Ellen Fetzer
*editor*

# Regenerative Landscapes

# Designing the Transition

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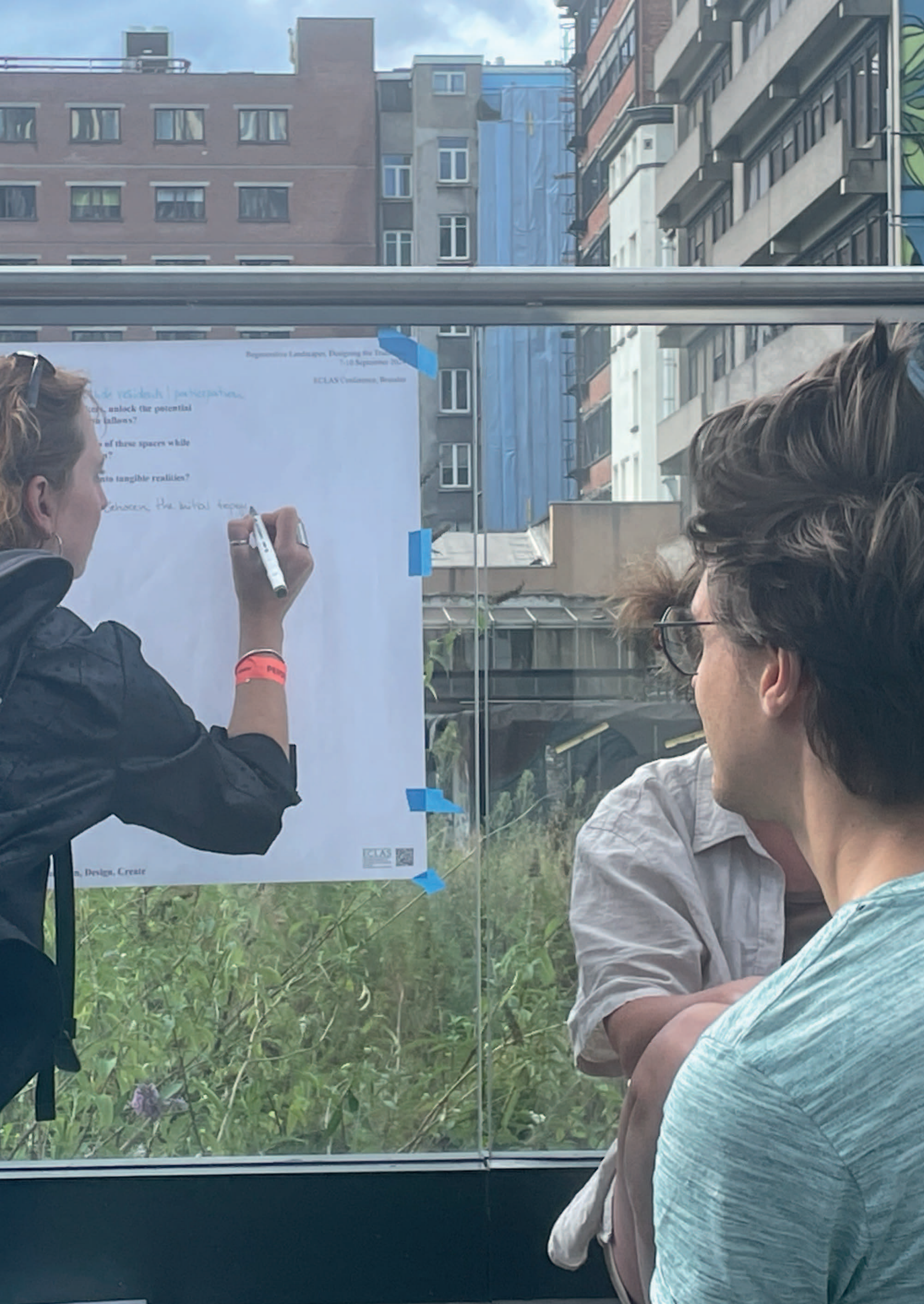

unlock the potential
of these spaces while
into tangible realities?
the initial
Design, Create
ECLAS

Regenerative Landscapes

**Regenerative Landscapes - Designing the Transition**

Selected Proceedings of the ECLAS 2024 Conference


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# Regenerative Landscapes

# Designing the Transition

Selected Proceedings of the 2024 Conference of the European Council of Landscape Architecture Schools (ECLAS) hosted from September 7 - 10, 2024, by the Faculty of Architecture, Université Libre de Bruxelles (ULB), in Brussels, Belgium.

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## Editorial

As President of the European Council of Landscape Architecture Schools (ECLAS) it is my great pleasure to introduce these selected proceedings of the ECLAS Conference 2024, hosted at the Université Libre de Bruxelles (ULB) in Brussels. The conference theme, *Regenerative Landscapes – Designing the Transition*, has underscored the critical role of landscape architecture in navigating the complexities of climate change, biodiversity loss, and societal transformation.

We have gathered with almost 300 people in Brussels at a pivotal moment. Our landscapes -both urban and rural- are under unprecedented pressure, with six of nine planetary boundaries already exceeded. This conference provided an opportunity to reimagine landscapes not merely as spaces of adaptation but as active agents of regeneration. The contributions in this volume reflect a shared commitment to fostering landscapes that restore ecological function, enhance social equity, and inspire cultural renewal.

Our thematic tracks have explored the diverse facets of regeneration: from energy and mobility landscapes to foodscapes, hidden landscapes of the global value chain, biodiversity regeneration and democratic landscape transformation. Each theme represents a vital component of the transition towards resilient, equitable, and thriving landscapes. The discussions initiated here will be crucial in shaping the future of landscape education, research, and practice.

I extend my sincere gratitude to the organising team, our hosts at ULB and CIVA Brussels, and the dedicated researchers, educators, and practitioners contributing to this conference. Further, the conference and these proceedings would not have been possible without the TELOS ERASMUS project and its team. TELOS provided the conceptual framework for designing our call for papers guiding the discourse of this conference.

I hope that our 2024 gathering has served as a catalyst for new collaborations and bold ideas, driving the discipline of landscape architecture toward a regenerative future.

Dr. Ellen Fetzer
ECLAS President 2018-2024
European Council of Landscape Architecture Schools

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EUROPEAN COUNCIL OF LANDSCAPE ARCHITECTURE SCHOOLS

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# Degrowth

**Keynote speech transcript from**
Nathaniel **Barlow**, Department of Socio-Economics
Vienna University of Economics and Business (WU), Vienna, Austria

When I first got the request to speak I was surprised. What can I, as an economist concerned with strategies for social ecological transformation, offer to a conference on landscape architecture?

This puzzled for me some time, until I spoke with one of the conference organizers and they mentioned that at the moment most (landscape) architects are paid by the square meter of soil sealing!

Also last month, in a Le Monde Diplomatique article I read, it said that to build the modern highway system in France it required: 5 tons of sand & gravel per linear meter of highway built and that infrastructure projects account for the largest flow of resources (more so than any other socio-economic activity in France). In these moments it became clear to me why someone from the degrowth research community fits to a conference on landscape architecture.

**I perceive we are facing the same problem, the absurdity of a system that has reached its limits yet continues to require ongoing expansion and growth despite everyone knowing it's not possible to continue in this way.**

The buildings, spaces and environments you want to build and design (or advocate for) can not be created en masse and at scale in the current economic system, despite everyone knowing that the logic of more new buildings and more concrete must change to renovation, and new materials. And if you try to work within the logic of the current market economy, these alternative projects are destined to be marginal because they simply don't fit to the current economy, they are too expensive and not what the client wants.

This is why I am working in the field of degrowth, to challenge an absurd economic system that requires infinite growth on a finite planet, which I believe closely touches your field of landscape architecture and its concerns of:

- Preventing soil sealing
- Expanding green spaces
- Focus on re-localizing
- Shifting from closed and private spaces to public and shared spaces
- Retrofitting and re-designing rather than re-building
- Innovative re-using of materials, and
- Creating spaces that foster connection rather than isolation; and much more !

