vandalism' and deterioration, and for making design changes. This can lead to increased acceptance of the users and a focusing of resources.

A new system of long term development called 'process-oriented project completion' is being tested for the 'Park am Gleisdreieck' in Berlin. This is based on a planned withdrawal of part of the project budget in order to be able to react to changes and optimise operational performance after the completion of construction works. A 'User Advisory Board', consisting of elected local representatives, neighbours and members of the administration, represents the interests of the community and enables continual public participation throughout the project lifecycle, from the design phase to the post completion phase. The close contact between the management and the user advisory board ensures that the park's amenities develop close to the needs of the population, and that conflicts of use are recognised and minimised. An additional strength of this concept lies in the formation of a social network, thus increasing local identification and social control within the park. Insights from the initial usage of the park have led to the implementation of many concrete

optimisation measures including the construction of further facilities and additional maintenance measures needed to correct the damage caused by intensive use. (Park am Gleisdreieck 2017; Grün Berlin GmbH 2013)

The initial 'process-oriented project completion' period has now been extended to incorporate further unforeseen adaptations and extensions to the park due to park internal and external development factors (Endter 2018). In discussion with the park manager David Endter, an optimal processual completion period for all projects is not possible to define due to the specific individuality of projects. However minimum processual completion duration of 3 - 5 years is suggested (Ibid.).

CONCLUSION

Many factors influence the type, frequency and intensity of use of public space. Some forms of misuse lead to damage and destruction whilst others such as graffiti or stickers, form an additional surface protection layer and therefore can enhance durability. Non-destructive misuse may be viewed on certain sites as a positive indication of the appropriation of public space, highlighting the participation of citizens in shaping their environment. All forms of 'misuse' however contribute to the 'Broken Windows Theory' and therefore can result in further misuse and decline. The consequence of both **overuse** and **underuse** is accelerated deterioration which can be counteracted through increased maintenance or changes to the design, construction or maintenance regime.

The problems associated with use show a clear need for landscape architects to accurately foresee the intensity and frequency of use during project planning. However many factors are not accurately predictable, especially when considering the

complete project lifecycle. Therefore an adjustment mechanism is necessary during the post-completion phase in order to adapt to the actual situation of use through time. This research calls for the post completion monitoring of built works by the landscape architect in order for conflicts arising from the type and intensity of use or misuse to be addressed. The 'process-oriented project completion' model enables projects to adapt to changes by retaining part of the project budget for post-completion adjustment purposes. If accompanied by continual public participation, the needs of actual user groups can be incorporated into the further project development and in the optimisation of maintenance strategies. Therefore, regular monitoring of post-completion development together with the implementation of necessary maintenance and/or design improvements can assist in improving performance and extending project service life.

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Eco(nomi)logical Productivity: Leveraging Precision Agriculture for Economy and Ecology

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ABSTRACT

Agriculture is America's oldest and most vital economic pillar. Since the founding of British colonies on New World shores, farmers have reformatted the American landscape according to the principles of production and economic return. Though agricultural expansion and intensification have achieved unmatched levels of productivity, it has come at the cost of habitat conversion, fragmentation, and degradation. Could the same machines and mechanizations with which farmers have optimized economic performance be retooled to optimize ecological performance as well? This essay examines the potential of precision agricultural technologies to support eco(nomi)logical vitality in Iowa, the heart of the Corn Belt. Due to the constraints of mechanization, the working landscapes of Iowa have largely lost the ecological vitality they exhibited at the dawn of the 20th century. At the dawn of the 21st century, advances in the very same mechanization technology now hold the promise of enabling the reintroduction of biodiversity without sacrificing economies of scale.

INTRODUCTION

As de Tocqueville noted in the first half of the 19th century, "The Americans arrived but as yesterday on the territory which they inhabit, and they have already changed the whole order of nature for their own advantage" (1862, p. 562). The economic vitality of agricultural production has largely come at the expense of native ecosystems. If a vital and healthy ecosystem is

diverse and resilient, it cannot be denied that the logic of mechanization (as an extension of capitalism) has progressively homogenized and standardized conventional agricultural space. Since the emergence of State Agricultural Experiment Stations as part of the Hatch Act of 1887, farmers have increasingly applied scientific practices to to increase the productivity of their farms. Central to the logic of scientific experimentation is the control of variables. As James C. Scott notes in *Seeing Like A State* "if the logic of actual farming is one of an inventive, practiced response to a highly variable environment, the logic of scientific agriculture is, by contrast, one of adapting the environment as much as possible to its centralizing and standardizing formulas" (1998, p. 301). The economic transformation of agricultural trade through commodity pricing has further deterritorialized agricultural production.

One might understand the ecological vitality of mechanized agriculture, or absence thereof, by looking the world's most productive and heavily subsidized commodity crop, corn. In the U.S., corn uses more land than any other crop, spanning over 90 million acres that produce over 14 billion bushels annually (USDA, 2014). Corn is used as dairy, beef, swine, poultry, and even catfish feed. It is converted into ethanol, high-fructose corn syrup and bio-based plastics. modern corn hybrids require more nitrogen fertilizer than any other crop, some 5.6 million tons of nitrogen annually (Pollan, 2002). As a result of advancements in plant genetics, cornfields in the United States are more productive than ever, generating on average 15 million calories per acre. Yet with increasing productivity has come a rapid decline in diversity, resulting in a range of unintended environmental impacts. In addition to consuming land and water resources, modern corn hybrids require more nitrogen fertilizer than any other

crop, some 5.6 million tons of nitrogen annually. Runoff from fields degrades waterways and aquatic ecosystems, contributing to coastal “dead zones” in the Gulf of Mexico and Great Lakes.

Though history might indicate otherwise, this paradigm of mechanization and ecological homogenization is not immutable. As Lewis Mumford notes in *Technics and Civilization* “The machine itself makes no demands and holds out no promises... So far, we have embraced the machine without fully understanding it, or, like the weaker romantics, we have rejected the machine without first seeing how much of it we could intelligently assimilate” (1934, 6).

The potential for higher yields and increased efficiencies have historically driven advances in agricultural technologies and the widespread adoption of new practices. Mechanized agriculture has degraded regional landscapes not because it is inherently destructive, but because the logic of capitalism has driven production methods. Could the same machines and mechanizations with which farmers have optimized economic performance be retooled to optimize ecological performance as well? Could precision agricultural technologies resolve the conflict between economy and ecology? This essay examines the potential of precision agricultural technologies to uncover eco(nomi)logical synergies in Iowa, the heart of the Corn Belt. Due to the constraints of mechanization, the working landscapes of Iowa have largely lost the ecological vitality they exhibited at the dawn of the 20th century. At the dawn of the 21st century, advances in the very same mechanization technology now hold the promise of enabling the reintroduction of biodiversity without sacrificing economies of scale.

Agriculture as Economy

Capitalism determines the spatial and material logic of commodity

agriculture today. Divorced from the land that produces it and the people that consume it, commodity agriculture is no longer driven by the free-market forces of supply and demand. The deterritorializing forces of global trade and financial speculation increasingly guide the form and functioning of the productive landscape. This history is nearly as long as agriculture itself. Agricultural products comprised the world’s first commodities as food surpluses enabled trade between communities at the onset of the agricultural revolution in 8,500 BCE. As trade advanced, farmers and merchants sought to protect the price of their products from the volatilities of weather, conflict and supply and demand. Futures agreements allowed brokers to buy and sell agricultural commodities at a predetermined price at a specified time in the future. As a precursor to the stock market, the Dojima Rice exchange positioned rice as the primary financial currently in 17th century Japan. Agricultural futures spread to the United State in the early 19th century, as grains were transported from Midwestern farms to Chicago before being shipped to the east coast. Because agricultural products are perishable and the quality of stored grain could deteriorate over time, forward contracts allowed farmers to sell commodities before they were harvested and delivered. This enabled the establishment of the first American exchange, the Chicago Board of Trade (CBOT), in 1848. Agricultural products remained the primary class of futures trading at the CBOT for over 100 years. By the 1970s, as global economies moved away from the gold standard, currency values fluctuated based on market forces and financial futures themselves became tradable commodities. Finally, brokers could trade prices instead of goods.

The economic transformation of agricultural trade through commodity pricing in the 20th century further de-territorialized agricultural production.

When then President Bill Clinton signed the Commodity Futures Modernization Act into law, he opened the way for investment banks and other financial actors to bet on commodities as speculation, rather than insurance. As Heidi Chow of the World Development Movement notes, “Where we used to see something like 12% of the market made up of financial players, since deregulation, this number has now jumped to over 60%.” Following this act, commodity price indices become tightly coupled, with the price of agricultural commodities increasingly dependent on energy, mineral and other commodity markets. With the comovement of commodity pricing, investment in agricultural commodities more than doubled in five years.

Scholars from various disciplines have discussed this relationship between capitalism, power and agricultural technologies, be they institutional, mechanical or biological. Jack Kleppenbergh in *First the Seed: the Political Ecology of Biotechnology* and Deborah Fitzgerald in *The Business of Breeding: Hybrid Corn in Illinois, 1890–1940* describe how an organism can be engineered to maximize the accumulation of capital. Meanwhile, in *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed*, James C. Scott details how commodity agriculture, as a high modernist endeavor, radically simplifies agricultural production in order to increase the legibility of the land and the people working it to their centralized political power. Though not directly related to agriculture, within the discipline of architecture, Keller Easterling in her texts *Organization Space* and *Extrastatecraft* calls attention to the policies and protocols that govern landscape information. She states: “Some of the most radical changes to the globalizing world are being written, not in the language of law and diplomacy, but in these spatial, infra-structural technologies—often because

market promotions or prevailing political ideologies lubricate their movement through the world” (p. 14).

Mechanization in the Corn Belt

In many ways mechanization seems anathema to ecological vitality. Mechanization, and by extension capitalism, have progressively homogenized and standardized agricultural space in the United States. As forests were cleared, wetland drained and prairies plowed over, biodiverse ecosystems were gradually replaced with monocultures. These processes are particularly evident in the Iowa, the heart of the modern day Corn Belt. Prior to colonization, tallgrass prairie covered 85% of the state (Bogue, 2011). Iowa’s geology and climate encouraged the growth of perennial grasses that could reach over six feet tall, with roots just as deep. The flat and poorly drained soils of the Des Moines Lobe gathered water, creating lakes wetlands that were part of the larger prairie pothole region, reaching across to Minnesota, the Dakotas, and into Canada. Early settlers called Central Iowa “Land of 1,000 Lakes” due to these many shallow prairie pothole wetlands. Wet and tallgrass Iowa prairies provided habitat for a large variety of wildlife specially adapted to life in the open grassland, including bison, elk, and wolves. Nomadic Native American tribes followed bison herds while sedentary tribes farmed not in the prairie but along the river banks.

As the midwestern prairies were incorporated into the young United States as part of the Louisiana Purchase in 1803, European American settlers moved westward. As a New World landscape, the ecology of the midwestern prairies captured the imaginations of these travelers and settlers. While the hilly forested terrain of New England could be shaped to reflect European pastoral ideals, visitors to the prairie

encountered an other-worldly flatness that inspired awe and fear in equal measure. Herbert Quick writes in *Vandemark's Folly*,

"I sat looking at it, with the tears trickling from my eyes, the uplift of my soul more than I could bear. It was not the thought of my mother that brought the tears to my eyes, but my happiness in finding the newest, strangest, most delightful, sternest, most wonderful thing in the world--the Iowa prairie--that made me think of my mother... And as I thought of this I realized that the woman of the ferry had climbed over the back of the spring-seat and was sitting beside me. "I don't wonder," said she, "that you cry. Gosh! It scares me to death!" (Quick, 1921, pp. 111-13)

While Quick found promise in the uninterrupted horizon of the Iowa landscape, others like the young woman he mentions encountered a frightening and lonely landscape. In *America by River and Rail*, William Ferguson writes "The feeling of relief with which one escapes from the interminable forests of the middle States, into these boundless 'earth-oceans,' becomes changed almost to oppression, as you gaze upon the unintermitted expanse of grass, which only here and there a solitary cabin in the wide waste - a mark to help us in estimating the immense extent of the vast solitude." (Ferguson, 393).

The deep roots of the prairie grass would not easily allow early settlers to transform the immense prairie to their liking. Indeed, most early Iowa pioneers did not have technology to plow through the thick mat of prairie sod. The deep dense roots of bluestem and Indian grass created an impenetrable barrier above

the soil that could not be broken by wooden plows of the early 1800s. This changed in 1837 when John Deere invented the steel moldboard plow. The plow revealed a dark black soil, rich in organic matter from millennia of grassland decomposition. The fertility of the black soil would ultimately motivate the transformation of the prairie from space of ecology to one of economy. By the end of the century, the Iowa prairie would be gone, some thirty million acres of deep-rooted grasses plowed over and converted into the most productive farmland in the world.

The wet prairies of the Des Moines Lobe were slower to develop. Farmers looked to the soggy, mosquito-infested areas and found it ill-suited to settlement or agricultural production. Though ideally suited for wetland plants, poor surface drainage impaired agricultural productivity. The federal government sought to remedy this impediment in 1849, when the Swamp Lands Act declared that the 1450 square miles of swamp and overflowed lands in Iowa were "unfit for cultivation" and granted lands to the State. States established drainage districts in order to "reclaim" the wet prairie by constructing ditch networks. During this time, hundreds of miles of ditches were built across the state to improve land drainage. While ditches were effective drainage systems in the Northwest Plains, they were less successful in the Des Moines Lobe, where the waterlogged flat terrain needed to be drained with subsurface, or underdrainage, tiles. As a drainage technology, tile drains were slow to proliferate because they required teams of skilled workers to dig trenches with picks and shovels. The invention of the Buckeye Steam Traction Ditcher in 1902 mechanized tile drain installation and sealed the fate of the wet prairie.

Aided by technological advancements, the ecological identity of Northwest Iowa was intractably altered, the sea of grass supplanted by a sea of grain. As outlined by William Cronon in

Nature' Metropolis, the interrelated infrastructural and economic innovations of the refrigerated railcar, the grain elevator, and the commodities exchange market in the mid 19th-century drove the destruction of the prairie and rise of corn. Between 1839 and 1859, national production of corn more than doubled (Wartnz, 1957). By the turn of the 20th century, Iowa would be positioned firmly in the center of the "Corn Belt." Indeed, the name of the largest Ecoregion in Iowa, the "Western Corn Belt Plains," reveals the extent of this transformation, the ecogeography secondary to the productive territory.

The importance of machinery in agricultural production in the state has only increased over time. As of the most recent Agricultural Census, the estimated market value of machinery and other equipment per farm in Iowa was over \$200,000, twice the national average. Farms in Cherokee county, the highest yielding county in the state, hold an average of \$272,880 in machinery and equipment. Farm equipment is increasingly data driven and classified as precision agriculture (PA) technology. The most common PA technologies integrate digital data acquisition and/or utilization into agricultural equipment. Most systems are based on GPS technology for positioning and incorporate multiple sensors. GPS guidance systems, variable rate application equipment, and yield monitors are the most widespread. The objective of these technologies is primarily to maximize efficiency and optimization in relation to yield and profitability associated with watering, fertilizing, planting, and harvesting.