I hope my presentation will do two things:

- Explain what degrowth is, and is doing, to show that it is relevant for both of our fields (economics and landscape architecture), along the way highlighting that the current social-ecological crises are at the core of how our societies are organized, based on a capitalist mode of production, consumption and exploitation
- and then, I will argue that due to the scope of changed required to achieve a social ecological transformation, effective strategies and coordinated political action is necessary – not another 'best practice', another model project , or even more good ideas, but instead changing the rules of the game!

**What is degrowth?**

So, explaining degrowth can be challenging because it has multiple facets: it is first and foremost a critique, second it is a vision of an alternative way to organize the economy/society, and lastly it is a loose movement of activist-academics who are trying to realize this change.

It has existed since 2008 as a research field, with its first academic conference taking place that year, which as most of us know, wasn't a great year for the economy. Since then degrowth has had 17 conferences, most of which took place in Europe but also elsewhere like in Mexico City and Montreal. Degrowth draws heavily on the fields of ecological economics, feminist economics, political ecology, social ecology, Marxist economics, development studies and critical theory more broadly, with many intellectuals and academics that we are building upon and bringing together.

**Why is degrowth relevant?**

One of the most exciting things about degrowth, in my opinion, is that it is increasingly being engaged with by researchers, politicians, young people, and many different walks of life – and that means it is relevant and not just a marginal critique.

The IPCC's sixth Assessment report released in 2023 named degrowth as one of the two key green economy approaches (alongside green growth). Degrowth scholar Jason Hickel spoke to the Dutch parliament on the merits of degrowth. Dozens of local groups working on degrowth as a 'political' project exist across Europe and increasingly elsewhere as well. Last year the Beyond Growth Conference took place in Brussels at the European Parliament, with MPs in attendance and supporting the event. The EU last year awarded its largest grant, an ERC grant of 10 million euro, to a degrowth research project based in Barcelona for seven years; and lastly, Kohei Saito published a book on Degrowth Communism in Japan and it became a best-selling book there!

**So now on to degrowth's critique**

Degrowth is a critique of our current economic system that is focused on infinite growth at the expense of society and the environment, which has produced an economy that fetishizes growth at all costs (both human and environmental). Further, economic growth often just profits the richest of society while showing no improvements to the majority. Instead, the growth economy swallows up more and more resources, pillages more eco-systems, obliterates biodiversity and communities along the way, in the search for new cheap materials and more things to commodify. The only thing that matters is that GDP increases even if that is due to economic activity like military expenditure, surveillance equipment, more advertising in our already visually polluted environments, or other "uneconomic" growth that hardly improves our quality of life.

There is a misconception that economic growth is key to societal well-being and this simply is not true, instead in many instances economic growth undermines our societal goals of ecological sustainability and social well-being.

A quick example to show the contrast:

- An ambulance going to help someone in a car accident increases GDP; whereas
- A person who goes for a walk every morning has no increase on GDP

Based on the logic of mainstream economics, the former is better for the economy (and thus society); whereas the latter brings no benefit to the economy (and thus to society). I think I don't need to spell out the absurdity of this.

Degrowth is also critical of the emerging 'green economy' paradigms that promise more consumption, more production, and no meaningful changes to our way of life, just a switch from fossil fuels to "renewable" energy sources, which is the mantra of green growth enthusiasts but also visible in less critical applications of sustainable development and circular economy.

These narratives are enticing, but they are inadequate in a few ways. First: These discourses often assume it is possible to de-link economic growth from its material, energetic and biophysical basis but research shows this isn't possible. All economic growth is inherently material and energetically intensive Second: these approaches often reduce our collective societal crises just to carbon. But the crises run far deeper: inequality, alienation, biodiversity loss, and many others that cannot be de-carbonized away, instead deep structural and political-economic change is needed, which these approaches often do not advocate for. Third: green economy approaches do not challenge how we use energy, but simply advocate a switch of sources to "renewable energy" But if you have ever seen the production and transport process required for a wind turbine or a solar panel you will know anything but renewable. These things do not grow on trees.

This is not to say degrowth thinks we should go back to the stone ages and is anti-renewable energy, it instead emphasizes that these technologies are crucial but if they are used to maintain our current mode of living, then they are totally inadequate – a change of our way of living must accompany these technologies else this added energy will be used just to expand more production and consumption (as is currently the case).

So, to put it in a nutshell, all economic growth is materially and energetically intensive (especially when we zoom out to the global level), and given the timeframe for rapid decarbonization we have no time to explore and place hope in miracle technologies but must instead degrow our economic activity. Obviously not degrowing endlessly, but until a balanced point is reached, in other words, a kind of steady state economy. So degrowth can be understood as a transition from our current massive over-production and hyper-consumption economy to a more balanced one without the simplistic and false promise of "nothing needs to change, just the energy source".

And one big disclaimer: It must be made clear that degrowth is a vision for transformation in rich countries of the global north, which aims to create ecological space for the Global South to find its own paths forward (devoid of neo-colonial relations) and acknowledging the North's disproportionate responsibility in terms of $CO_2$ emissions, biodiversity destruction, material usage, and eco-system degradation.

**So, what could that look like? I will next sketch the degrowth vision:**

Vision: degrowth envisions a post-capitalist future where the economy is in service of social and ecological needs, aiming for human flourishing within biophysical limits based on principles of equity, care, reciprocity, as well as global solidarity. This implies new laws, built infrastructures, adapting and re-inventing existing institutions and a significant cultural change away from consumption towards conviviality with issues of equity and justice at the center. This can be achieved in a number of ways and crucially across multiple domains or spheres of life, I will give some examples to try and show the interrelation of politics, economics, markets, ownership structures, cultural change, and consumption habits. I will explore a few via examples of what degrowth could look like in the future by describing some examples in more detail (i) Red Vienna, (ii) Mobility; and (iii) Improving well-being.

**Red Vienna**

Removing basic needs like healthcare, education, mobility, and housing from the whims of the market is a key pillar of a degrowth future – in other words: de-commodification. De-commodification is one key pillar in a degrowth future because it ensures people's basic needs are met regardless of income. This also increases the possibility of planning production rather than having market demand shape production, so not building more of the luxury apartments that we see dominating the skylines of most cities as empty investment prosperities.
Red Vienna was a period in the early 20th century when a massive amount of municipal housing was built in Vienna by the socialist (red) government and has since been sustained and expanded. It is an excellent example of de-commodifying housing and fits well to the degrowth vision because it is characterized by affordability, quality (there is a design competition for new buildings), social integration (multiple classes alongside each other to avoid ghettos), links to public transport and newly built buildings require bike storage. An impressive figure: 2/3 of the Vienna housing stock is owned or managed by the city. Prices aren't determined by

profit-seeking real estate investment companies but rather municipal entities or limited-profit firms that have clear rules on the building quality and the degree to which the prices are subject to market-mechanisms, and this has a downward affect on the other apartments in Vienna. I pay less than 400 EUR for a room in a shared apartment and we have two balconies in a newly renovated municipal building, which is impressive for a European capital city! They could be improved further by increasing the number of shared facilities, for example shared clothes washing facilities, which in the early 1900s the Karl Marx Hof had. The legacy of Red Vienna is very impressive and shows that a degrowth future is not utopian but requires often re-assembling what we already know.

However, such changes in ownership structures are limited today by the EU's common market and its laws on competition, which bans municipal ownership at this scale. These laws on competition show the close link between economics (or economic ideology) and the barriers to meaningful structural change in many sectors. So a degrowth housing policy must not only aim to expand public housing and de-commodify housing, but simultaneously challenge the pro-market logic of the EU.

**Changing mobility under degrowth**

Degrowth is not just about encouraging the consumer to make better, more eco-friendly, and socially conscious buying habits (which will play some part), but it's also about limiting consumption and production through new rules/norms, and also building infrastructures and adopting policies to enable these lower energy modes of living.