Precision technology and Eco(nomi)logy

Though agriculture is driven largely by economic principles, it can also be understood as ecological production by a different name. Like an ecosystem, agriculture is driven by the dynamic interaction of organisms

and the localized abiotic environment. Even contemporary row-crop agriculture manifests a form of ecological succession, with the annual disturbance of harvesting starting the successional timeline while the management of planting and chemical amendments encourages the colonization, survival and productivity of the agricultural organism. Indeed, if photosynthesis is one measure of ecological productivity, then Corn Belt is the most productive place on Earth. In peak growing season its intensively managed fields of corn and soy boast more photosynthetic activity than the Amazon Rainforest. (Guanter et al, 2014). Yet Agriculture is highly simplified and exclusionary ecology and agricultural yield often comes at the expense of other valued ecosystem services at the site and landscape scale. A variety of different external factors influence this ecological bargain. Agricultural policies like the farm bill incentivize a small number of commodities, while markets do not pressure growers to internalize negative environmental costs. Meanwhile, consumers are not well educated about environmental trade-offs of food choices.

Funded primarily by large agricultural corporations like Monsanto and Syngenta, to date, the main driving force behind PA technologies has been to maximize economic return to the farmer, with environmental impact mitigation relegated as a secondary benefit. With the majority of technologies designed for commodity crops like corn and soybeans that are not grown for direct consumption, the relationship of PA to ecology remains unexamined. If, as Mumford asserts, if it is not the technology that determines its destiny, but society, could PA technologies be leveraged to restore terroir to spaces of production agriculture? In this section I explore the potential of the combine grain yield monitor.

Combine grain yield monitors

dynamically record and geolocate yield while the combine is harvesting. Most monitors measure harvested volume, moisture content and flow rate to determine the total amount of grain harvested. A GPS system locates the spatial coordinates for each harvested quadrant, at a typical resolution of one square meter. After harvest, this allows the farmer to produce a yield map. When combined with data on field inputs and up-to-date commodity prices, this yield map can generate a spatially explicit snapshot of the season's harvest. By overlaying maps from multiple seasons, the farmer can discover areas of the field that are generating less profit or perhaps even losing money. Yield monitors could identify marginal areas that could be taken out of production and converted to a native plant community and in so doing, actually save the farmer money. Yield maps combined with high resolution soil maps, gathered through in-field surveys or remote sensing, could inform the most suitable plant community for the marginal areas. Newly planted native prairie and wetland plants could provide year-round habitat and food for beneficial insects and pollinators. Greater numbers and species of birds are consistently found in agricultural fields with small patches of prairie and wetland. Research has also shown that insect diversity in cropland with linear prairie plantings equals that of nearby prairie restorations. Though agriculture has historically fragmented regional, discrete site scale interventions could network to generate connected wetland, grassland, and forested habitat.

CONCLUSION

To summarize, yield monitors could help to reclaim ecology within Iowa cornfields, creating a heterogeneous productive landscape that materializes in-field variation as crop diversity. Moving beyond mitigation, these

technologies afford new methods of practice that prioritize complex ecologies alongside productive economies. The landscapes and instruments associated with Precision Agriculture are an ideal testing ground for the field of landscape architecture to imagine the potentials for agricultural technologies to impact ecological systems at the unprecedented scale of conventional agriculture.

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Interdisciplinarity versus Conflict: A Joint Effort

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ABSTRACT

The 21st century sets up new demanding tasks for professionals involved in spatial transformations and especially of public spaces. These tasks include, among others, aligning traditional landscape design objectives with those striving towards landscape democracy in its material and non-material appearance and acknowledging the impact of spatial interventions on multiple social identities, collective emotions and feelings. This paper aims at contributing to the growing discourse on urban conflicts by showcasing the interdisciplinary nature of public space design as a medium in taming conflicts. It outlines affective background of socially spatial disorders both as a result of spatial intervention and of disturbed communication within the profession itself. The authors argue, that conceptualizing interdisciplinarity as a joint effort of urban professionals stewarding urban landscapes will open a path for landscape architectural practice and theory to promote empathic cities.

INTRODUCTION

The 21st century, coming with megacities, messy democracies and IT revolution, calls spatial design disciplines to facilitate integrating the traditional design objectives with the management of social processes. Transforming material component of urban space nowadays is often accompanied by social disorders of different scale and intensity. There is an evidence indicating interrelations between spatial transformation, social disorders and such non-material

phenomena as social identity and collective affective body.

This paper is a sketch aimed at contributing to the discussion on urban conflicts, which has been growing within urban discourse during the last decades, by focusing on the interdisciplinary character of public space design process and its role in creating an empathic city. Empathy in the urban practice is understood as social form of love (philia) - solidarity that keeps the polis together as a political entity. "It presides over the truest form of justice: a friendly arbitration through discursive speech rather than the placation of law and can thus be defined as a "social sympathy" (Perez-Gomez, 2009: 122).

Public space nowadays increasingly functions as an agora [1] and is a platform of democratic debate. Even though this assumption has been criticized as idealistic, and issues like access and eligibility, the increased privatisation of public space, its monitoring and control, have rendered the public space less public (Avgitidou et. al, 2016), exercising empathy through landscape design becomes a demanding task for the practitioners involved in spatial transformations. Now more than ever, landscape architects, being "generalist in nature" with broad understanding of built environment (Holmes, 2018), are the link between multiple stakeholders within urban projects, from professionals and inhabitants to politicians. As such, they must fulfil the role of a threefold mediator: between professionals from related disciplines, between the civic society and the authorities, and between the counterposing interests of diverse social groups within the civic society.

Nowadays, the professional education in spatial design disciplines, mirroring the processes in the "wild", is in search for new, more integrated and interdisciplinary approaches (Sandercock, 2004; Innes and Booher, 2015). These approaches strive to reflect the needs of different but

overarching fields, growing demand for all kinds of participation, interdisciplinary and interdepartmental collaboration and international co-operation.

Interactive events of continued professional education (Gutmane and Schreurs, 2016), interdisciplinary in-academia workshops and plain-airs, various types of action research (Coghlan, Brydon-Miller, 2014) or new academia-to-practice oriented systems of research grants are but few examples of attempts to diversify the academia-practice relationship and to encourage communication among spatial design disciplines within academia.

Professional education within landscape architecture as well facilitates new voices that bring interdisciplinarity into focus, explicitly taking on challenges it encounters. Some examples are the recently (2014) founded LA+ biannual publication and the online Scenario journal hosted by the Landscape Architecture Department at the University of Pennsylvania's School of Design, and the Interdisciplinary Centre for Urban Culture and Public Space (SKuOR) at the Faculty of Architecture and Planning at TU Wien.

These collaborative tendencies towards interdisciplinarity in practice and academia seek to fulfil the role urban practitioners traditionally have created - addressing discords generated by inequalities in power and mediating for public interests (Almendinger and Haughton, 2012). The fulfilment, methodological approach, and distribution of responsibilities for these tasks are frequently discussed in a large spectrum of literature on collaboration (Healy, 1997; Booher and Innes, 2002; Sandercock, 2002; Hillier and Metzger, 2015) and conflicts (Bob and Bronkhorst, 2010; Coopens, 2011; Metzger et al, 2015) in urban planning, design and architecture. However, there is much less scientific attention devoted to in-field communicative disturbances, which to a large extent prohibit effective work on public good.

CONFLICTS AS AFFECTIVE SOCIAL DISORDERS

Socially spatial disorders are mirrored in body of texts on protests in planning literature, following the growing in 50-s, boomed in 80-s and nowadays still existing high interest in conflict and consequently conflict management [2] in human geography, social psychology and organizational studies. There is a large spectrum of discords, broadly debated within urban discourse like protests against big developments, public resistance phenomena like NIMBY and LULU, various types of environmental conflicts, spatial interventions disproportionately affecting women and minorities, or "New social movements" (NSM) performing as squatting, urban gardening or green guerrilla. While most protests take the form of demonstrations or peaceful mobilisation of communities to claim their rights by local or environmental activists, there are also violent incidents (Bob and Bronkhorst, 2010). An important note is that whatever type of resistance is encountered, it always means evoking and socially sharing emotions of different gradient and displaying them publicly to a different extent. Thus, socially spatial disorders are situations of salient emotional condition which involve "behavioural expression of formerly latent attitudes where one party is perceived to take action at the expense of another party's interests" (White et al., 2009:244).

It is possible to draw a psychological border between violent and non-violent conflicts. The first is a display of negative emotions like hatred, fear, threatening, and possession aimed at destroying. The second generate gratitude, serenity or altruism aimed at co-creation. All actions of resistance always animate sharing of positive emotions like solidarity, pride, hope for better future, satisfaction, whatever

the goal – constructive or destructive - they aim at. By animating certain positive emotions, fundamental human needs like feeling of belonging and social identity, are strengthened within protesting group.

Acknowledgement of the affective background of social practices of resistance has two crucial implications for spatial design professions both in the building practice and in academia. One concerns mediation of communicative disturbances within urban projects, the other - recognition of the affective background of disturbed communication and the need to research the socio-affective aspects and to teach young professionals appropriate skills.

The first has been much assessed within the debate on rationality in urban planning (Alexander, 1984, 2000; Sager, 2003) and in the literature on collaborative (communicative) planning approach (Innes, 1995; Booher and Innes, 2002; Healy, 1997). Discussions concerned autocratic tendencies of the rational planning model, its inability to adequately consider the collective nature of planning and design process and the central role of dialogue, as well as the insufficient consideration of creativity (Lawrence, 2000).

Although the second issue has been continuously approached within the architecture and urban planning literature for at least 50 years (Rapoport, 1977; Baum, 1997; Gunder and Hillier, 2009), the socio-psychological approach has not yet developed as a discipline with a sufficient disciplinary community, array of publications or mechanisms of professional socialization like in geography, law or sociology (Hoch, 2006; Baum, 2015).

INTERDISCIPLINARITY AS A JOINT EFFORT

Within the spatial design disciplines, the acknowledging need for collaboration, managing social disorders and

mediating salient emotions reflects the global urbanization accompanying processes: blurring of boundaries between spatial entities (e.g. city and countryside), the increase of the multidimensional character of building projects (e.g. build/open space/economic efficiency/ecological responsibility) and, as a result, softening traditional disciplinary boundaries of architecture, landscape architecture, urban planning, and urban design. Disciplinary boundaries strengthen professional clusters' social identities, where, when belonging to that particular cluster, the individuals share its habitus' rules, social benefits (illusio) and doxa (Bourdieu, 1997; Hillier and Rooksby, 2005). The latter means a point of view shared by members, which they perceive to be neutral, objective and universal, and which they impose on others.

Dissolving disciplinary boundaries contributes to growing "inter-disciplinary anxiety" when "crossing of boundaries leads to concerns regarding the integrity of institutional identity and an irretrievable loss of intellectual autonomy" (Huggan 2002: 245 in Kullmann, 2016). This contributes to the creation of hidden misunderstandings or open confrontations between urban professionals, shifting focus from the common aim to sectoral interests. Landscape architects, dealing with collective character of open space, are often involved in mediating communicative disorders within and outside urban projects. This mediation means mostly exercising interdisciplinarity by empathic attitude towards multiple social identities over the disciplinary borders.

Several terms can be found in related literature that are applied to over-disciplinary phenomenon interchangeably: "multidisciplinary", "cross-disciplinary" and "transdisciplinary". "Multidisciplinary" is used more consequently in the Multidisciplinary landscape assessment (MLA)

methodology, elaborated by the Centre for International Forestry Research in 1999 to enhance understanding between development practitioners, policy makers and forest communities (Liswanti and Basuki, 2009). The term also often concerns the profile of a practicing professional team. “Cross-disciplinary” may refer to research that unilaterally investigates a topic outside of the researcher’s original discipline, without interacting or cooperating with the visited disciplines, but “transdisciplinary” - to a holistic unity of knowledge that is greater than the sum of the constituent disciplines (Kullmann, 2016).

Conceptualizing the term “interdisciplinary” as a philosophy of urban research and building practice regarding urban culture and public space (SKUoR) may bring both – research and practice - at a new level of over-boundaries integration. Approaching interdisciplinary action as a joint effort of urban professionals stewarding urban landscapes, may help to overcome aforementioned “inter-disciplinary anxiety”, permeate walls that currently exist psychologically between the disciplines (Kullmann, 2016:39) and promote open spaces as “sites of respect” (McAuliffe, 2012).

EXPLORING LANDSCAPE OF COLLABORATION

There are contradicting tendencies in perception of landscape architecture as profession. One displays more pessimistic view of landscape architecture undergoing “fragmentation and loss of disciplinary territory in both theory and practice, lack of authentic design discourse that is attributed to the diverse origins of the field...”. (Kullmann, 2016 :30) Another marks a strong increase of interest in landscape and landscape architecture as an art and design discipline (Baird and Szczygiel, 2007; Holmes, 2018).

Numerous cases from all over the world – from micro scale street furniture

to meso scale projects of urban plaza, parks and sacral landscapes to macro scale green infrastructure projects – are shared on web-sites of NGO-s, companies or individual professionals. Waiting for being researched, this extensive body of digitally presented information cannot fully replace exploring personal reflections of professionals what such tools as open-ended repeated interviews or thematic surveys can provide. Except of direct tasks of analysis, these research actions activate reflections and can serve as facilitator for discussions.

Within working group “IFLA/UIA” [3] brief survey on interdisciplinary dimension within the profession has been elaborated. The survey aims firstly at testing widely within profession shared perception of landscape architects having vulnerable position within urban projects. Secondly it has been initiated as a tool for facilitating discussion on and professional activities concerning interdisciplinarity and setting priorities for strategy and research.

At this research stage survey designed simple. One closed question: “During your practice professionals from which disciplines have you worked with for landscape design project?” provides multiple choice answers: “architects, artists, interior designers, gardeners, ecologists, foresters, urban planners, agriculturalists, designers, sculptors, anthropologists, sociologists, scientists, traffic engineers, water engineers, arborists”. All multiple-choice answers had cross question to identify the levels of cooperation: LEADER - you as landscape architect (LA) lead the project; CO-WORK - you as LA have position/status comparable to that of others team members; UNDER - your status/position as LA subordinated by that of other specialists; CONSULTED – to execute project you invite other specialists as consultants; NO EXPERIENCE”.

Three options invite respondent to extend given information by (a)

adding expertise and respective level of cooperation if ones are missing in the multiple-choice question, (b) to give one to three examples of joint interdisciplinary projects, (c) to describe educational background. Latter meant to test assumption that landscape architects have interdisciplinary background. The survey was digitally and manually distributed among practicing landscape architects and interviews were conducted while distributing. The preliminary results cover 30 respondents from 20 countries. The results confirm theoretical assumptions mentioned above and formulated as concluding remarks.

CONCLUSIONS

There is steady evidence supporting bumming interest in landscape as an integral component of social revival, as bearer of social identity and as a focal value of multiple actors. Landscape architects, often coming into the discipline from related fields, work as mediators between multiple stakeholders involved in urban projects.

The role of mediator requires understanding of and appropriate skills for a systematic “friendly arbitration” while building solidarity among external stakeholders like civic society or politicians, among allied professions within building practice and academia as a hub of professional education. Therefore, an interdisciplinary theoretical framework for design innovation is much awaited in the field. This framework must include systematically approached affective dimension of human relations.

Dissolved disciplinary boundaries outlined by diversification of spatial design disciplines create psychological “walls” between professionals belonging to particular disciplinary habitus and strengthen feeling of interdisciplinary anxiety accompanied by emotionally perceived need to protect “own territory”. If activated as

a collaborative platform for mutually empowering knowledge exchange: “yes, you can use my ideas”, interdisciplinary can significantly contribute to dissolving the competitive spirit between allied professions and build closer relations between academia and practice.

Jointly engaging with interdisciplinary collaborative agenda and building steady knowledge about socio-affective aspects of urban planning and design, spatial design professions would significantly contribute to co-creating empathic city, which suggests practicing solidarity, social sympathy and moral geography built around inclusion.

NOTES

¹ Greek: Ἀγορά, Agorá) was a central spot in ancient Greek city-states. The literal meaning of the word is “gathering place” or “assembly”. The agora was the centre of the athletic, artistic, spiritual and political life of the city. <http://www.agoraps.com/> [accessed 2018.04.07]

² For discussion see Rossel, J., & Collins, R. (2001). Conflict theory and interaction rituals. *Handbook of Sociological Theory*, 509-531.

³ ‘International landscape architecture federation /International Union of Architects working group within professional Practice Committee focuses on elaboration of common strategy, overcoming sectoral fragmentation and breeding idea of emphatic design.

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Perception of Wind-Energy-Landscapes

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Keywords:

landscape assessment, participation, renewable energy, scenarios

ABSTRACT

There are many assumptions on wind turbine perception but few empirical studies exist to support them. This paper presents findings from a study on perceived landscape effects and values of wind turbines. This research is part of efforts to understand landscape effects of the implementation of energy transition policy in Germany. Contributing to the de-carbonization of national energy production, the public generally appreciates this policy, called the Energiewende in popular terms, as an important contribution to economically and ecologically sound development of the country. Locally, however, people might receive energy transition projects less favorably, particularly so when residents perceive plans for projects such as wind power turbines as detrimental to much cherished landscapes. The research objective is to collect empirical evidence and compare expert and public landscape perception and values. The empirical study has two parts and includes a GIS-based professional landscape assessment and an open online-survey with $N = 215$.

INTRODUCTION AND STUDY APPROACH

Funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the German Nature Conservation Agency (Bundesamt für Naturschutz BfN) contracted a research consortium¹ to conduct a study with two objectives; first to design scenarios for the development of renewable energies and, second, to learn more about landscape effects of renewable energy projects. Findings of the project

would become part of discussions on future national policy as well as future legislation. This paper reports on findings from the landscape effect study. The majority of renewable energy production is and will continue to be from wind- power. People take note of environmental and landscape effects of wind turbines. Interests includes fauna, such as the conservation of wild birds and bats, and landscape, such as the protection of local character and scenery.

The study of landscape effects takes scenarios as starting points. Scenarios for placing wind turbines include all of Germany. Scenarios consider economic aspects and optimize, among other issues, the best locations for generating energy by wind turbines, according to average wind speed and strength, and the proximity to places of energy demand. Scenario design is based on the national network development plan called *Netzentwicklungsplan* (Bundesnetzagentur 2017).

Each of the scenarios is presented in a nationwide raster-map of 25x25 meters cell size. The maps indicate where wind-turbines would need to be placed and, at the same time, meeting the goal of 80% renewable Energy production in Germany.

For the environmental assessment of scenarios criteria were identified and, using the GIS-based maps, applied to each of the scenario. The assessment includes landscape effects, particularly scenic quality and wind turbine perception. In environmental assessment practice, professionals such as landscape architects usually take pragmatic approaches to assessing landscape quality and landscape effects of plans and projects. Assessment methods usually use criteria that are derived from legislation, such as the national nature conservation act, the *Gesetz über Naturschutz und Landschaftspflege (Bundesnaturschutzgesetz)* 2009.

In efforts to make opinion and

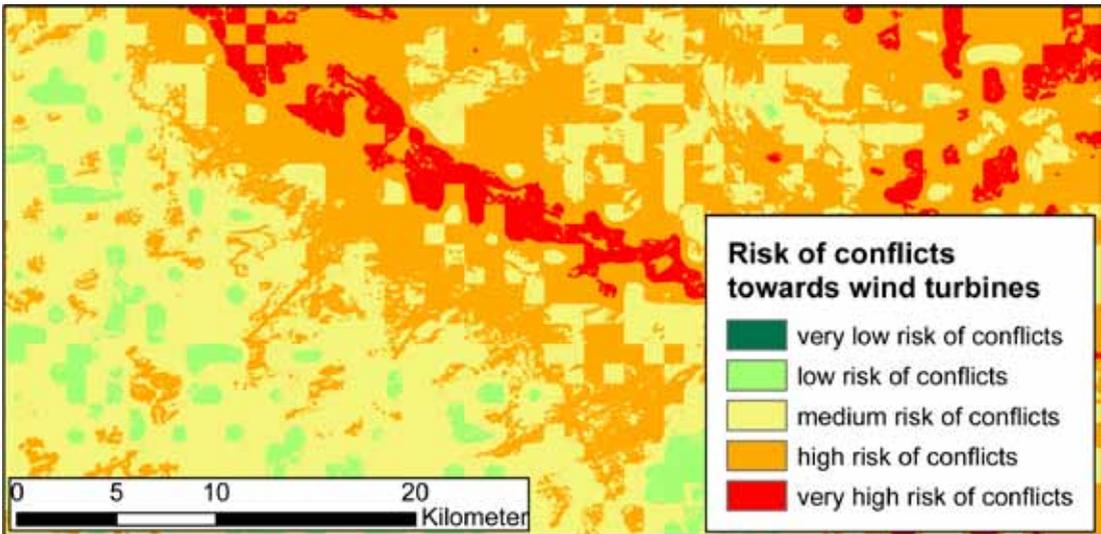


Fig. 1. GIS-landscape-assessment-map showing landscape value ranging from very high (red) to very low (green)

decision making more participatory and to include not only expert but also public perspectives, an online survey was conducted. This survey makes use of landscape photographs. In the following, the focus will be on this part of the project. The expectation was that the study would offer insight as to the publically perceived effects of wind turbines, and generate knowledge about public landscape values. In addition, survey results would be compared to expert assessments that are made based on GIS-maps. Here, the expectation was that empirically generated information might lead to modifications of the GIS-model used to date.

Expert landscape assessment based on GIS-maps

The GIS-based landscape assessment takes provisions made by the national nature conservation act, the *Bundesnaturschutzgesetz* as a starting point. This legislation requires that landscape assessment considers beauty (*Schönheit*), diversity (*Vielfalt*), and specificity (*Eigenart*) as well as recreational values (*Erholungswert*) of nature and landscape (Bruns and Stemmer 2018). In order to learn how practitioners apply these general

criteria in their assessment practice, a systematic literature search was conducted and a number of commonly used landscape assessment methods identified. Reviewing and comparing these methods with one another resulted in a set of assessment-criteria (Table 1). Applying these criteria the GIS-model allowed to produce a nationwide map that represents the expert assessment of landscape quality.

In a second step, a set of hypotheses was formulated that provide the basis for assessing the risk of conflict that might arise between landscape quality values and wind turbine placement. The hypotheses are expressed as landscape vulnerability against placing wind turbines:

1. The higher the diversity of a landscape the lower the vulnerability.
2. The higher the specificity of a landscape the higher the vulnerability.
3. The higher the beauty of a landscape the higher the vulnerability.
4. The higher the recreational value of a landscape the higher the vulnerability.
5. The higher the naturalness of a landscape the higher the vulnerability.



Fig. 2. Two versions of a photo used in the survey: original (left) manipulated (right)

The application of these hypotheses resulted in a GIS-based map of the risk of conflicts that might arise between defending landscape values and placing wind turbines for the entire German territory. Fig. 1. Illustrates an example of that map.

Public Online Survey

The aim of conducting the online survey was to generate data that would represent public landscape perception. The idea was to compare public and expert assessments on the basis of GIS-analysis.

The approach to conducting the online survey was to use landscape-imagery. First, images were produced to be used as stimuli material. Out of the national data set, six sample areas were selected. Each of these sample areas represent a particular type of cultural landscape; the typology is according to a classification of cultural landscapes by Schmidt et al. (2014). In every sample area standardized photographs of potential windfarms siting areas were taken, according to the scenarios described above. Using virtual 3D scenes, these photographs were modified to integrate possible wind farms. This procedure resulted in four photos for each sample area; two existing and two modified ones (Fig. 2).

The photographs were fed into an online survey that was conducted in 2017, from August 16th until November 20th. Addressees of the survey were

lay people. Lay people, in this context, are defined as people who would not respond to landscape or renewable energies in a professional manner. The general structure of the survey is illustrated in Fig. 3.

To make sure no respondent would see the original and modified version of the same picture, the images (original and modified versions) were clustered in four different groups beforehand (Fig. 3). As each respondent saw a maximum of 12 photographs, not every participant saw every picture.

For every photograph, each participant needed to rate eight items representing diversity, specificity, beauty and naturalness. This method is based on an approach suggested by Roth (2012). Participants also needed to rate the recreational value using PRS-Scales suggested by Pasini et al. (2014). Scales ranged from 1 to 10. Information on personal attitudes towards landscape, renewable energies and nature was also collected, as well as some socio-demographic information such as age (Fig. 3).

RESULTS

Survey participants completed 215 questionnaires. Of these, 114 reported to be landscape experts and 101 to be lay people. 102 male and 113 female persons participated. The average age was 46.6 years. The education

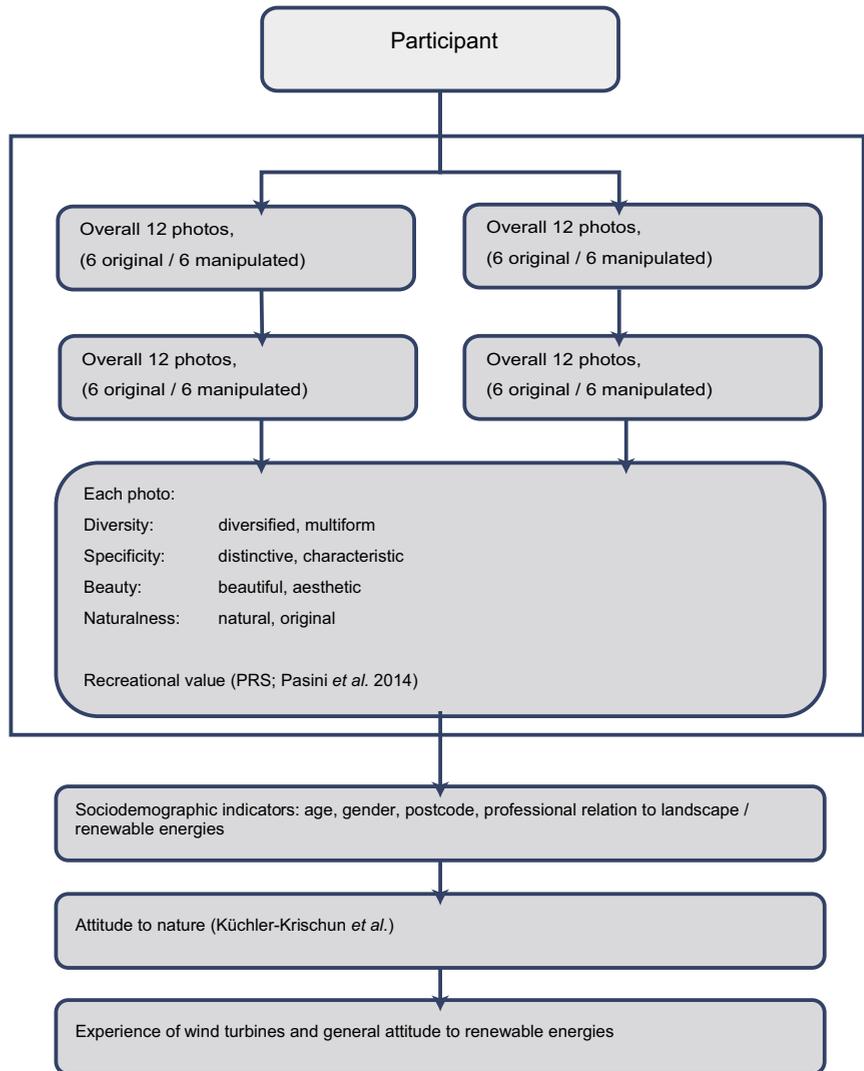


Fig. 3. Structure of the online survey

was high with 90 % of the participants having finished studies at a university or a university of applied sciences. 15 % held a doctoral degree.

One third of all respondents lived in an area that had no current wind turbines at all, 38 % lived in a distance of more than 5 km to the next wind turbine, 23.3 % within a distance of more than 3 km.. Attitudes to nature and landscape is, in average, highly positive, particularly when compared to results that national surveys had previously generated (Küchler-Krischun et al. 2015).

Nearly all of the socio-demographic information indicates that the

sample of this online survey was not representative regarding the German average in almost every respect.

All items that were included in the survey to test people's landscape preference showed significantly high correlations between one another; correlations were ranging from 0.828 for beauty and diversity, and towards 0.673 for naturalness and specificity. At the start of the study, the assumption had been that these items, in pairs of two, would help measure diversity, specificity, beauty and diversity independently from each other. Survey results suggest, however, that all eight items were measuring similar things;

LANDSCAPE EXPERT AND PUBLIC ASSESSMENT IN COMPARISON

apparently, in public perception, little difference seem to exist when lay people use the criteria that experts employ during professional landscape assessment. In the following, all of these items taken together are summarized as "overall aesthetic value".

All items that were included in the survey aiming at to test people's recreational preferences, PRS, were all highly correlated with one other, up to 0.895. This result met with previous expectations and it is thus reasonable to assume that these items are useful to measure recreational landscape values.

Regarding overall aesthetic landscape values, survey results showed significant differences between responses to photographs representing different kinds of cultural landscapes. Results also suggest that people rate landscapes that include wind turbines generally lower than those that have none. Nevertheless, even the modified versions of the most highly rated landscape type (L1) are still rated higher than the non-modified images of low-rated landscape types (L3-L6) (Table 2).

Regarding recreational value, respondents rate the two most highly rated landscape types higher than the low-rated landscapes even in the cases of modified versions.

Another important finding is that, even if the most highly rated landscapes for recreational and overall aesthetic value are rated high with wind turbines included, the total loss of perceived value inflicted by turbines is considerable. Within in all landscapes that people perceive as less attractive and possessing little recreational value, the turbine effect is minor or moderate, depending on the cultural landscape type. The risk of conflict occurring is higher in landscapes of high value. In this respect, of the hypothesis stated above hypothesis number 2, 3, 4 and 5 where verified, while hypothesis number 1 was falsified. This finding led to consequent modification in the GIS-model.