For example, encouraging people to bike to work is not enough, we need the public infrastructure built for it, we need to educate people who did not grow up with bikes how to ride, we need to subsidize good bikes for all, we need to build bike parking and retrofit trains to transport bikes. But we also need to challenge the dominant and destructive modes of transport through laws and rules, and not leave this to the market to fix. This could include banning advertisements for cars or at least severely limiting it, since today many motivations for having a car are tied to image, power, toxic masculinity, and other behaviors that a degrowth future needs to challenge and move beyond. Also putting clear limits on high-carbon activities, like private vehicles, long-distance flights, and limiting luxury consumption in general, since these activities account for a large percentage of emissions yet are done by few, often the rich.

I saw an excellent image recently showcasing the space on a road required to transport 50 people in different forms of transport – foot, bike, bus (each taking a marginally larger amount of space) and then the massive increase in the amount of space once each was in a combustion engine car (an image many of us are familiar with ) and then it showed how the space changed for electric cars, hydrogen cars and biofuel cars and it was exactly the same as the normal car of course. So changing mobility under a degrowth paradigm requires expanding access and ease of us of low-carbon forms of transport, through investment and innovation, but also limiting the most excessive forms of high-carbon mobility. Simply because we can build a Hummer SUV does not mean we should, simply because we can go to the Canary Islands for the weekend on a private jet doesn't mean we should. And this isn't about then moralizing individuals and making better green consumption habits but instead collectively deciding on societal limits and then helping our society to best stay within those limits while still leading a good life for all .

**Improving well-being and why degrowth isn't austerity**

One of the mistaken understandings of degrowth, which assumes a degrowth paradigm implies everything must shrink, but obviously some things must grow and flourish (like renewable energy production, but also community centers, bike infrastructure, etc). Degrowth aims to increase well-being through fewer resource and material usage, this can be seen in policies that focus on reducing things like work-time reduction, less stress, less traffic, less pollution, less advertising (visual pollution), less pressure to perform. And also increasing the things that bring us happiness and increase well-being but have a small ecological and social footprint, like increasing time with friends, increasing the amount of cooking we do at home, increasing caring time with loved ones, increasing time for fixing things and repairing things, having time for buying used things. These changes can be understood as a shift from consumption to conviviality (in other words: gaining human satisfaction and well-being through interactions and inter-relations not through more objects). Such a cultural change also entails re-normalizing the idea of "enough" (sufficiency), which historically there were such limits on what we could and couldn't do, limits we have abandoned with the philosophy of "if we can do it, we should do it" … but should we really do anything just because we can?

Thus a degrowth society and economy would shrink those things that are harming humans and the environment, but aim to expand those things that enrich and nourish communities and eco-systems. This won't be easy, and will require re-learning and forgetting things, crucially needing not just economists but importantly the arts, media, designers, and philosophers to support with such a historic cultural shift.

**Implications**

The implications of the degrowth vision and analysis are many. Deep structural change is necessary, in other words a social ecological transformation, so more best-practices and micro projects will not cut it. Any solutions focusing on green growth and more technology are not viable as these only enable localized places to achieve sustainability on the backs of others; and there will be resistance to this kind of systemic change and thus political power is key to this change, not only better ideas but translating them into political action.

*So how do we manage to get from here to there?*

**Degrowth and political action. Or in other words: why strategy matters**

Strategy can be understood in this context in the broadest sense of how to get from our current status quo to realize a social ecological transformation in line with a degrowth vision, so a theory of change, how to combine different actions and tactics across time. Firstly it must be said that within degrowth there is not consensus on how best to achieve social ecological transformation and there are many currents. Some more anarchist and prioritizing bottom-up approaches, others more statist and top-down, some advocate for an abrupt break with current institutions, others imagine a slower transition with institutions adapted to degrowth principles, some are policy-oriented and think more/better policies are the key and the task is to convince policy-makers, some believe a political party is key, others are in-between or undecided, etc.

Degrowth previously was not particularly engaged with the question of strategy but myself and others in the degrowth community encouraged degrowth to move beyond this kind of indifference that embraced an "anything-goes" approach, where all strategies are pursued simultaneously without any distinction or discussion about which is more fitting for different contexts (or which may be incompatible), we called this "strategic indeterminism"

But that was 6 years ago that we began advocating for more focus on strategy in degrowth, and since then we organized a conference on the topic and published a collected volume on strategy and degrowth. So the importance of strategy can now be considered an emerging consensus within the degrowth community.

Without considering seriously the issue of strategy we risk naively imagining a better future, but the immense barriers to transformation are overlooked or downplayed because immense structural change, either that imagined by degrowth (or that imagined by your field of landscape architecture and design) are both contested processes, a power-sensitive analysis is necessary, which accounts for how the necessary change can materialize (and also who wants to block or challenge such change).

If we are researching a different way of organizing society, the economy, and space – then we must embrace a political vision of how these realities may (or may not) come into being, thus we must do the difficult, messy but also brave and necessary work of examining how to get from here to there and engage with socio-political processes. As Marx famously said:

it is not enough to analyze the world, the point is to change it!

Unfortunately,  I do not come to you with a magic solution for the best strategy, but I appeal to you to take seriously the importance of strategy, political action, power, governance, and organizing to make a social ecological transformation possible.

But I did have some questions in mind that might help us to collectively move forward:

- How can landscape architecture and design be an ally for social ecological transformation ?
- What can possible alliances look like?
- How to move away from another best-practice or award-winning project, to instead achieving structural, political and institutional change in the field of architecture and design?
- How can you mobilize your power (which is technical expertise and knowledge that many do not have) in service of social ecological transformation?
- You have the concepts and ideas for how to build and design in a more sustainable and equitable way, how to mainstream this?

As my presentation comes to an end, I have one last thing I wanted to share before I finish: I read a great webarticle before the conference by Benjamin Wells on the links between degrowth and architecture, in the article he cited Keller Easterling who said that "*architects are well positioned to master methods of subtraction*", which I think fits beautifully to the ethos of degrowth…. so with that I now turn the floor to all of you.

Thank you !


Keynote speech on design theory by professor Sandra Groll

# Designing for ecologies
# One cannot not design systems

**Keynote speaker**
Prof. Dr. Sandra **Groll**
Professor for Design Theory
Brand University of Applied Sciences, Hamburg, Germany
& Zhejiang Wanli University, Ningbo, P.R. China

Design is far more than the functional-aesthetic shaping of more or less usable consumer goods. As an attempt to improve a situation or transform a problematic condition into a better one (Simon, 1968, p. 153), design is not only part of many professions with little to do with applied aesthetics, but is more fundamentally a central element of human cultures. Design enables us to survive on this planet despite our poor natural adaptability to the environment (Gehlen, 1940). At least that's what we believed. Today, it's clearer than ever that design, as one of the tools of progress and improvement, also produces side effects of all kinds – effects that threaten this very survival. Design impacts not only our environment but also the designers themselves – often in surprising ways. "Design designs" (Willis, 2006), and in a systemically complex world, this means creating interactions that are difficult to foresee – especially when designs consider only simple systemic relations and methodically ignore broader contexts, because they appear irrelevant from design's human-centered perspective.

In a world composed less of inert things and more of living systems – social, biological, cognitive – that form complex system-environment relationships including artificial and socio-technical systems, our attempts to design situations, relationships, and environments around human needs alone become paradoxical: they claim control, yet the attempt itself creates the unforeseen. Conditions are simultaneously improved and worsened. For constructivists and cyberneticians, this is not new. Since the shift toward second-order cybernetics (Von Foerster, 2003), we've known that observers and designers are part of the observed – and that every observation has a blind spot. Paradoxes such as the fact that every design also actualizes the undesigned are not inherently problematic. Typically, they are concealed by pretending as if they don't exist (Richter & Groth, 2025). Only when this pretense no longer works – when consequences can no longer be ignored – do we see shifts in direction, which require learning processes and lead to the replacement of guiding distinctions, paradigms, or orientation values. This has already happened repeatedly in design history. A broader understanding of design has since become established – one that no longer sees design solely as operating at the level of products, goods, or brand identities (Krippendorff, 2006).