Next, values generated by landscape expert assessments and values generated based on photographs are compared. To make comparing of the two different data sets possible, view shed analysis of the photo-perspectives were conducted using a DEM (Digital Elevation Model) and expert landscape assessments performed within the view-shed of each of the photographs. Based on results thus generated, expert assessments were compared to the publically generated values for each of the non-modified images. Only the average generated for of all viewable cells was calculated, as there is no knowledge at all about the meaning of distance to any of the viewer. A maximum viewable distance of five kilometers was assumed as reasonable. On this basis, the calculated correlation between expert generated values and values from the public survey was moderate positive (Table 4).

When looking at the data in greater detail, there the highest correlation appears for naturalness. The absolute value generated through the GIS- based approach was constantly higher than those generated through the public online evaluation (Fig. 4). The correlations differ highly depending on the landscape types. An example of this phenomenon is illustrated for diversity in Fig. 5.

ANALYSIS AND DISCUSSION

The approach to data generation and data analysis generally seem to work well; but it also had some weaknesses. A variety of parameters were tested for their positive influence on findings generated through the correlation analysis.

First, the indicators used in the GIS-analysis were in the focus. It was tested if a variation of indicators would

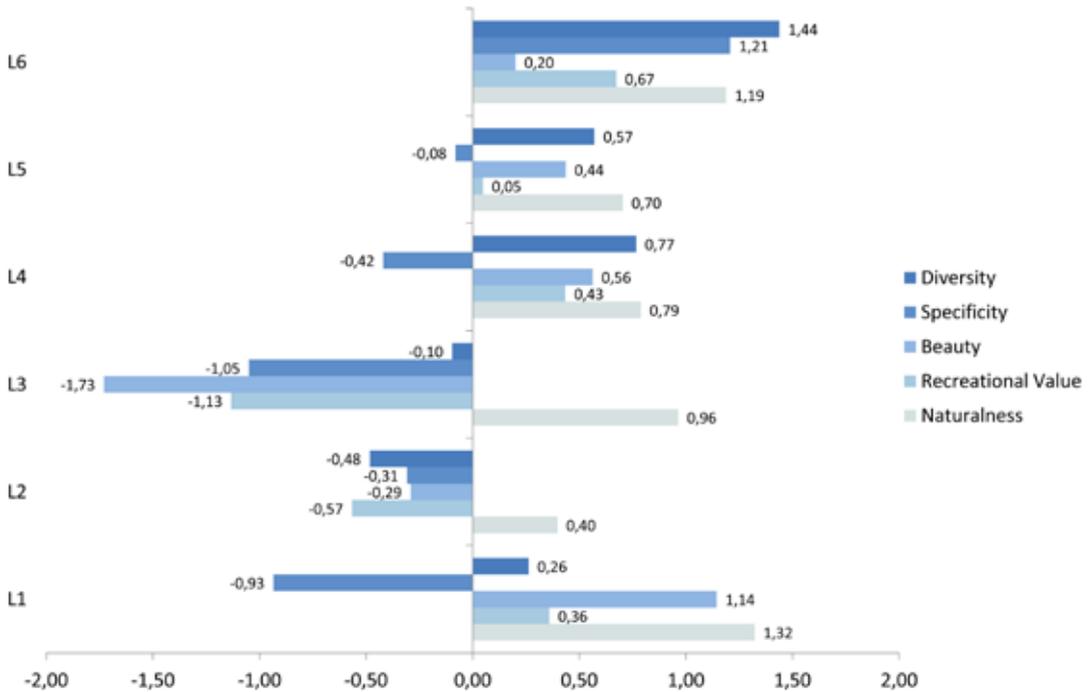


Fig. 4 Correlation of attributes within the GIS-Analysis and the survey outcomes

result in higher or lower correlations. Naturalness seemed to be a good starting point because, compared with public assessments, this parameter was generally estimated higher within the GIS-analysis. Thus, it was tested to calculate naturalness only based on perceived naturalness (Table 1), and also based on lower classifications of the naturalness for some land uses. These modifications showed only little effect on correlation results (plus 0.02). But, more importantly, the total values achieved through these modifications matched much better than before.

Looking at recreational value is interesting because of their generally low correlations. It was assumed that recreation demands are important, particularly near settled areas. However, it is not always visible if the landscape is close to settlements in the imagery shown to the participants of the online survey. Thus for a test, this aspect was left out which resulted in an increase in correlation from 0.23 to 0.42.

Second, the technical parameters of the view-shed analysis were tested.

For the weighing of different distance zones, no reasonable theory based approach seem to exist. Disregarding this shortcoming, the application of different elevation models (DEM) was tested. For all photographs a DEM and for some also a DSM (Digital Surface Model) was available. The application of these models resulted in heterogeneous findings. Correlation numbers increased slightly for all criteria, except for specificity. For specificity it dropped by 0.11.

Landscape assessment using the above-described GIS-based methods is an expert-only approach. To apply expert-lead assessments only seems to contradict democratic understandings of landscape. Landscape is considered as areas "as perceived by people" and thus conceptualized as a mental and social construct (Council of Europe 2000, Kühne 2006; Ipsen 2012). With this study, it was possible to get insight into the effect that wind turbines might have on perceived landscape quality. In general, it appears that these effects are negative. However, study finding

suggest that differences exist between different sample areas, and regarding different cultural landscapes included in the study. In particular perceived negative effects of wind turbines appear particularly high for landscapes that generally have high perceived landscape and recreational values. Detrimental effects appear lower in landscapes that have low perceived quality. The measured and perceived effects are nearly the same for all of the parameters used in the study: beauty, diversity, specificity and recreational value. The above mentioned hypothesis 1 could thus not be verified. This led to a change in the GIS-analysis-model and to a recalculation of landscape scenic value.

Interestingly, any differences that might exist between the values that survey participants assign to non-modified and modified images tend towards zero the closer people get to those landscape types that they gave the lowest scenic value to begin with. While highly valued landscapes are affected the most from perceived value-loss due to wind-turbines, they still maintain high values even with wind-turbines in them, and these values stay higher than those of the landscapes rated lowest in the survey when they have no wind turbines. This means that landscapes are not "lost" when wind turbines are installed (Stemmer and Kaußen 2017).

CONCLUSION

The comparison between expert and public landscape assessment indicates how some systematic differences exist between both. According to German law, landscape experts must use criteria that are based on parameters of diversity, beauty and specificity as well as the recreational value. Findings from the survey suggest that experts use criteria for all three parameters, including naturalness that, when done by lay people, measure not different

but similar things. Results from the survey differ considerably from those that derive from assessments using the GIS-model. It appears that expert landscape assessment only partly meets values assigned to landscape by public rating. Applying expert landscape assessment methods, such as the one used in this study, might not be useful when the application of different parameters generate results that hardly reflect what people give value to in their surroundings.

To improve methods for professional landscape assessment, particularly but not only for Germany, further research is needed into public landscape perception and values. In particular, studies might help elucidate how to identify and validate indicators that help landscape parameters to meet public perceptions. At the root of the matter, the legal basis of landscape assessment must also be discussed and guidelines for practical application at national and state level be issued. Approaches are needed that help implement the European Landscape Convention and that are promoting democratic forms of opinion forming and decision making.

The study illustrates how landscapes of high value maintain much of their original high value, even with wind turbines. In order to raise landscape values, with power projects installed, Landscape Architects have an important contribution to make and design windfarms in a way that mitigate and offset negative landscape effect to a minimum. What would be even more important is that, through participatory designing, to add meaning to renewable energies beyond general environmental considerations. The idea is to give meaning and beauty to existing landscapes (Stemmer and Kaußen 2017).

NOTES

¹ The consortium includes members of the Ostwestfalen-Lippe University of Applied Sciences and the Fraunhofer Institute for Energy Economics and Energy System Technology IEE, with subcontracting PSY:PLAN Institut für Architektur- und Umweltpsychologie, Lenné3D GmbH and Christian Westarp.

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Table 1. Assessment-criteria for the GIS-model to landscape value

	Indicator	Indicator Scale	Value	Criteria	Aggregation	Attribute	
Diversity	Number of land uses / unit of area	17 - 26	very high	Diversity of land use	Mean	Diversity	
		15 - 16	high				
		13 - 14	middle				
		10 - 12	low				
		3 - 9	very low				
	Terrain Ruggedness Index (TRI) ²	6,07 - 199,21	very high	Diversity of relief			
		2,79 - 6,06	high				
		1,24 - 2,79	middle				
		0,47 - 1,23	low				
		0,00 - 0,46	very low				
Specificity	Deviation of land use pattern from typical land use of cultural landscape type / unit of area (MABw ³)	0,62 - 1,17	very high	Specificity of land use pattern	Mean	Specificity	
		0,49 - 0,62	high				
		0,39 - 0,48	middle				
		0,30 - 0,38	low				
		0,00 - 0,29	very low				
	Classification of Landscape change since 1996 (SCHMIDT ET AL. 2014)	none	very high	Historic Continuity			
		-	high				
		-	middle				
		high	low				
		very high	very low				
Beauty	Presence of protected areas	-	very high	Beauty			
		Biosphere Reserve and/or National park	high				
		area of outstanding natural beauty	middle				
		-	low				
		No protected area	very low				
Naturalness	Perceived naturalness of land use types	very natural	very high	Perceived Naturalness of land use	Maximum	Naturalness	
		natural	high				
		moderate natural	middle				
		unnatural	low				
		very unnatural	very low				
	Presence of protected areas	At least on protected area	very high	Perceived Naturalness of protected areas			
		-	high				
		-	middle				
		-	low				
	Presence of acoustic and optical disturbance	No protected area	very low	Disturbance			Conditional Degradation
		yes	very high				
		no	very low				

Table 1. Part 2: Assessment-criteria for the GIS-model to landscape value

Recreational value	Presence of protected areas	Nature Park	very high	Potential recreational value (Tourism)	Mean of potential recreational value (Tourism) and potential recreational value (local)	Recreational value	
		Biosphere Reserve and/or National park	high				
		Green Belt Germany	middle				
		–	low				
		No protected area	very low				
	Diversity, Specificity, Beauty and Naturalness (Quantile)	very high	very high	Potential recreational value (local)			
		high	high				
		middle	middle				
		low	low				
		very low	very low				
	Areas close to settlements	yes	very high	Potential demand for local recreation			Maximum
		–	high				
		–	middle				
		–	low				
		no	very low				
Exposed Sites	Difference between height and average height of surrounding areas (10km-Radius)	–	very high	Exposed Sites			
		> 50 m	high				
		–	middle				
		–	low				
		≤ 50 m	very low				

Table 2. Mean and standard deviation of overall aesthetic values

Landscape	Manipulation	n	M	SD	min	Q1	Median	Q3	max
L1	Original	213	6.72	1.73	2.5	5.50	6.88	8.12	10.00
L2	Original	188	6.15	2.12	1.0	4.75	6.38	7.88	10.00
L3	Original	280	4.27	1.84	1.0	2.88	4.00	5.75	8.88
L4	Original	205	4.68	2.15	1.0	2.75	4.38	6.12	10.00
L5	Original	170	3.03	1.59	1.0	1.88	2.75	3.75	8.00
L6	Original	208	4.42	2.18	1.0	2.75	4.06	6.00	10.00
L1	Manipulated	187	5.61	1.97	1.0	4.00	5.88	7.12	9.00
L2	Manipulated	283	4.80	2.21	1.0	3.00	4.38	6.69	9.88
L3	Manipulated	186	4.03	1.77	1.0	2.62	4.00	5.38	8.50
L4	Manipulated	167	3.75	1.91	1.0	2.00	3.25	5.06	8.38
L5	Manipulated	206	3.15	1.55	1.0	2.00	2.88	3.88	9.12
L6	Manipulated	163	3.42	1.77	1.0	2.00	3.12	4.88	8.25

Table 3. Mean and standard deviation of recreational value

Landschaft	Manipulation	n	M	SD	min	Q1	Median	Q3	max
L1	Bestand	213	7.06	1.63	1.7	6.00	7.30	8.30	10.0
L2	Bestand	188	6.83	1.94	1.7	5.30	7.00	8.50	10.0
L3	Bestand	280	5.33	1.95	1.2	3.80	5.35	6.83	9.4
L4	Bestand	205	5.38	2.31	1.0	3.50	5.40	7.20	10.0
L5	Bestand	170	3.73	1.62	1.0	2.70	3.60	4.70	8.2
L6	Bestand	208	4.96	2.21	1.0	3.30	4.65	6.65	10.0
L1	manipuliert	187	5.81	1.96	1.7	3.95	6.20	7.50	9.8
L2	manipuliert	283	5.23	2.10	1.0	3.50	5.30	6.75	10.0
L3	manipuliert	186	4.75	1.96	1.3	3.20	4.60	6.30	9.9
L4	manipuliert	167	4.20	1.96	1.0	2.70	3.90	5.60	9.6
L5	manipuliert	206	3.70	1.74	1.0	2.40	3.60	4.50	9.7
L6	manipuliert	163	3.64	1.76	1.0	2.15	3.30	4.80	8.5

Table 4. Correlation between GIS-analysis and survey outcomes

Criteria	Correlation Coefficient
Diversity	0,35
Beauty	0,37
Specificity	0,28
Recreational Value	0,23
Naturalness	0,56

Economy of Landscape Services in Ilgaz Region, Central Anatolia

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ABSTRACT

Definition of landscape covers natural and cultural features as well processes in an area. "Landscape Services" refers to the contributions of landscapes for human wellbeing and community. As indicated by the European Landscape Convention landscape plays a significant role as an ecological and economic resource in environmental management and individuals' well-being. This study aims to analyze economic benefits of landscapes in Çankırı Ilgaz Region of central Anatolia, Turkey. Based on two dimensions, economical value of pollination and climate regulation are examined in the assets value while economic value of food sources, production and economic value of biofuels (fertilizer and biogas) are examined in the obtained products. The calculated current value is defined as the current available money flow which contributes to rural and regional development and generates annual potential income. The annual production values are obtained as a result of direct use of natural resources. Study results will provide a strongly approach to understand and appreciate landscapes' monetary and non-monetary values in a Central Anatolia case area which evolved with their economic characters and greatly contribute to the preservation, management and promotion of the landscapes.

INTRODUCTION

"Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of

natural and/or human factors (Council of Europe, 2000). Landscape Services are defined as the contributions of landscapes and landscape elements to human wellbeing.

Biodiversity in the landscape provides benefits for people and contributes to security, resiliency, social relations, health, and freedom of choices. Improved valuation techniques (such as economic valuation) and studies on ecosystem services demonstrate that there is a need for better understanding of multiple landscape benefits (MEA, 2005). It strengthens the functioning of services such as resistance to invasive species, pollination, pest and disease control in agriculture, disease control and erosion prevention (Chapin et al., 2005). This strengthens the food production service and supports services and human well-being.

Human life heavily depends on biodiversity and benefits derived from the diversity are more prominent in low income communities particularly in rural areas. Biodiversity has unique social values for the social life of all rural and urban people regardless of the socio-economic status and economic environment they live in. The contribution of the landscape services to social psychology and norms, democracy, human rights, rule of law, social solidarity, spiritual needs, science, art and cultural development is indisputable reality.

In recent years landscape services are seen as an important approach in landscape researches a valuable knowledge in landscape planning (Termorshuizen and Opdam, 2009). Müller et al. (2010) suggested that landscape services should be included in landscape analysis and planning while Hermann et al. (2011) emphasized that the necessity of landscape services in the decision-making process with different spatial scales. Nowadays new methods have been investigated to define landscape goods, functions and

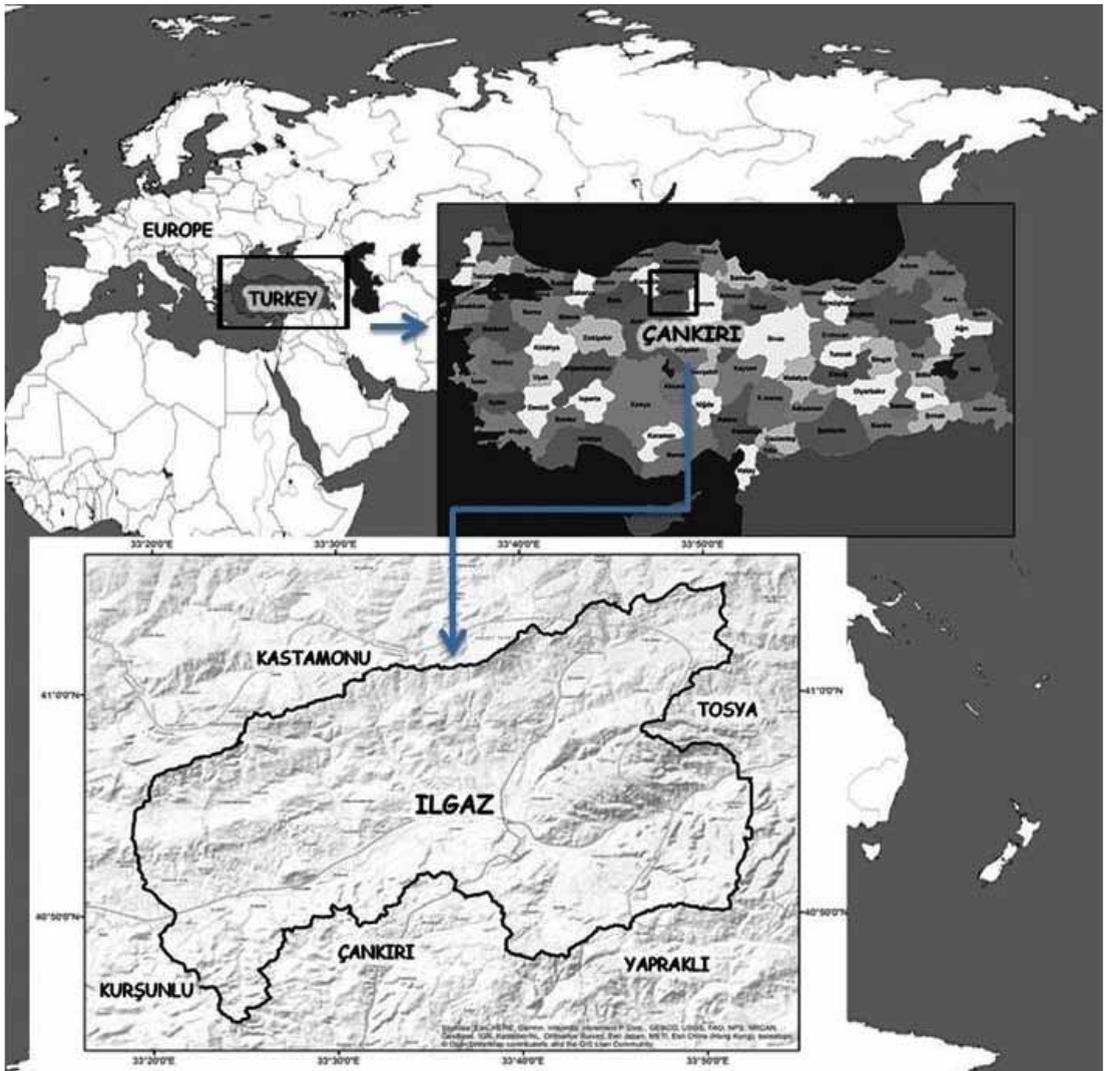


Figure 1. Location of research area

services with ecologically measurable and non-measurable values.

This study attempts to calculate the annual production values obtained as a result of direct use of natural resources in the case of Çankırı Ilgaz Region, Turkey. It is possible to create more added value and increase the production value by processing the obtained primary data. However, in the frame of the study, the industrial production is taken into consideration. Economic analysis of landscapes in Çankırı Ilgaz Region with regard to benefits such as food resources, water resources, climate and energy

where monetary values of benefits and non-monetary values are also discussed.

Economic benefits of Ilgaz Region landscapes are examined in two different groups: the value of assets and the obtained products. *Economical value of pollination and climate regulation* are examined in the value of assets; *economic value of food sources, production and economic value of biofuels (fertilizer and biogas), economic value of water resources, biological raw materials and industrial products, recreation and ecotourism value* in the obtained products. Besides,

the calculated current value is defined as the current available money flow which contributes to rural and regional development and generates annual potential income.

MATERIAL AND METHOD

Material of the study is in Ilgaz, Çankırı, Turkey (Figure 1).

Located in Central Anatolia, Ilgaz Region is the sample area of the study. Ilgaz Mountain and Devrez River are the main landscape components that define the regional characters. Hills, narrow valleys, alluvial land forms, native vegetation corridors, different colors and texture of rocks combined with land uses of transportation, settlement, agriculture, animal husbandry and forestry with its rugged topography create a rich landscape diversity in the region (Ilgaz Development Plan Report, 2007).

Methodology of the study includes multiple steps. Natural and cultural landscape features of the area were examined by using remote sensing, ArcGIS and rectified RE-3A Rapid-Eye Satellite images. Topographic maps, soil maps, geological map, hydrology, vegetation maps were digitized and collected in a single database. Land use/cover map were maintained according to CORINE land cover classes following field surveys.

Based on the classification of Common International Classification of Ecosystem Services (CICES) natural, cultural, social and economic benefits of landscapes in Ilgaz Region landscapes were analysed. The CICES classification has been adapted to the concept of landscape services, together with the conventional ecosystem services classifications, the regulation of perceptual processes and the provision of space. Consequently, more services were added to the provisioning and regulating categories. New category was the cultural group which was

rearranged to include the different contributions of landscape to human well-being in a more comprehensive and consistent way.

Proposed services indicated in CICES classification were;

- *Place to Live, Place to Work and Place to Move* in provisioning service category;
- *Connection of Spaces, Buffer Disturbing Use, Provision of Spatial Complexity of the place* in regulation service category;
- *Mental health, Physical health, Passive enjoyment, Active enjoyment, Way-finding, Scientific resources, Didactic resources, Spiritual experience, Source of inspiration, Social interactions, Place identity, Sense of continuity* in cultural and social services (Val-lés-Planells et al., 2014).

Landscapes of Ilgaz region were categorized according to CICES classification as ecological, social and cultural, visual and aesthetic, economical services. Historical, social and cultural resources were difficult to measure in the Ilgaz Region. But these resources provide an economic contribution in terms of recreation and ecotourism activities to the region.

Economic services have examined food resources, biofuels, pollination, climate regulation, water resources and recreation & ecotourism resources in terms of regional development.

FINDINGS

ECONOMIC VALUE OF ILGAZ REGION LANDSCAPE SERVICES

Economic value of food sources

Animal, milk, meat, honey and herbal production were the components selected for economic value of food sources. The size of meadows in Ilgaz is 17.594 km² for a common use of 58 villages living on animal husbandry with

average numbers of 30.117 cattles, 65 buffaloes, 19.481 small cattles and 21.866 bee hives.

Annual milk production values were obtained from cattle and sheep and estimated between 2.545 and 5.340 liters per cow. Local farmers receive 12.708 tons of milk from bovine animals and 12.055 tons of milk from small cattles. With the price of 1.40 Turkish Lira (TL) for raw milk per liter defined by Turkish Milk Producers Union, annual milk production value was 34.668.000 TL.

Some hypothesis were evolved to calculate annual meat production. Herding period is defined 6 years for breeding cattles and 7 years for

223,163 ton honey. Thus 1 kg. of honey is 50 TL and approximately 11.158 TL income are generated in Ilgaz (TÜİK, 2017).

About *Herbal Production Value* = *Unit Price x Annual Production Quantity*; 72.530 tons of grain, 6.331 tons of vegetables and 11.700 tons of fruit are produced annually on the 367.702 decare land in Ilgaz. It is possible to obtain annual 9.815.519 TL from vegetable and 31.298.716 TL from fruit production and 39.026.217 TL from grain production. Moreover, mushrooms are collected in spring and autumn, especially in Ilgaz Mountain which was reckoned annually 150 tons and valued 750.000 TL/year (Table 1).

Economic Facts about Goods, Products and Services		Annual Production Value (Turkish Lira / Year)
Animal Production Value	Milk	34.668.000
	Meat	220.559.500
	Honey	11.158
	Fish	100.000
Herbal Production Value	Grain	39.026.217
	Vegetable	9.815.519
	Fruit	31.298.716
Mushroom Production Value		750.000
GENERAL TOTAL		336.229.110

Table 1. Animal and Herbal Production Values of Ilgaz Region landscape services (Tülek, 2017)

small cattles (Turkish Ministry of Food, Agriculture and Livestock, 2018). Number of 30.117 cattles and 19.481 small cattles were recorded in 2017 in Ilgaz (TÜİK, 2017). Turkish Meat and Milk Organisation (2017) called purchased live animals, weight of cattle is 25 TL and small cattle is 21 TL. Sale is 7.000 TL for a cattle and 500 TL for a small cattle while carcass meat value is 210.819.000 TL for cattle and 9.740.500 TL for small cattle and eventually annual meat production was estimated 220.559.500 TL.

Regarding to economic value of honey production, number of 21.866 unit bee hives recorded with annual

Table 1. Animal and Herbal Production Values of Ilgaz Region landscape services (Tülek, 2017)

Economic value of biofuels (fertilizer and biogas)

Biogas production were evaluated according to Deniz (1987), Akbulut and Dikici (2004) with an average 3,6 tons of fertilizer for a cattle and 0,7 tons for a small cattle per year. To estimate biogas value;

From cattle;

$$(30.117) * (3,6) = 108.421 \text{ ton / year}$$

fertilizer

From small cattle;

$$(19.481) * (0,7) = 13.636 \text{ ton / year}$$

fertilizer

Ilgaz Region (Kursunlu-Ilgaz-Devrez-Hızardere Chief) Forest Management Chief								
Ilgaz Region Amount of Carbon Release								
Tree Species Groups	Volume of planted barked body Dgh (m ³)	AMOUNT OF BIOMASS (T o n)				AMOUNT OF CARBON (T o n)		
		Ground surface TÜBK	Underground (root) TABK	Dead and alive above ground cover TÜÖDBK	TOTAL TGBK	Inside of Total Biomass TGBK x (h)TBKM	Inside of forest soil OTKM	Inside of total forest ecosystem TKM
		DGH x (a) x (c)	TÜBK x (e)	(TÜBK+TABK)x (g)	TÜBK+TABK+TÜÖDBK	TGBK x (h)	TBKM x (j)	TBKM+OTKM
		DGH x (b) x (d)	TÜBK x (f)	(TÜBK+TABK)x(g)	TÜBK+TABK+TÜÖDBK	TGBK x (h)	TBKM x (j)	TBKM+OTKM
Leafy	97274	77819	11673	35797	147465	66359	38488	104848
Coniferous	4198200	1068057	213611	512667	1794335	807451	468322	1275773
TOTAL	4295474	1145876	225284	548464	1941800	873810	506810	1380621
Ilgaz Region Amount of Oxygen Production								
Tree Species Groups	CURRENT ANNUAL INCREMENT (m ³)	AMOUNT OF BIOMASS INCREASE (T o n)				OXYGEN PRODUCTION (T o n) OÜ		
		Ground surface TÜBKA	Underground (root) TABKA	TOTAL TBKA				
		DGHA x (a) x (c)	TÜBKA x (e)	TÜBKA+TABKA	TBKA x (x)			
		DGHA x (b) x (d)	TÜBKA x (f)	TÜBKA+TABKA	TBKA x (x)			
Leafy	4839,656	3872	581	4452	5343			
Coniferous	112030,8	21963	4393	26356	31627			
TOTAL	116870,456	25835	4974	30808	36970			
(a) =	0,64	Pre-determined OVEN DRIED WEIGHT for Leafs (Ton)						
(b) =	0,473	Pre-determined FINE DRIED WEIGHT for needle Coniferous (Ton)						
(c) =	1,25	Biomass corresponding to the volume of the stern body, biomass conversion factor in the terrestrial species (Ton)						
(d) =	1,2	Biomass corresponding to the volume of the stern body, the factor of conversion of the biomass above the ground in conifers (Ton)						
(e) =	0,15	Biomass corresponding to the stem volume, subfloor biomass conversion factor in leafy species (Ton)						
(f) =	0,2	Biomass corresponding to the volume of the stern body, subfloor biomass conversion factor in the conifers (Ton)						
(g) =	0,4	Conversion coefficient of biomass of trees with bosom diameter <8 cm and shrubs, shrubs, cecerylates and dead hides (Ton)						
(h) =	0,45	The live non-living biomass is converted to CARBON amount factor (1 ton of oven flakes in vegetable matter of 0.45 ton)						
(j) =	0,58	Conversion factor for carbon content in forest soils						
(x) =	1,2	Factor of conversion of biomass increment to produced O ₂						
Economic Facts about Goods, Products and Services				Annual Production Value				
Carbon Release 1.819,216 ton				The social cost of carbon emissions: 336.554,96 Turkish Lira /YEAR 78.226,288 \$/YEAR				
Oxygen Production 48.714 ton								
GENERAL TOTAL				336.554,96 Turkish Lira /YEAR				

Table 2. Carbon release and oxygen production value (Tülek, 2017)2017) 2

Presuming that the average cost of animal fertilizer was 4 TL/ton, the value of the animal fertilizer was estimated as 488.228 TL/year.

In rural areas it is also possible that animal fertilizers alternatively used in biogas production. In this case, the expense for producing electric energy can be potentially obtained for both biogas and electricity generation.

Considering that about 1/3 of the fertilizers have disappeared in meadows, estimation for biogas account was;

From cattle;
 $(108.421) * (2/3) * (33) = 2.361.409 \text{ m}^3 / \text{year biogas}$

From small cattle;
 $(13.636) * (2/3) * (58) = 431.988 \text{ m}^3 / \text{year}$ is calculated as biogas.