### Beyond Aesthetics: Design as Systemic Practice

The classical understanding of design describes it as a practice that gives everyday artifacts their shape, considering their functional and contextual usage. On a larger scale, design as a professionalized practice with specialized training and its own institutions became necessary with the industrial revolution (Meurer & Vinçon, 1983). With the emergence of mass markets, the basic contingency of artificial things became a problem. For producers in anonymous mass markets, it was unclear how things should be shaped in form and function so they would make

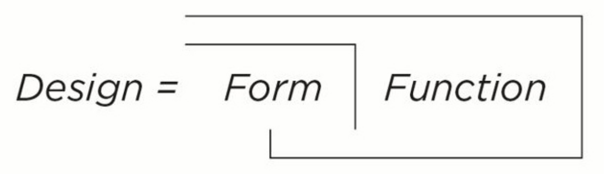


Figure 1: Basic Design Calculus (according to Baecker)

sense to others – in the sense that people would be willing to buy them. Or, in Marx's terms: for the exchange value to be realized (Marx, 1890). Design provided the solution.

However, design's value does not end with this economic function – even though it is a relevant area and has rightly been criticized as one of the most dishonest disciplines, whose sole purpose is to design things for people who want to impress others (Papanek, 1984). Still, it makes sense to distinguish between performance and function, as Luhmann does in the context of functionally differentiated social systems (Luhmann, 1997). Performances are supporting functions one social area provides for another, whereas "function" refers to the broader social context. In design, it is a way of managing contingency – based on the notion that everything could always be different. Therefore, we must always answer why something should, at least temporarily, be the way it is. The question we, as designers today, must ask is whether our methods and rationales are still complex enough – or whether they rely on excessive simplification.

**Wicked problems and the challenge of complexity**

Many of today's most urgent design challenges – such as climate change, biodiversity loss, urbanization, or social justice – are so-called wicked problems (Rittel & Webber, 1973). These problems cannot be definitively solved – not even by design – because they are themselves systemic in nature, involving multiple interdependent variables. Worse, they cannot even be fully described as problems, since both the understanding of the problem and its solutions depend on the describer's perspective. Traditional problem-solving approaches fall short here. In design, one example is Human-Centered Design, whose anthropocentric perspective and focus on relevant design variables (Viability, Desirability, Feasibility) make sense for socio-technical innovation, but neglect extended system contexts. Human-Centered Design and its method set reduce the world's complexity too drastically, excluding actors, systems, and entities that these methods cannot capture. A human-centered interface design might be technologically feasible, desirable for users, and economically successful – but this says nothing about

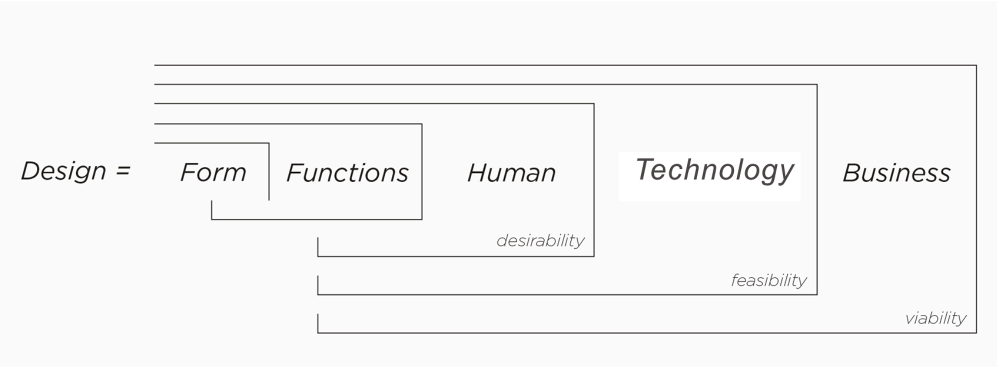

Figure 2: Human-Centered Design Calculus

its impact on users' neural systems. The same applies to landscape design: just because a space is feasible and attractive to visitors doesn't mean it's suitable from ecological or biodiversity standpoints. With the climate crisis and biodiversity loss, expanding the system contexts considered in design is becoming increasingly essential. Just because a relevant system context isn't explicitly addressed in a design doesn't mean it's not still shaped by that omission. Design always manifests its effects within the systemic complexity of our world.

**Design as interface: navigating ecologies**

To navigate such ecologies through design, it is helpful to recalibrate our conceptual and methodological tools – and to develop a new, reflexive self-understanding that acknowledges the selective nature of every design. We can never consider all relevant system-environment relationships, but we can expand the depth and specificity for each particular context. This can be illustrated through design calculi, which epistemologically build on George Spencer Brown's Laws of Form (1969). In Dirk Baecker's words – whose basic calculus (Figure 1) is shown on the previous page – "design occurs whenever function informs form and vice versa" (Baecker, 2007, p. 253).

The basic calculus is expanded in Human-Centered Design (Figure 2) by adding the variables Human, Technology, and Business – to correct for misguided developments in 20th-century product and digital design (Brown, 2009). However, this has resulted in a strongly anthropocentric perspective in the designs emerging from this approach, since only those system relations, values, and entities are considered.

In a systemically complex world, such omissions have consequences. In many design tasks, focusing on the human-technology-business relation is insufficient, as other systems are relevant but ignored – and that omission still influences the whole. An ecological understanding of design must therefore engage with extended system relationships beyond the human-centered perspective. Expressed again in calculus form (Figure 3), the horizons addressed in the design must be expanded.

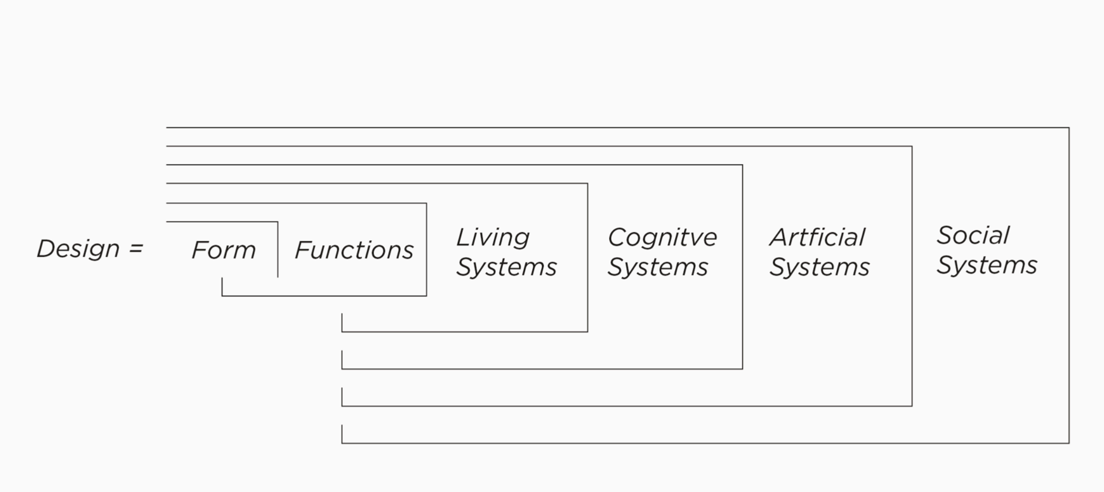


Figure 3: Design Calculus – Systemic Dimensions

**Designing for the Future**

Design has always been a systemic practice – every design changes the system relations in the world. Designers don't only create products; they also have unintended effects on complex conditions. These must be considered more adequately than is typically done with the overly selective design approaches in use today. An ecological understanding of design invites us to include more contexts in our design considerations and to expand the calculus of design in a context-sensitive way. By accepting complexity and rethinking design's role as an interface, we can develop a resilient, adaptive, and ecologically-oriented design practice – one that doesn't merely respond to change but actively shapes the future we aim to build.

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# Regenerative Landscapes

# Call for Papers

# ECLAS 2024
# Regenerative Landscapes
# Designing the Transition

## Call for Papers

Ellen **Fetzer,** ECLAS President 2018 - 2024
Nürtingen-Geislingen University, Germany

ECLAS 2024 discussed the capacity of landscape as an approach and a method for systems design and transformative change. Thinking and acting with a landscape perspective opens up opportunities for innovation. This design potential evolves at the boundaries of sectors and interest groups, and seemingly competing values and goals. Unlocking capacity for transformation is more urgent than ever. Landscape can act both as a conceptual framework and as a medium for activating this capacity.

The 'why?' is clear: We are operating beyond the capacity of our planet. Six out of nine planetary boundaries have been crossed (Rockström et al, 2023). We need to move back into the safe operating space.

We invited our community to share teaching, research or practice perspectives of past, present and future regenerative landscapes. The idea was to share teaching, research or practice perspectives of past, present and future regenerative landscapes.

All contributions were asked to address the following cross-cutting questions. Depending on the nature of the theme, not all questions were addressed at the same level of depth.

1. ***Regenerative Landscapes: How might we define them?*** Please present and discuss the theories and discourses that are shaping your understanding of this concept
2. ***Regenerative Landscapes: How do they work?*** Please specify very briefly which type of regenerative systems and models you want to discuss. What are they supposed to change and how? These can be existing practices but also studio work, prototypes, or research
3. ***Regenerative Landscapes: Why do they work?*** Please also share some of your ideas about possible evidence: Why is the model you are presenting regenerative? What is supposed to be regenerated? How would we know? Which evaluation approach is needed? You can also share your theoretical thoughts on this, if the model is still hypothetical at this stage.

Within this cross-cutting framework, we prepared seven chaired thematic tracks plus an open track:

- Energy Landscapes
- Mobility Landscapes
- Foodscapes
- Hidden Landscapes of the
- Global Value-Added Chain
- Beyond Cheap Nature
- Heritage and Identities,
- Democratic Landscape Transformation

**Track 1: Energy Landscapes**
Thematic outline: Our transition towards decarbonisation in a climate change scenario mainly depends on relying on renewable energy production. The integration of this productive layer into multiscale landscapes needs to be embraced by landscape architects and other planning and design disciplines as it competes for space against many other critical functions, such as biodiversity, agriculture, housing, and transportation.

We discussed the integrated and multidimensional theme of energy efficiency/productivity/flexibility within the landscape system, as a practical and evidence-based response to the challenge of ever-increasing land use conflicts, related to renewable energy infrastructure and ongoing urbanization. This includes innovative approaches emerging at local level such as Positive Energy Districts and Circular Cities.

The session was framed by a discussion on the systemic relationships between multiscale energy landscapes and local system change in our direct living environment. We addressed both the material and the socio-economic dimensions of the different types of energy landscapes. We further discussed the implications of the energy transition for education and practice, and explored potential directions for future research initiatives.

**Track 2: Mobility Landscapes**

Thematic outline: Our ever-growing need for mobility stems to a large extent from the spatial separation of the urban functions. While we have been following the modernist paradigm of the Charter of Athens over decades, production and resource-provision have taken up global dimensions. So we find ourselves today in an environment where people and goods are permanently moving between locations. This certainly creates a lot of benefits and opportunities, allowing people to participate economically, socially and culturally. On the other hand, our current mobility systems consume far too much energy and space, in addition to reinforcing and creating new social inequalities. The impact of mobility systems on landscape development and landscape quality is still to some extent underestimated in landscape architecture. In this session, we explored transition pathways towards sustainable mobility, building on the possible interactions between sustainable mobility infrastructure, public spaces and green-blue infrastructure. We explored the difference of systemic and spatial development within dense and more sprawled environments, the contemporary interest to work with existing built environments and focus on retrofitting those or examples that display the interdisciplinary approaches by connecting e.g. stormwater management, biodiversity, health and mobility planning on a streetscape level. Thus, the role of landscape architecture to co-shape interdisciplinary processes in (re)developing mobility systems and spaces were intensively debated.

**Track 3: Foodscapes**

Thematic outline: Food has shaped the relationship between humans and their landscapes since the beginning of mankind. The strong links between people, food production and landscape got lost in the transition to modern urban societies. Like many other economic systems, foodscapes operate today in a network of global material flows. This includes a loss of awareness and skills for the limited natural resources on which our food depends, especially soil and water. A transformation of the food system, both locally and globally, is urgent as it responds to multiple crises related to biodiversity, climate, water, health, and food security. Establishing local and regional food systems is very important for reducing carbon footprint, enhancing biodiversity goals, increasing climate resilience, and fostering social cohesion. Understanding landscapes and its cultural heritage as foodscapes bears great opportunities for reconnecting people to nature and promoting responsible consumption. In this session we wanted to discuss the relevance of foodscapes in landscape architecture and other spatial planning disciplines. We shared case studies and research outcomes. Abstracts were invited to present transition pathways (case studies, research) and reflect on the mechanisms of the system change, such as transdisciplinary and participatory processes. We further invited contributions that are discussing innovative approaches to education, research and professional practice in this field.

**Track 4: Hidden Landscapes of the Global Value-Added Chains**

Thematic outline: Spatial planning disciplines, including landscape architecture, focus on the specific local territory of a region, town or commune. This territory is the main reference for analysis, goal-setting and strategy building. But what about all the landscapes along the global value-added chain, invisible from a local perspective? Do we consider them in our approaches? The material flows and supply chains moving in and out of our contemporary urban landscapes stem from a global network of 'other' territories. Our consumption patterns and global supply chains put a lot of pressure on these 'other' environmental and social systems. In this session, we want to discuss the opportunities of spatial planning disciplines to support system change towards more sustainable and responsive global value chains as a prerequisite for sustainable consumption.

While this discourse is well established in other disciplines (e.g., economics, sustainability studies, or international affairs), it seems to be almost nonexistent in spatial planning and design. Radically new collaborations and thinking across disciplines, methods, and knowledge domains are needed to move the discussion forward. Looking at given frameworks, the session is particularly about designing a circular economy and incentives to rethink consumption patterns in general (less, slower, more regional). The session included a moderated discussion and some co-creative actions to advance our ideas for education, research and professional practice. However, we also invited abstracts covering, amongst others, theoretical reflections, good practices or educational approaches on the topic.

**Track 5: Beyond Cheap Nature**

Thematic outline: The protection and enhancement of ecosystems has been at the core of landscape architecture since its beginnings. Designing with and for nature at the interface of society and the environment is a fundamental value of the discipline. In this session, we wanted to explore opportunities for accelerating the regeneration of nature. Since we have already extensively crossed this planetary boundary, protection is not enough. The task is to regenerate the foundation of any life on the planet. This is about soil, water, air, flora and fauna. All of these fundamentals are overexploited today. And they continue to do so as capitalist systems build on the idea of 'cheap nature'.

Since the appearance of the EU's Green Deal and the EU Nature Restoration Law, there has been a lot of discussion about green growth, in the sense of decoupling economic growth from the exploitation of natural resources. The idea is obviously to justify yet another growth agenda. But how about concepts that argue beyond growth, such as degrowth? What if we defined growth not any more by GDP, but by the degree of regenerated nature? This session invited theoretical reflections about possible new approaches for regenerating nature. We explored ideas that go beyond protection and impact mitigation as facilitators of the classical growth agenda. Approaches that rethink the economy as we know it.

Which innovative operational models for regenerating nature are already out there? And which models might we still need to invent? What can we learn from other disciplines, cultures and our own history to address this fundamental task?