On the other hand, the equivalent electricity value of biogas as the electricity value was: 1 m³ biogas is equal with 4.70 kW / h energy (Bilir et al, 1983). As a result, the income that can be obtained from biogas amount from cattles and small cattles in the region is determined as 901.960 TL in 2017.

Economical value of pollination
 Ilgaz Region covers 35.6 % forests and 16.7 % agricultural areas with high species diversity. Regarding to pollination value, honeybee (*Apis*

LANDSCAPE SERVICE		ANNUAL PRODUCTION VALUE (Turkish Lira / Year)
1	FOOD	336.229.110
2	BIOFUELS	1.390.248
3	CLIMATE REGULATION	336.554,96
4	FRESH WATER	6.089.120
5	POLLINATION	24.702.542
6	BIOLOGICAL RAW MATERIALS AND INDUSTRIAL PRODUCTS	351.600.568,94
7	RECREATIONAL AND ECOTOURISM VALUE	364.678,54
8	WILLING TO PAY	541.654,26
TOTAL VALUE		721.254.476,7

Table 3. Total potential annual value of Ilgaz Region landscape services (Tülek, 2017)

mellifera L.) is the key factor that contributing greatly to the agricultural productivity and biodiversity. Regarding to regional biodiversity, five different honeybee populations are located in the geography of Turkey (Kandemir, 1999, Kandemir and Kence, 1995, Kandemir et al., 2000).

Economic value of pollination was evaluated according to (Gallai et al., 2009; Barfield et al., 2012) with an estimated income about \$ 15 billion in USA agricultural economy between years 1996 and 1998. In accordance, total pollution value in Ilgaz was calculated as 24.702.542 TL depending on the presence of bees as the bee population in a significant part such as 90% of the agricultural production obtained in Ilgaz. Ilgaz Directorate of Provincial Food Agriculture and Livestock encourages beekeepers with 10 TL per hives which equivalents to $21.866 \times 10 = 218.660$ TL per year for 21.866 beehives.

Economical value of climate regulation

Carbon dioxide and nitrous oxide gases play big role in global warming and climate change caused by greenhouse gases. Regarding to climate regulation distribution of forests in Ilgaz Region was defined as 342,04 km² and carbon release and oxygen production values were estimated as in Table 2. The social cost of carbon emissions is also mentioned as Uyar and Cengiz (2011) have determined the average value of this cost was 43 dollars

(185 TL) (14.08.2018 Central Bank Exchange Rate) based on a Carbon Social Cost formula. Accordingly, the social cost of carbon emission was estimated 336.554.96 TL per year in the region.

Economic value of water resources

It is very difficult to measure the value of water as a commodity. There is 16.024 ha agricultural area in Ilgaz Region where the number of 17 underground water stations were used for irrigation purpose and 1 was for domestic watering. Total 15.000 tons/year of water resources were consumed for domestic purposes and 59.550 tons/year of water resources were spent for irrigation purposes (DSİ, 2016).

Ground water has been conventionally operated by using deep ground-pumping in Turkey. General Directorate of State Hydraulic Works (DSİ) as the main responsible body estimated that the average amount of energy of 1357 kilowatt (kW) /ha was used for maintaining water from the ground level. Considering that fee per kW/ha is 28 kuruş, which turns out that the price for 1 hectare costs approximately 380 TL for farmers for irrigation in agriculture. Total energy expense is calculated as 6.089.120 TL for irrigation with energy consumption in agricultural areas.

Recreation and ecotourism value

Ilgaz Mountains National Park, Kadınçayırı Natural Park, Kırkpınar Highland, Great Highland and other

highlands have high potentials for recreation and ecotourism with outstanding natural values. Especially multifunctionality of Ilgaz National Park attracts locals and visitors especially for winter tourism. Number of 43.450 visitors coming to the national park was recorded in 2015, while income with accommodations in 8 tourist facilities and the visitor entrance fees in Ilgaz Mountains National Park was documented 364.678,54 TL.

The total potential valuation for Ilgaz Region landscape services calculated was 721.254.476,7 TL/ Year (Table 3).

RESULTS AND CONCLUSION

Definition of landscape services and transfer them into the landscape planning and management still remain a priority including support for biodiversity, climate improvement, genetic resources, water control, human health and well-being. Balkız (2015) indicated that in recent years main institutions in charge of conservation of nature, soil and water resources in Turkey take particular interest in ecosystem services and landscape services as a basic framework in environmental planning.

Accordingly, Ilgaz Region landscapes' economic benefits were examined in two different groups in this study: the value of assets and the obtained products. The calculated current value is defined as the current available money flow which contributes to rural and regional development and generates annual potential income.

Diversity of its landscapes and land use patterns in Ilgaz Region encourage climate regulation, soil and water conservation, climate regulation, flood prevention, recreational facilities and human health protection. Natural forests provide raw materials for wood such as timber and firewood to local people.

Regarding to landscape services and sustainability, Öztürk and Aydoğdu (2012) have emphasized on the conservation of biodiversity in Ilgaz Mountains National Park, creation some alternative sources of income for the local people, development of recreational services for visitors, presentation of regional foods for local bazaars, management of sustainable resources and diversification of existing facilities.

We found out that Ilgaz Region forest landscapes are determined to provide a total of 1.819.216 tons of carbon release and 48.714 tons of oxygen production with leafy and coniferous tree species in terms of air quality regulation and climate protection functions (Tülek, 2017). On the other hand, contribution of forest in climate protection is highly important due to the fact that 35% of Ilgaz Region is covered by native forests. Therefore protection forest landscapes are crucial both for local economy and for the mitigation of the impacts of global warming.

Among the non-wood forest products are rose hip, wild pear and mushrooms are the main crops in the Ilgaz Region. Wild pear, blackberry and rose hip, which are medicinal and aromatic plants, are found especially in the steppe vegetation around the Kurşunlu and Ilgaz. These products provide important economic income for the region in ecological and economical dimensions.

According to Power (2010), agricultural areas provide benefits such as the production of food, bioenergy and medicinal products and at the same time regulation of water quality, pollination, pest control and nutrient cycling. In Ilgaz, while 62% of agricultural areas are used for irrigated and unirrigated agriculture and especially rice production has been carried out in Yuvasaray, Çeltikbaşı, Yukarıkayı, Avşar and Kızılöz villages along the Devrez River that supplies irrigation water for arable lands around.

Economic value is an approach to define landscape services. Emerton and Kekulandala (2003) confirmed that 3.000 hectare Muthurajawela Reeds serve \$ 5 million for flood control per year in Colombo, Sri Lanka. Balkız (2015) articulated that landscapes in British Columbia, Canada provided \$ 23-44 billion for aesthetic and recreational services, \$ 2.3-7 billion for water provision, \$ 2-5 billion in storm and water conservation and fighting for drought.

Study results showed that significant contribution that equal to 336.229.310 TL was maintained by biological raw materials and the food sources for the regional economy in Ilgaz. Agricultural areas have been mainly placed along the Devrez River and irrigated areas, support local economy greatly in Ilgaz economy. Natural river corridors and forests, that represent and form the main body of watershed ecological systems, also ameliorate the watershed economy in the region.

There is an urgent need that landscape services should be integrated into the watershed planning and management works and policies at a regional scale in Turkey because economy and well being of local population and environment still depend on semi natural, natural and rural landscapes related to main river systems. In Turkey local level, landscape services are operated in the frame of Environmental Plan, Regulatory Development and Implementation Plan, Special Purpose Plans, Forest Management Plans, in Regional Plan and the National Development Plan for Agricultural Master Plans.

Ilgaz Region landscape services and their sustainability are closely related to the protection and development of regional landscapes. Forest ecosystems play an important role in the region, and they support ecological systems, provide habitats for important plant and wildlife species

in terms of rare and genetic resources, regulate climate and air quality, provide raw material, support water resources and strengthen recreation and ecotourism potential.

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6. POSTERS

MONDAY

10 SEPTEMBER

A

HUMAN AND NATURE

Potential and Significance of Untouched Nature Inside Urban Tissue - A Project for an Empty Park in Belgrade, Serbia
Matteo Umberto Poli
POSTER

D

HUMAN AND NATURE

A Framework for Organizing Events in Parks
Kirsten Bomans
POSTER

Space for Water – Working Together Towards a Balanced Dender
Lieven Symons
POSTER

B

PLANTING DESIGN AND ECOLOGY

The Green Machine
Dhanush Pandian
POSTER

E

HUMAN AND NATURE

Stiemer Valley Park: An Agent for Cultural and Ecological Transformation
Mark Wilschut
PECHA KUCHA PRESENTATION & POSTER

C

CONSERVATION AND DEVELOPMENT

Biodiversity Protection versus Economic Exploitation: Landscape Value as Base of the Recovery process of the Ancient Mine Site of Martinet
Elisa Baldin
POSTER

G

TEACHING AND LEARNING

Learning Outside the Classroom – Experimental Summer Studies in Landscape Architecture
Julia Donner
POSTER

H

THEORY AND PRACTICE

Designing the Public Awareness Before the Landscape: Case of Park Nebula
Enise Burcu Derinbogaz
POSTER

TUESDAY

11 SEPTEMBER

J

PLANTING DESIGN AND ECOLOGY

The Future of Urban Green Space Under
Conditions of Predicted Climate Change in
the Long Run

Krisztina Szabó

POSTER

O

CONSERVATION AND DEVELOPMENT

Varosha, Famagusta. Shared Past...

Frozen Hopes... Collective Future

Hatice Karaca, Didem Dizdaroglu

POSTER

Expansion by preservation

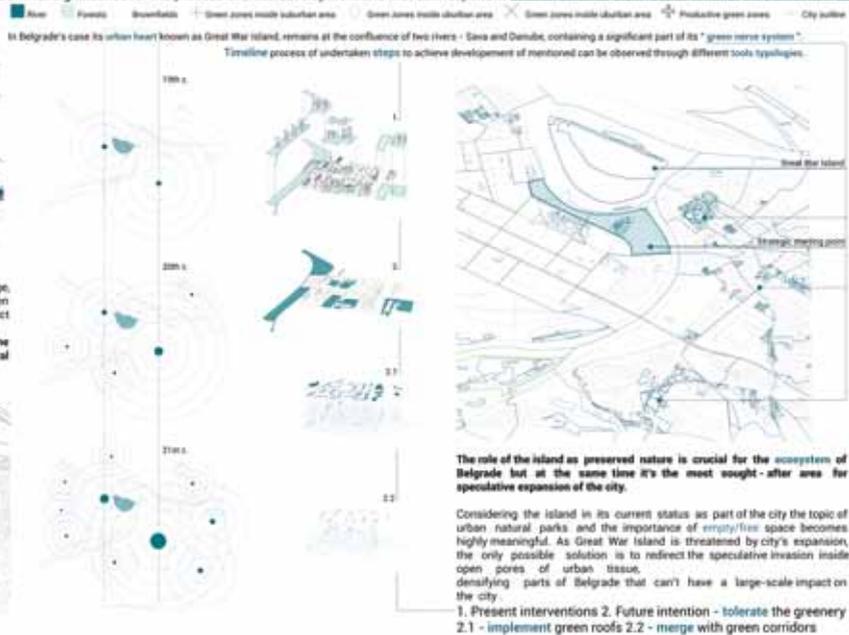
POTENTIAL AND SIGNIFICANCE OF UNTOUCHED NATURE INSIDE URBAN TISSUE – A PROJECT FOR AN EMPTY PARK IN BELGRADE, SERBIA

"A revolution that does not produce a new space has not realized its full potential"
Lefebvire, H. (1991): "The production of space"

When we talk about development and future of cities, we think about "movement" and expansion of built structures along axes and beyond borders. De facto, this is the most obvious future of cities, especially metropolitan ones as Belgrade, the capital city of Serbia. Questioning traditional development models of expansion and occupation raises questions on how urban voids can be designed. The word "void" can correlate at the same time with other terms that have similar significance for the process of cities development and that can respond to **flexible, contemporary, changeable, now-untouched, speculative structures.**



Observing where flexibility, change, openness happens in cities we often get to observe "nature", as a byproduct of human inactivity. How can "nature" be part of the complex puzzle of architectural achievements and social changes?



The scope of the project is to reverse the picture of the city as a built system with segments of greenery to the idea of an ecosystem with built fragments



Autors: Matteo Umberto Poli, Marija Zivic - Politecnico di Milano, Dipartimento Architettura e Spazi Urbani

Potential and significance of untouched nature inside urban tissue - a project for an empty park in Belgrade, Serbia

Marija Zivic, Matteo Umberto Poli,
Politecnico di Milano, Serbia

Self Sustainable Regenerator to support the plants in water scarce areas

Dhanush.P, Govardanan.S, Vigneswaran.A

Marg Institute of Design and Architecture, Velur-Village, Cheyyur Post, Kancheepuram district, Tamilnadu-603302, India.

ABSTRACT

Water Scarcity is always associated with negative repercussions for the plant life which ends up affecting the entire ecosystem. Water scarcity in cities are mostly due to unplanned urbanization and more than half of the world's largest cities experience water scarcity. These events lead to lot of questions, whether there is any possibility of growing plants in water scantiness urban environments? Even if gets water will it be an eternal source? The idea of this poster is to find a way to protect the plant life from acute water scarcity in water scarce areas by creating a self sustainable regenerator. The combination of plant with high evapotranspiration rate and a material with high water retention capacity creates an artificial Nano-ecosystem with its own individual characteristics, where the available water is retained in the form of humidity. A dehumidifier converts the atmospheric moisture into water completing the cycle. It is suitable for all climatic conditions but works more efficiently on high humid areas.

Have You thought about planting a sapling? If yes, please consider the external environment for its survival too .

INTRODUCTION

Due to population growth in cities, it becomes increasingly important for a compact and sustainable urban development to mitigate urban sprawl. Such urban ecosystems include green spaces which are man engineered ecosystems or artificial (Nano-ecosystems with its own individual characteristics. The artificial ecosystems are not the contradictions of the natural systems. It is only the proportions and speeds of the ecological interactions that can be an interference for the advantage of man. These ecological interactions may have adverse effects on the natural ecosystem and water scarcity is one of the consequences due to such interactions.



Figure 1: (Acknowledgement) Official website The Acler Hill Industry, 'Generating pure drinking water from air', The process of dehumidification.

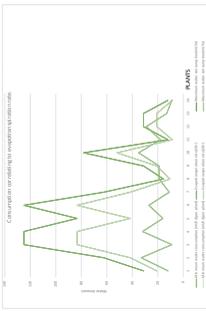
METHOD AND MATERIALS

To construct a self-sustainable installation, which is independent of the outside environment, we carefully observed and reconstructed an artificial Nano-ecosystem within its framework. The framework comprises of:

- Circular base
- Dehumidification unit
- Trellis

which has the shape of a single curve that is broad in the centre and tapers to a point at each end.