**Track 6: Heritage and identities: Activating Cultural Capital**

Thematic outline: Landscapes are ideal platforms for regenerating cultural heritage in an integrative way. This includes articulating and activating the identities of local communities. Ideally, fostering cultural capital generates social capital, and vice versa. The potentials are huge and manifold, as are the challenges. Heritage can be defined at national level and managed within a fixed institutional framework. Likewise, cultural values and their material or immaterial manifestations can evolve within local communities from bottom-up. Alternative ways of managing cultural assets can emerge within these communities, for example through NGOs, cooperatives, social enterprises or other forms of collective action. Understanding heritage from a landscape perspective opens many opportunities for creating synergies and added-values at the interface of tourism, recreation, nature protection, agriculture, education, health and well-being. In this session, we want to explore innovative ways of activating and preserving cultural heritage. We invited good practice case studies and research findings, as well as educational approaches for enhancing social innovation in this field.

**Track 7: Democratic Landscape Transformation**

Thematic outline: The goal of this conference is to explore how we might activate capacity for the transformation of unsustainable landscape systems.

Much, if not all, of this capacity is embedded in people: in their values, knowledge, resources, decisions and concrete actions. Therefore, it is important to look deeper into the underlying power structures that are determining our landscape realities. What prevents people from acting? How might we address these wicked situations where power and interest conflicts dominate and entry points for change are hard to be found? In the light of these challenges, community-based approaches, partnership and co-creation are more necessary than ever, but across sectors, there is limited capability for cultivating truly participatory approaches.

There is no 'one-size-fits-all' approach, as every community and their landscapes are unique. But what seems certain is that such transformative processes require a deep self-reflection and a profound relation to ourselves, as a foundation for any collective action.

Are we prepared for radically new ways of engaging with our landscapes and the communities they embrace? Are we aware of what this comprises, how it feels and which values and competences really matter? The Open Landscape Academy team invited for this session to share reflections and approaches to the 'Why' and the 'How to' of democratic landscape transformation.

In the following, we present selected short papers from each conference track.

# Energy Landscapes

# Energy Landscapes

**Track Chairs**
Maria Beatrice **Andreucci,** La Sapienza University in Rome, Italy
Dorothee **Apfel,** Nürtingen-Geislingen University, Germany
Marco **delli Paoli,** La Sapienza University in Rome, Italy
Sven **Stremke**, Wageningen University & Research, Netherlands
Anders **Larsson,** Swedish University of Agricultural Sciences, Sweden
Dorota **Wojtowicz-Jankowska,** Gdańsk Tech, Poland

**Reflecting our conference experience**
The Energy Landscapes track was framed by a thematic outline focusing on the ongoing transition towards decarbonisation in a climate change scenario, as strictly dependent on renewable energy production. The dedicated call for abstracts asked for reflections on the need of integration of this productive layer into multiscale landscapes, as well as on the role and responsibilities of landscape architects and other planning and design practitioners regarding the emerging competition for space faced by the energy landscapes against other critical functions, such as biodiversity, agriculture, housing, and transportation among the others.

Within the frame set by the three cross-cutting questions asked by the 2024 ECLAS Conference on Regenerative Landscapes - How might we define them? How do they work? Why do they work? – the aim of the Energy Landscapes Track was to promote a multidisciplinary discussion among the participants on the systemic relationships between energy landscapes and the needed local system change in our direct living environment. In that direction, the participants were asked to address both the ecological-environmental, and the socio-economic dimensions of the different types of energy landscapes.

Selected contributions focused on ecological and environmental issues as well as people concerns regarding the landscape quality erosion, both associated with the increasing presence of photovoltaics and wind farms. Authors offered valuable perspectives and presented original research experiences highlighting disruptive ecological fragmentation and negative use value effects produced overtime by the lack of systemic approaches in energy landscape and related territorial transformation.

Main topics addressed by the participants in this thematic part of the session spanned from the relevance of spatial measures for the promotion of landscape quality and sustainable energy landscapes, to the proposal of transitional and multidimensional strategies of co-production for future sustainable landscapes based on agrivoltaics, and of methodological approaches to pursue objectives of dual use of land for both agriculture and solar energy generation. Beside agrivoltaics and solar landscapes, discussions on the potential of underground quarries to boost synergies between underground and surface landscapes; on the power of miningscapes to reconstruct the energy production system, reclaim polluted land, and develop new productive activities to sustain the local community; and on the effectiveness of food-energy-water islands for the development of nexus strategies for multifunctional energy landscapes, enriched the environment-driven part of the session.

All presenters deeply reflected also on the relevance of social and economic aspects. The debate emphasized, in particular, the relevance of user experiences and people needs to be considered as priorities, especially when aiming at public acceptance, behavioral change, and environmental stewardship.

More on the specific role of design in the energy transition, interesting aspects emerged in relation to decommissioning and landscape "mending" practices, with interventions focused on opportunities and challenges from the practioners' perspective.

Towards the end of the session, the complexity of the integrated and multidimensional theme of energy efficiency/productivity/flexibility within the landscape system emerged as a practical and evidence-based response to the challenge of ever-increasing land use conflicts, related to renewable energy infrastructure and ongoing urbanization. Promising approaches highlighted in the discussion included innovative multiscale models emerging at local level, such as Positive Energy Districts and Circular Cities.

The implications of the energy transition for education and practice were also discussed, advocating a well-defined multidisciplinary, integrated approach in teaching and learning (energy) landscape planning and design disciplines.

The potential directions for future scientific initiatives polarised the final remarks, promoting research on the landscape-energy-water nexus and the provision of recommendations for the development of landscape-inclusive agrivoltaics power plants among most desirable people-planet-economy oriented topics.

# Unlocking the regenerative potential of solar landscapes through multidimensional design and planning

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**Keywords:** solar power plants, renewable energy transition, landscape-based approach, multidimensional design, guidelines

**Abstract**

The current implementation of renewable energy technologies has been posing environmental, ecological, social and cultural concerns. Besides climatic, technical and economic considerations, the concept of landscape can be more included to ensure a regenerative energy transition. This study draws on the experience gathered from the PEARLS project, focusing on planning and engaging people in the energy transition in the Mediterranean countries. The framework facilitates the shift from mono-disciplinary perspectives to holistic approaches enhancing relationships between natural systems, energy infrastructures and inhabitants. Based on interviews with experts, literature studies and case studies analysis, the study collects and presents design strategies addressing multiple dimensions of solar landscapes. The outcome is a methodological framework to foster a holistic perspective as spatial planning and design considerations providing a useful tool for decision-makers, planners and designers for multidimensional energy landscapes

**Introduction**

The use of Renewable Energy Sources (RES) is crucial to achieving the realisation of Europe's climate change mitigation and neutrality objectives. In recent years, many Renewable Energy Infrastructure (REI) projects have been implemented, paving the way for the attainment of the 2020 targets. However, this has also led to questions regarding the implementation of these projects and the potential impacts they may have. The energy transition, in fact, requires a significant transformation of the landscape - of the spaces in which we live and work - causing immediate, unusual and dramatic changes (Selman, 2010). Such transformations have caused various situations of opposition in recent years, as they impact not only the physical space, but also the way in which the user uses and interprets space (Wolsink, 2018). Furthermore, REI, being distributed infrastructure, may cause environmental impacts. The occupation of land with ground-mounted Solar Power Plants (SPPs) conflicts with the use of land for agricultural production and often reduces biodiversity (Scognamiglio et al. 2016, Sánchez-Pantoja et al 2018). Several studies in recent years have addressed the issue of reducing the impacts of REIs, for instance in relation to the topic of visual impact, biodiversity loss or soil erosion (e.g. Oudes and Stremke 2018). Furthermore, a growing focus has developed on social and landscape aspects (Bevk and Golobic, 2020; Salak et al. 2021). These concerns have been translated into practical terms with an accurate selection of areas on which to implement renewable energy projects. In this way, it is possible to exclude fragile and landscape-sensitive areas from the list of eligible areas (Clarke et al. 2020). Nevertheless, this approach serves to mitigate the impacts of energy projects in the environment, rather than providing new value to the areas involved. Adopting a regenerative approach allows for the simultaneous consideration of various aspects, with the aim of producing positive impacts rather than limiting them. In addition to addressing environmental impacts, regenerative design serves as a catalyst for positive change by acknowledging the coexistence of natural and human systems. Thus, landscape transformations simultaneously enhance the value of natural capital and the systems of water, energy, materials and users. In this context, the topic of energy transition becomes one of the challenges addressed in landscape design, which can also take into account, for example, climate change adaptation or public acceptance.