Figure 2: Consumption of water by selected plants comparing to their evapotranspiration rates.
1. *Agave americana* 2. *Abutilon* 3. *Albizia* 4. *Banksia grandis*



5. *Eugenia purpurea* 6. *Elephantopus* 7. *Elephantopus scaber* 8. *Elephantopus scaber* 9. *Hebe carnifera* 10. *Ischaemum verticillatum*

11. *Medicago sativa* 12. *Phaseolus trilobus* 13. *Phytolacca frutescens* 14. *Verbena elegans* 15.

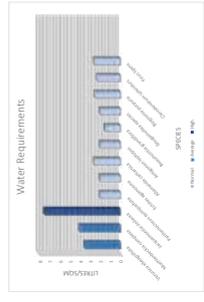


Figure 3: Water requirements in litres per square meter of above mentioned species of plants suitable for the setup

DISCUSSIONS

Theoretical trellise can be no substitute for a practical experience, so we have designed a concrete structure to make it suitable for all climatic conditions. The basis of the design is to harvest the moisture in the atmosphere and convert it into water by the process of dehumidification, which is return used by the plants.



Figure 4: Concept of proportion between trellis with respect to suitable species.

Figure 5: The division of proportion between the structural part and the functional part

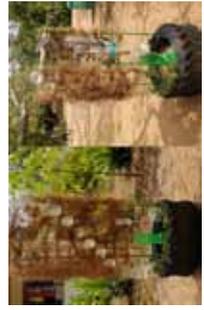


Figure 6: (left) The constructed ends of half water boxes creates venturi effect inside the reservoir (right) The preliminary circular profile was exhibited at Kattabakudi, Chennai, Tamilnadu, India. Source: Author.

RESULTS

The plants' water needs are influenced by environmental, regional and weather changes. A simple way to determine this is by watering the plants in the morning and let them drain for at least 30 minutes. The base is constantly weighed at a regular interval of 24 hours. The decrease in weight is the amount of water that has been used by the plant. Water is collected in a reservoir and used to create enough water daily to sustain the setup at an example test condition of 78% relative humidity and 93°F.



CONCLUSION

Explaining the specific qualities of our design and possibilities of optimising them was our prime intention. The change is inevitable and the recuperation of the ecosystems must meet the needs of today without compromising the ability of future generations to meet their own needs.

ACKNOWLEDGEMENT

Figure 1: 'Generating pure drinking water from air', The process of dehumidification. Source: The Acler Hill Industry

Figure 6: (left) The constructed ends of half water boxes creates venturi effect inside the reservoir (right) The preliminary circular profile was exhibited at Kattabakudi, Chennai, Tamilnadu, India. Source: Author.

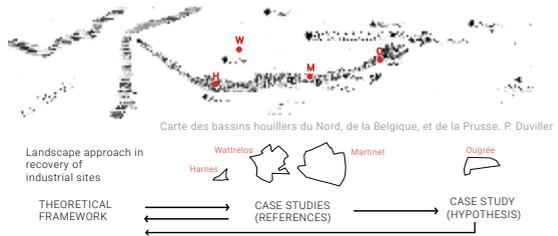
THE GREEN MACHINE

BIODIVERSITY PROTECTION VERSUS ECONOMIC EXPLOITATION

LANDSCAPE VALUE AS BASE OF THE RECOVERY PROCESS OF THE ANCIENT MINE SITE OF MARTINET

The research is about landscape approach in brownfields recovery, where regenerative design (J.T.Lyle, 1990) is proposed as a new form of manufacture in former industrial sites (N.Kirkwood, 1999). The thesis studies the relations between technique and landscape reinterpreting the meaning of production and its evolution in these sites.

Three sites, between Wallonia and Nord Pas de Calais regions are studied as references of different regenerative strategies, integrating the ecological, the social and the aesthetic dimensions (I.Thompson, 1999) as main characters of landscape design. Observations on realised projects, their actors and their impacts are discussed and relaunched into a recovery hypothesis for another abandoned site.



MARTINET: A 23 YEAR OLD CONFLICT OF VALUES

The debate on territorial reuse often generates conflict between inhabitants, industrial companies, public institutions, all defending different values within the recovery policies. At Martinet, citizens have defended the landscape value opposing to the economic opportunity proposed by an industrial company who wanted to extract the residual coal.

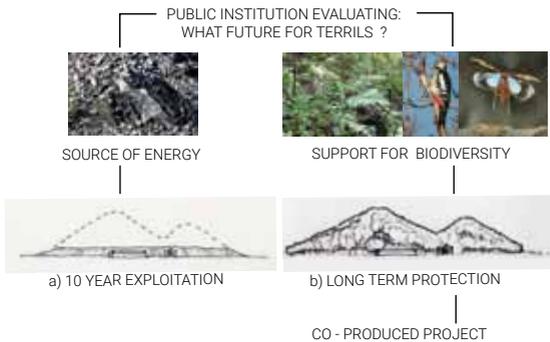
The case of Martinet is interesting because it represents an example of bottom-up strategy, based on the engagement of citizens for the protection of the terrils as natural reserves and matrix of a en evolving landscape.



RECOLONISATION PROCESS: REGENERATING SOIL AND PERCEPTION OF THE SITE

Since the cessation of extraction activity, the spontaneous vegetation turned the black terrils into wooded hills.

By walking on the terrils people rediscovered new qualities of the site as it became progressively a space of biodiversity, a landmark in their territory, a green reserve in town, perceiving it as a "common good". Since 1976, as an industrial company tried to acquire the site in order to exploit the terrils, the inhabitants of Martinet strongly opposed to face the risk of the disappearance of their "little Amazonia".



CITIZENS IN ACTION AGAINST THE DISTRUCTION OF TERRILS

- investigations about the impartiality and the legality of the public commission
- promotion of raising awareness activities and fundraising events
- engagement of scientific experts for ecological and social surveys.



EFFECTS: FROM PROTECTION TO EVOLUTION

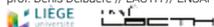
- 1) In 1995 the terrils were classified as "no-exploitable" (categorie A) for the rarity and singularity of their fauna and flora and as elements of a cultural landscape heritage.
- 2)The committee worked to co-produce a project for the reuse of abandoned buildings on the site. From 2009 to 2013 reclaiming and renewal process offered new spaces for investors and associations and for phytoremediation experimentation.
- 3) The committee actions also contributed in modifying the law (M.B. 22.06.1995) shifting to municipal level the decision power of classifying the terrils: an important step towards a more shared and local vision on the future of the landscape heritage.



The landscape value is not proposed in order to keep the site untouched but as a means to start a shared project of redevelopment which integrates the protected nature, new public facilities and spaces for new productive activities.

Elisa Baldin, PhD student
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Directors of research:
prof. Rita Occhiuto // Lab VTP// ULiège
prof. Denis Delbaere // LACTH // ENSAPL



LANDSCAPES OF CONFLICT // 9_12 SEPTEMBER 2018



Biodiversity protection versus economic exploitation: landscape value as base of the recovery process of the ancient mine site of Martinet.

Elisa Baldin,
Faculté d'Architecture - Université de Liège, Belgium

A FRAMEWORK FOR SUSTAINABLE EVENTS IN PARKS

AUTHOR: KRISTEN BOMANS,
GERT STAPPAERTS
MATTHIAS LOECKX

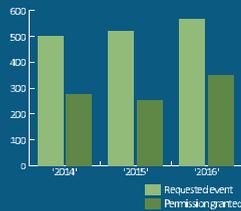


SCALE: 1/20.000



PUBLIC SPACES, AND MORE SPECIFICALLY PARKS AND GREEN AREAS, ARE INTERESTING PLACES TO ORGANIZE EVENTS. IN ANTWERP (BELGIUM), WE NOTICE AN INCREASING NUMBER OF REQUESTS FROM EVENT-ORGANIZERS. ALTHOUGH EVENTS BRING LIFE TO THE CITY, THEY CAN ALSO HAVE A NEGATIVE IMPACT ON THE ENVIRONMENT (FOR EXAMPLE DUE TO NOISE, LITTER, SOIL-COMPACTION, DAMAGE TO TREES, ETC.). THEREFORE, CLEAR GUIDELINES FOR ORGANIZING EVENTS IN PARKS ARE OF GREAT IMPORTANCE.

Events in the parks of Antwerp



In order to support sustainable management of parks and to prevent damage – especially in the most vulnerable areas – the city of Antwerp works together with Antea Group on a framework for organizing events in parks. The framework is founded by a benchmark study and includes general guidelines that should be applied to all parks regarding mobility and infrastructure, noise, energy, waste management, fauna and flora.

In addition to this global framework, each park has its own specific framework that indicates what is and isn't possible in each park. It includes specific areas in the park where events are possible, routing in the park, zones for heavy infrastructure, utilities, etc. It also holds information on which type of event is possible in each park and the maximal annual frequency of events, depending on the scale.

The information from this study will be integrated in the online tool that the city of Antwerp uses to evaluate requests for events in parks.

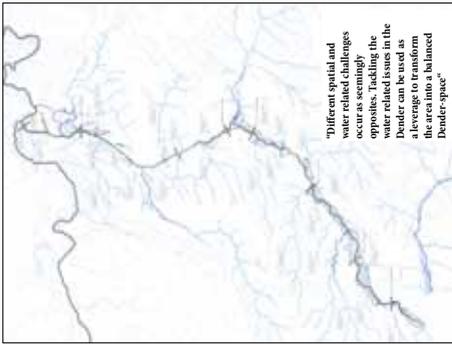
©SCAPE
USAGE OF SPACE (2019), WATERPLACES (2020), MATERIALS (2020), PHOTOS OF BELGIUM (2020), PARKS OF ANTWERP (2017), ORTOGRAPPA (2019)

A framework for organizing events in parks

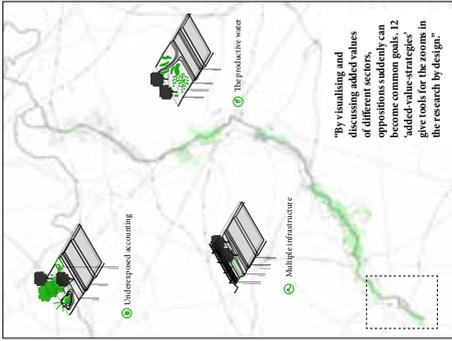
Kristen Bomans, Gert Stappaerts, Antea Group, Belgium

SPACE FOR WATER - Working together towards a balanced Dender

CHALLENGE



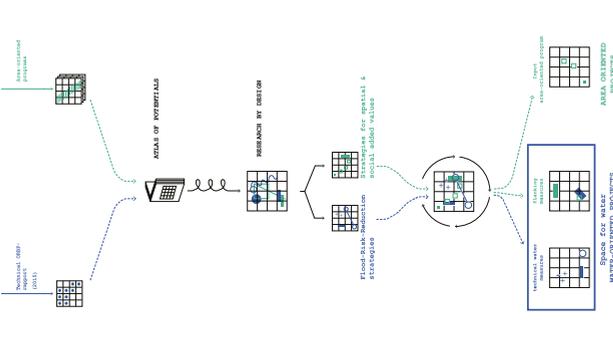
ATLAS OF POTENTIALS: THE DENDER-ATLAS



RESEARCH BY DESIGN

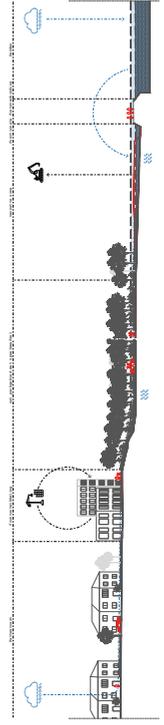


STRATEGY



It is self-evident that a 'consensus plan', as drawn in the research by design, is necessary to realize the common interests. Objectives and sensitivities of all actors. All this can be done, but we have to protect the integrated story and common interests and goals. The process diagram above illustrates how, after a new technical insight, we have to redefine and realize different types of projects (drawn by different actors). In this way, the separate objectives of the various stakeholders are achieved in an integrated way.

In the next step of the process we tried to integrate the added values of the regional scale and the local assignments into design proposals. The research by design method is hereby used to achieve multiple goals. It is used as a method to talk to stakeholders about a future scenario and to test specifically what role the water has in this future scenario. The design is used to understand and explain some tasks research by design method as a way of communication. It is used as a tool to bring people closer together. The research by design method depicts a plan where opposite interests can be united. In this way it also acts as a catalyst for initiating concrete actions.



Maat-ontwerpers and Labo used a research by design method to illustrate the combined added values of such an integral approach. In the first phase, the team used different workshops to create a 'Dender-Atlas'. The water story, the spatial narrative and the coherence between these two are illustrated by showing 'added-value-strategies'. These workshops created a common sense about the task and the strategy on how to deal with these tasks.

- 1) Even though the focus and the question for this to use a broad view. We don't focus only on the floodings of the Dender but also the general floodings related to common responsibilities. Implementing measurements in the catchment area is necessary to tackle both local and supra-local water problems.
- 2) We early tackle all these challenges in the catchment of the Dender. With climate change and the specific section of the Dender we still have to take measurements to deal with the floodings. We can't solve all the problems of the Dender by taking measurements in de catchment of the Dender. A number of drastic measures must take place within the entire Dender valley.
- 3) The first technical approach (2015) focused on risk-reducing strategies. How can we prevent as much as possible damage? In this research we want to combine this philosophy with an integrated question of added value. How can some measurements also generate (financial) benefits? In the preliminary phase we focus on the possibility to create strategies to protect or prevent damage. Now we can use these measurements to create advantages for local and regional stakeholders. By doing this, the conflict is converted to an integrated project with common goals.



The Dender valley, once defined a spatially coherent world of Dender-cities neatly positioned along one of the waterways from de 'Scheldedelta'. These cities were part of a society that largely derived its coherence from the valley, clearly structured in a feudal landscape that guarded the clear distinction between city-seape and countryside. The villages between the cities had a clear morphology and were developed as ribbons on the valley floor. There was no question of a conflict between the water landscape and man; the human understood the landscape and acted accordingly.

With a strong urbanization in the Flemish landscapes, these relation ships between man and nature, the logics of the water, were thrown overboard. The zoning plans and the 'property-right' suddenly made it seem obvious that the water landscape was not for the 'valley's' residents. Houses flooded and the government was looked after to protect them. For years, a strong technical-oriented and government-controlled approach was used.

Within the story of 'Space for Water - working together towards a balanced Dender', these problems are approached in a new way from a perspective between water and land. The task is to create a new technical approach, creating a new constructive interplay between the different, often contradictory logics without too many presuppositions and assumptions about what the natural ordering of this area might be.



STIEMERVALLEY PARK, GENK

AN AGENT FOR CULTURAL AND ECOLOGICAL TRANSFORMATION

TRACTEBEL Engineering
 GEORGES DECOCKE
 IMDC
 contact: mark.wilschut@tractebel.engie.com



ABSTRACT

Different assumption about nature and the relation between man and nature exist. The plurality of assumptions often leads to conflicting ideas among stakeholders involved in spatial projects. The discipline of landscape architecture should acknowledge these assumptions and work with different views and design approaches towards the relation between man and nature. The Masterplan of the Stiemer Valley Park, in Genk Belgium, employs different views towards nature, resulting in a spatial framework and spatial strategies that instigate aesthetic experiences that reduce barriers between humans and nature. Linear gardens, ecological conservancy areas and urban valley edges are spatial articulations which juxtapose nature's order and humans order. Thematic strategies dealing with processes of hydrology, ecology, trajectories and public culture are proposed as catalytic agents for transformation of the valley. As a result the Masterplan of the Stiemer Valley Park encourages contemplation on humans relation towards nature and could become an agent for cultural and ecological transformation.