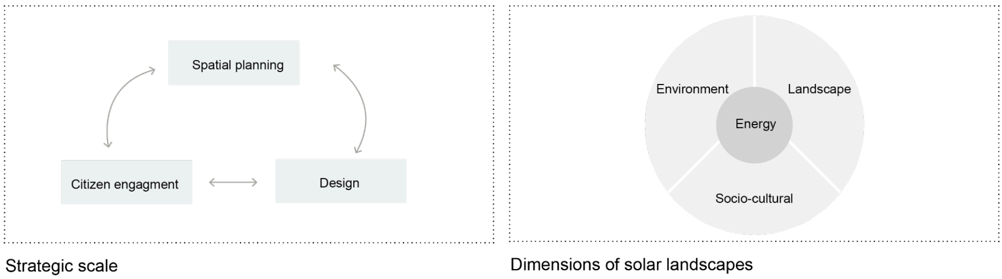
This study presents strategies that can be employed in the implementation of Renewable Energy Landscapes (RELs) with the objective of creating value and increasing acceptance. The results provide useful information that can be used as guidelines for local energy planning practices and to inform projects that enhance landscapes while reaching energy targets. In particular, the findings may contribute to the definition and evaluation of site selection criteria and to the introduction of design strategies that preserve and enhance landscape quality in the study areas.

**Framework and methods**

This study draws on the research activities conducted within the framework of the European Union's Horizon 2020 Planning and Engagement Arenas for Renewable Energy LandscapeS (PEARLS) project (2017-2023, coordinated by the University of Seville). In particular, PEARLS examined the aspects of spatial planning and the engagement of people in strategic decisions for the energy transition in Mediterranean countries (Barral et al., 2019). The project was based on international, cross-sectoral and multidisciplinary collaboration among research institutions and companies in Spain, Portugal, Italy, Greece and Israel. The research activities were also explored through staff exchanges between research institutions and companies in the aforementioned partner countries. The research conducted, through a variety of experimental methods and from the perspective of different disciplines, confirmed that the consideration of landscape is crucial in the energy transition. Through case studies in Spain, Portugal and Greece and through collaboration with local companies and consultancy agencies, we conducted investigations to ascertain how landscape could be included in local planning tools and design processes, with a particular focus on solar landscapes (e.g. Spyridonidou et al. 2021).

The implementation of solar landscapes has the potential to address a number of interrelated challenges, including those related to energy and food production, biodiversity conservation, and water management. In addition to the production of energy, the implementation of SPPs allows for the consideration of three further dimensions: landscape, environment and socio-economic conditions (Oudes and Stremke, 2022). Indeed, multifunctional SPPs may produce renewable energy while providing agricultural functions (Toledo and Scognamiglio, 2021), enhancing flora and fauna (Randle-Boggis et al 2020) or creating spaces for socialisation (van den Berg and Tempels, 2022). Consequently, they can be investigated not only in terms of energy production but also through a multidisciplinary system thinking approach, which encompasses local dynamics such as climate, ecology, human perspectives, and incorporates concepts of circularity, ecology, human wellbeing, and climate adaptation. The development of multifunctional SPPs affects the selection of suitable areas, which can be less restricted, as the typology of SPPs might also change its physical

Figure 1: Research framework: strategic dimensions explored and involved dimensions of the energy transition. Source: author




aspects. Indeed, spatial configurations and spatial properties are not only influenced by aesthetic considerations but also by the need to accommodate other functions (Blaydes at al. 2024; Buton et al. 2024). This approach necessitates the establishment of a network between various disciplines related to planning and design, as well as the integration of interdisciplinary system thinking.

Literature review, experimentation of new methodologies in collaboration with environmental consultants, and interviews with experts such as university professors, local decision-makers and practitioners were conducted in order to investigate how to implement these concepts into decision-making processes. In particular, our attention was directed towards local spatial planning tools, methodologies for citizen engagement and design strategies. In order to identify elements that could be improved, we engaged in a process of mutual learning and information sharing in a circular manner (Fig. 1). In strategic terms, the proposal encompasses several key aspects. At the planning level, the introduction of varying degrees of 'appropriateness' of land is suggested to guide the implementation of renewable energy facilities, each associated with specific requirements for landscape and environmental integration. Furthermore, community involvement should be incorporated into local planning through co-creative approaches and surveys investigating the perception of citizens regarding REIs. At the design stage, it is essential to consider the territorial, landscape and architectural scales. For instance, at the territorial scale, it is crucial to evaluate the patterns and density of facilities, while at the architectural scale, it is important to consider details such as the colour of facilities. In particular, the design of SPPs must consider how to accommodate other functions (e.g. through the density of the panels) or to address the visibility of the panels (e.g. through access modes, shapes of the panels, and the fence). Furthermore, the design of SPPs should consider the temporality of a plant, for instance in terms of reversibility.

To provide further insight into potential strategies, this contribution presents the advanced research and proposals developed for the case study of Arcos de la Frontera, Spain. In particular, a proposal for a potential local energy planning tool was developed, which could be integrated into local spatial planning tools.

**Case study: Arcos de la Frontera, Spain**
Spain is an interesting example of implementation of SPPs favoured by geography as well as by the legal conditions. These conditions favoured a strong and rapid expansion not managed by structured territorial planning and creating landscape integration questions (Mérida-Rodríguez et al., 2015). The case study is located in the South of Spain, in the

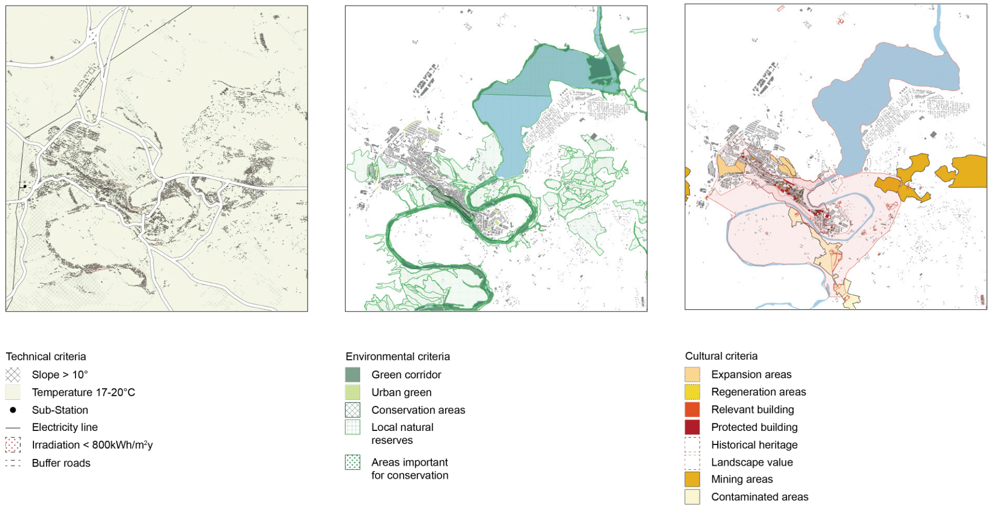
Figure 2: Case study: Arcos de la Frontera. Picture from the valley floor and location in Spain. Source: authors


Municipality of Arcos de la Frontera in Andalusia. Arcos de la Frontera is a small city situated in the inland of the Province of Cádiz, with an area of 526.81 km² and a population of 30,741 (figure 2). The municipality has a distinctive topography: the historic centre and urban area are situated on a sandstone hill, while the peri-urban and agricultural areas are located in the surrounding flat areas, along the Guadalete river and the reservoir. For this case study, we collaborated with a local landscape planning consultant and we interviewed local experts to better understand the context. The aim of the study was to provide guidelines for the implementation of new solar landscapes, considering both ground-mounted and on-buildings SPPs.