*The project 'juxtaposes and contrasts nature's order and human order which prompts the contemplation of what it means to be human and what is nature'. (Whitson Spim, 1988)**



MASTERPLAN

The masterplan identifies three spatial typologies within the valley: gardens, nature reserves and urban valley edges all connected by a valley route offering a sequence of diverse experiences.

THEMATIC STRATEGIES

THEME 1: EMPOWER HYDROLOGY

Currently the Stiemer is a canalised creek flanked by sewerage collectors and flowing through concrete channel. **Sewage overflow** from the collector into the Stiemer occur during peak rainfall, which has a negative effect on the water quality and the environment. Moreover, hydrological dynamics between creek and valley is disturbed due to the concrete channel and collectors. Two strategies are presented to overcome these problems:

- 1- **Creation of a new Stiemer:** a parallel creek connecting former meadows and ponds within the valley which will be fed by sewage water, groundwater and stormwater run-off from adjacent neighborhoods. Introducing SUDS (Sustainable Urban Drainage Systems) within the urban fabric will increase these 'clean water flows' into the parallel creek thereby restore hydrological valley dynamics and overcome sewage overflow in the long run.
- 2- **Creation of a purifying channel:** interventions are proposed on the infrastructure of the existing Stiemer to mitigate the negative effects of sewage overflow in the short term. These interventions consist of technical and off-pipe solutions to the sewerage system and nature based solutions (reebbed) along the channel.



THEME 2: STIMULATE ECOLOGY

Some areas within the valley of the Stiemer have high ecological value, which is directly linked to local climatic conditions (former meadows which are fed by sewage water). These conditions however are threatened by **stagnant water and acidification**. Moreover the valley is transformed from an open landscape system of meadows and moorland into an enclosed landscape system of forests due to a lack of maintenance and usage. As a result the **biological diversity within the valley has dropped**. Two strategies are proposed to overcome these problems:

- 1- **Creation of a diverse landscape:** identification of maintenance within the valley is needed to enlarge the biodiversity within the valley. Six areas are defined which have the ecological potential for **intensification of reedland, meadow, moorland and forests** by adjusting the applied maintenance. Creating this diverse valley landscape enriches the experience throughout the valley.
- 2- **Creation of an ecological creek:** the parallel creek should be constructed in such a way that conditions are provided for a spontaneous ecological development of the creek into **three possible ecotypes:** a swampy creek, an open flow through swampy or an enclosed flow through swampy.



THEME 3: CONNECT TRAJECTORIES

The valley of the Stiemer has the spatial potential to connect the Meisen with the National Park Hoge Kempen on a regional scale, strategic urban sites on a city scale and the adjacent neighborhoods gardens, the valley landscape on a local scale. **Today the trajectories throughout the valley are fragmented, badly materialized, lacking legibility. Also the valley is hardly accessible from adjacent neighborhoods.** The valley of the Stiemer is a regional landscape in Genk. To strategies are proposed to activate the spatial potential of the valley:

- 1- **Creation of a valley route:** a continuous route (6.8km) running from the Meisen to Thorpark connecting the valley on a regional scale, while linking different strategic urban sites and connecting the valley. The route includes pathways and proposes new connections offering a wide range of experiences typical for the spatial structure of Genk.
- 2- **Creation of neighborhood walks:** a series of informal pathways (2-3km) linking adjacent neighborhoods to the valley landscape. The routes are traced in such a way that specific characteristics elements within the urban and valley landscape can be observed.



THEME 4: ACTIVATE PUBLIC CULTURE

Today the Stiemer valley is unknown to many citizens of Genk. The valley is often crossed by cars, but only those who dwell on or along the valley use the valley for a walk or cross by bike. Places to meet or reside in the valley are not present, **public space is limited to the pathways.** The adjacent urban fabric is not oriented towards the valley creating **barriers and unattractive spaces.** The potential of the valley as an add-value for urban dwelling is not utilized at all. These strategies are presented to intensify the relation between urban and valley landscape by introducing public place along the valley and on its edge:

- 1- **Creation of gardens:** Gardens are conceived as public places in the valley, by transforming the existing channel of the Stiemer. Gardens are seen as spatial articulations clearly defining a place that is open to public encounters, usage, or play.
- 2- **Punctuated interventions:** Small scale architectural interventions along the neighborhood walks that aim to intensify the experience and interaction with the valley landscape.
- 3- **Urban valley edges:** places with a potential for urban socialisation in which public space can generate new relations between valley and urban landscape.



Supposition of the trajectory emergence onto the valley: a formal valley route running continuously through the valley connecting strategic urban sites and a series of informal neighborhood walks connecting adjacent neighborhoods with the valley landscape.

Supposition of the cultural strategies onto the valley: a transformation of the existing canalised Stiemer into public places (gardens) onto or along the Stiemer, punctuated interventions along the neighborhood walks and a transformation of the urban valley edges (crossing a fence) towards the valley, linking the valley directly with its surrounding neighborhoods.

Stiemer Valley Park, Genk. An Agent for Cultural and Ecological Transformation

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Learning Outside the Classroom



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Aalto Landscape Architecture Summer Academy

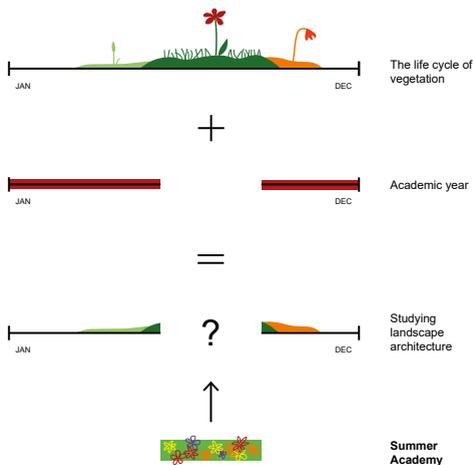
Experimental Summer Studies in Landscape Architecture

Abstract

Landscape architecture studies are dependent on seasons more than many other disciplines, because of the need to understand how different landscapes function. There is a clear conflict between the term times and the subject taught. During the autumn and winter terms, and a large part of spring term, teaching and learning take place in the classroom, except for excursions and occasional field courses. The need to introduce summer courses arose from this practical need for finding meaningful ways to study and research actual sites and vegetation. To address this need, in 2016, the Programme of Landscape Architecture at Aalto University started to work on a blended learning project (5 cr.) which would allow students to work independently during the summer period on a given assignment.

The Summer Academy provides students an opportunity to study a given garden or a landscape and collect data on the vegetation, including identifying species, determining environmental factors and studying the use of plant material in the context of landscape architecture. Students need to observe the site and collect visual and audio material. They are strongly encouraged to follow their interests in defining their individual task. The course offers a chance for them to cover gaps in their knowledge or strengthen other areas according to their individual needs.

The goals of the course are twofold: firstly, the aim is to teach students the subject matter and secondly, to provide them with visualization and data collecting skills (photographing, drawing, recording video and audio materials) and techniques to process, analyze and present collected material. Both the field work and data processing will enhance students' observation skills and abilities to analytically represent a space. The goal is to learn by experiencing, doing and creating and for students to be able to demonstrate the newly acquired skills in a concrete and creative way. The course also encourages students to share their knowledge and skills.



Summary - Solving Conflicts

The landscape architecture Summer Academy presents an attempt to solve the incompatibility of the local climate and university term times. The Academy studies give students a chance to apply their theoretical knowledge in practice. Independent study can be demanding, but it offers an opportunity to practice skills needed in working life. Feedback on the studies has been positive. Students have felt that the course work has been meaningful and useful for their studies.



The course work is based on independent study in accordance with the study plan. Working methods include recording and processing observations by drawing, drafting, photographing and collecting audio material.



The students are strongly encouraged to follow their interests in defining their individual tasks. The course is a chance for them to cover some knowledge gaps or strengthen certain areas of knowledge, according to their individual needs.



The work produced over the summer is collected onto a website designed for this purpose, which will become a landscape architecture data bank for teaching purposes and for the benefit of students and the general public.



Both the field work and data processing will enhance students' observation skills and abilities to analytically represent a space.



Students will make a joint field trip to this summer's research site. Students in Tapiola in 2018.



In the Academy, students get a chance to practice their technical skills, which can be difficult to adopt within the tight course schedule of the autumn and spring terms. The skills practiced on the course include drawing by hand, rollover images and 360 images.

Contact information

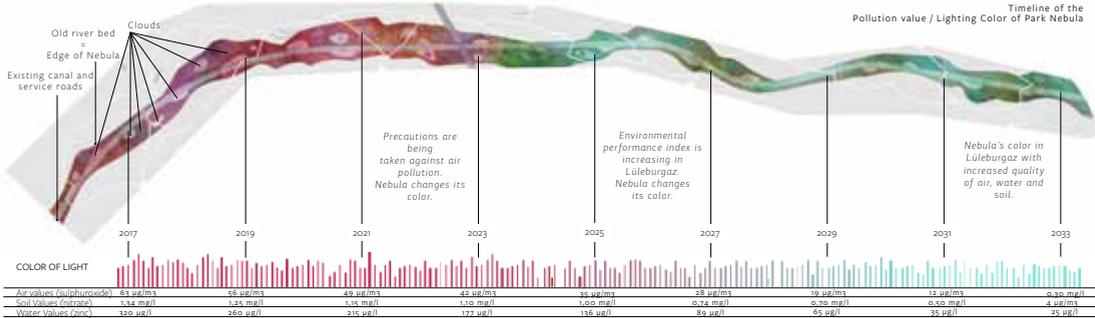
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Students on pilot courses 2017 & 2018

PARK NEBULA a park dedicated to minimising the industrial pollution, trusting in innovation



Ergene is a major tributary of the Maritsa river, flowing in the East Thrace region of Turkey. Lüleburgaz, a town located in Thrace Region at the very centre of Ergene Basin, is facing a vital danger due to the fact that rapid urbanisation and heavy industry is causing a considerable pollution. This pollution has spread all over the Thrace region and endangered all the

habitats, determined the ecological presence. Although Lüleburgaz, as a smart city, has a clear future vision guided by innovation, technology and sustainability, this environmental danger remains as a serious problem that needs to be taken into agenda as soon as possible. In order to make an action plan for this fact, prevention from the pollution must

be the very first step. Then should come the solutions that can cure the existing conditions. In this kind of rehabilitation process, public awareness is as crucial as the effectiveness of the technical solutions. If only the demand of the public compels a cleaner city for the future, the public bodies can be forced to execute real action plans.

We deeply believe that landscape architecture today must take an action upon this sensitivity and should provide the tools that can develop the public awareness. Award winning competition project Park Nebula is a result of this ethical standing point. It aims to make the pollution visible by using the poetic power of lighting in landscape.



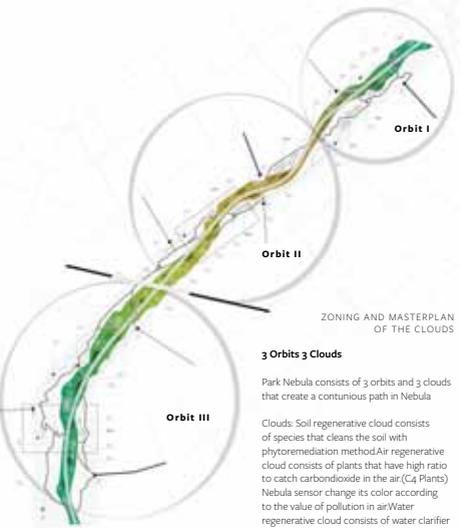
NEBULA DAILY VIEW

NEBULA NIGHT VIEW



Nebulas (Cloudlike) are dense gas and dust clouds that are visible by their spreading light energy between the spaces of interstellar. Stars create new, tiny stars by merging of gas before they complete their lifetime. All these stars and gas creates nebula. Stream's old, lost streambed is seems like a star that completed its life time. In this sense, Park Nebula is the metaphor of programs which touched and integrated with new restorative landscape.

Its aim is to bring landscape's regenerative, productive features and citizens together and also use technology to create different formulas of this meeting. Nebulas, create a view like dust spots, light splashes in the sky in shiny starred nights. Placement of light's colors based on the value of air, water and soil pollution. Thus, citizens of Lüleburgaz can easily see the values of environmental pollution and remember its importance.



ZONING AND MASTERPLAN OF THE CLOUDS

3 Orbits 3 Clouds

Park Nebula consists of 3 orbits and 3 clouds that create a continuous path in Nebula

Clouds Soil regenerative cloud consists of species that cleans the soil with phytoremediation method. Air regenerative cloud consists of plants that have high ratio to catch carbon dioxide in the air. (C4 Plants) Nebula sensor change its color according to the value of pollution in air. Water regenerative cloud consists of water clarifier plants. Nebula sensor change its color according to the value of pollution in water. While Nebula clouds clean the soil, air and water of Tosbağa stream, it also works as a warning lighting system for citizens that has a scale from pink to green which is related with the values of air, soil, water pollution in Lüleburgaz.

VOCABULARY OF THE PARK NEBULA AND SPATIAL PROGRAMS

- Nebula Terrace**: Nebula watching platforms in orbits
- Nebula Road**: Narrow discovery paths inside of the Nebula
- Orbit**: Regional and functional division that includes various programs
- Nova**: Meeting points located in flat parts of the topography inside the boundary lines, outside the Nebula (old riverbed)
- Nebula sensor**: Color changing lights according to the pollution values of air, soil, and water, placed in Nebula
- Nebula station**: Meadows locating by the stream. Attached to pedestrian and bicycle roads without defined programs
- Nebula Corridor**: Pedestrian connections that binds the two sides of Nebula

Planting Palette of Park Nebula

THEMATIC CLOUDS AND RESTORATIVE LANDSCAPE SPECIES

- Air purifying plants (C4 Plants)**:
 - Arundo donax, Miscanthus sinensis, Sorghum invar, Zea mays L., Pennisetum purpureum
- Soil remediation plants**:
 - Hypericum perforatum, Thymus serpyllifolius, Artemisia annua, Cirsium vulgare, Cirsium discolor, Cirsium palustre, Cirsium arvense
- Water purifying plants**

P R A X I S

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This project won the equivalent prize in Tosbağa River Park Competition in 2017.

Design Team
 Enise Burcu Derinbogaz, Oyku Arda, Melike Uresin, Başarhan Akkaya



Designing the Public Awareness Before the Landscape: Case of Park Nebula

Enise Burcu Derinbogaz, Melike Uresin, Oyku Arda, Praxis Landscape, Turkey



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Taylor & Francis Group



HoGent