The adopted methodology includes literature review and local experts consultation to build the structure of the proposal. To define spatial planning and design strategies, the methodology also included citizens' interviews and collection and creation of georeferenced data. The results include a map of different degrees of suitability for solar landscapes in the municipality, each associated with required landscape design strategies. Further details on the methodology and on the specific results are available in Codemo et al. 2023.

To define degrees of suitable areas, we collected and visualised potentials and constraints for the implementation of SPPs including aspects related to four categories: technical and legal, environment, biodiversity, land use and cultural (figure 3). Technical (e.g. solar radiation) and legal considerations (e.g. distance from streets) were considered restrictive, as they influence efficiency and distance from urban components. The other aspects had different degrees of suitability (i.e. suitable, required mitigation and unsuitable) and were weighted differently based on the consultation with the experts, who were asked to prioritize the importance of the assessment criteria. For example, landscape and heritage areas were considered very sensitive, while the soil agrological value was considered less important. The results of this first part were then further operationalized based on their visibility from urban areas, from walking paths and from viewpoints, and on the sensitivity of the areas (e.g. regeneration areas, heritage areas). This process of spatialization of siting criteria and consultation with experts and citizens to understand the sensitivity of the areas, allowed a discretization of the municipality surface into different degrees of suitability for the implementation of ground-mounted and buildings' photovoltaics. Specifically areas were categorised as not suitable, suitable under

Figure 3: Spatialization of parameters defining suitable areas. Source: authors




conditions, or preferred. General landscape-integration requirements were defined (e.g. soil conditions after use) for suitable areas, and specific landscape integration strategies were suggested to guarantee landscape care and to take into consideration the sensitivity of the area in the areas suitable under conditions. While landscape integration strategies should be evaluated according to their specific context, a structured list of recommendations has been provided to the Municipality (figure 4).

Specifically, solar power plants are investigated across three scales - territorial (linked to site selection and scale of the project), landscape design (related to the arrays patterns, land cover), and architectural design (connected to the system's components and fencing). The aspects of REL addressed by the strategies are multifunctionality (e.g. agrivoltaic, water management), visibility and accessibility in order to address the multiple dimensions entailed with REL and not only aesthetics. Specifically, according to the interviews with the citizens, important factors for the acceptance of new photovoltaic farms were low visual impact, multifunctionality, harmony with the landscape, and mitigated visibility.

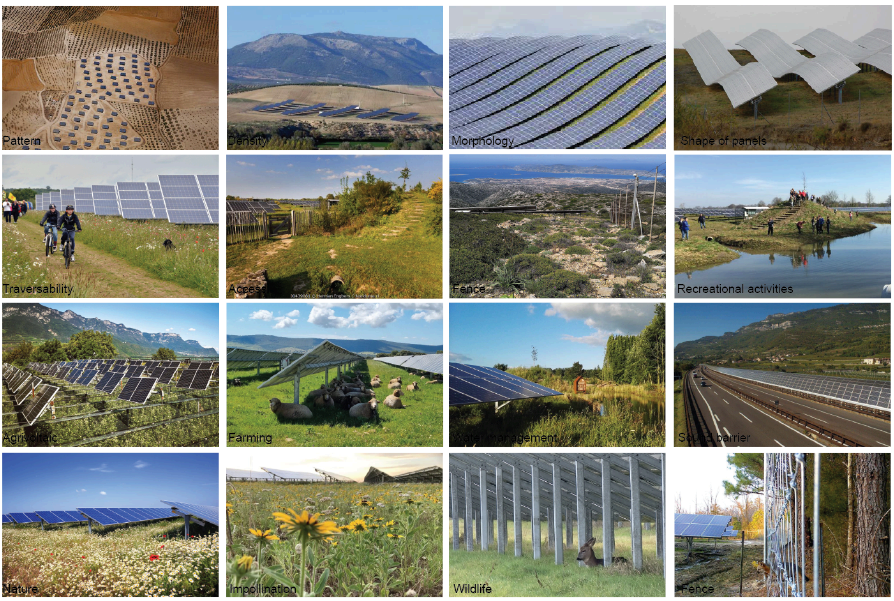



Figure 4: Examples of landscape integration strategies

**Conclusion**

This study is a result of the staff exchange from the Department of Civil, Environmental and Mechanical Engineering at the University of Trento to Territoria and Claner, two companies in Seville and Malaga. The staff exchange lasted five months and involved the collaboration with the Department of Human Geography at the University of Seville. The collaboration between academia and non-academic partners was useful to better understand local constraints and to propose solutions that could be integrated in the planning tools in force in the study area. Moreover, the interdisciplinary approach was useful for the integration of quantitative and qualitative aspects and to propose a framework that could combine spatial planning with design.

The objective of this study is to provide guidelines that will enhance the value of renewable energy landscapes and facilitate an inclusive and accepted energy transition. The proposed approach is based on an a-priori methodology, which differs from landscape or environmental assessment methods in that it shifts from limiting impacts to providing more value. Indeed, this framework places greater emphasis on the landscape design project of RELs and facilitates a comprehensive evaluation of the projects. Furthermore, it supports the balancing of energy targets with other factors of transformation in the negotiation of landscape values and functions. The outcomes can be useful to environmental planners and designers to negotiate trade-offs, for example, regarding land use and ecological impacts, and to manage transformations, defining both spatialisation and innovative design.

A holistic approach and system thinking are employed in this study. This perspective necessitates the integration of interdisciplinary processes and multiscale approaches, which connect the planning scale with the design scale. The utilisation of multiple scales is beneficial in ensuring the interconnectivity between humans, nature and energy infrastructures, thereby facilitating the implementation of tools. Thus, planning tools may be regarded as flexible instruments, capable of setting specific objectives while allowing for the implementation of different design solutions. The energy transition is shaped by landscape considerations, which necessitate reflection on societal interests, values and concerns.

This reflection must take into account the character of the landscape and the perception of communities. The incorporation of landscape considerations within governmental policies has the potential to alter the projected trajectory of the energy transition. Consequently, it is necessary to coordinate between different governmental levels in order to address and assess the targets. The study was conducted in a specific cultural and landscape context, which limits the ability to generalise the evidence and instead calls for further research in other contexts.

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# Biosolar roofs: Assessing plant performance in combined photovoltaic and green roof systems for regenerative landscapes

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**Keywords:** biosolar roofs, vegetation, landscape performance, plant performance

**Abstract**
This paper presents an in-depth literature review regarding plant performance on Biosolar Roofs (BR). BRs integrate photovoltaic (PV) panels with green roofs (GR). With multifaced environmental, social, and economic benefits offered by BR, they contribute to the regenerative landscapes. PV panels play an important role in contributing to energy efficiency and reducing the reliance on non-renewable energy sources by generating renewable energy from sunlight. At the same time, GR contributes to mitigating urban heat island effects and promoting urban biodiversity, while plants improve PV efficiency through cooling effects from plant evapotranspiration. Our review of 39 studies, sourced from Scopus, explores the plant performance of BR and their role in the combined PV/GR system. We identified four case studies in which plant performance was assessed in experimental settings. Our review reveals significant research gaps, particularly a lack of comprehensive studies examining substrate and plant species selection for BR across varying climate zones. To better understand plant performance dynamics on PV roofs, long-term experimental studies are needed, which remain lacking to date.

## Introduction

Climate change effects, air pollution, and energy depletion affect our society, calling for sustainable, environmentally friendly, and renewable energy sources. Biosolar roofs (BR), which combine Photovoltaic Panels (PV) with green roof (GR) systems, play an important role in regenerative landscapes by offering complex environmental, social, and economic benefits. They thermal insulation for buildings, reducing energy needs and decreasing buildings' carbon footprint. The PVs generate clean, renewable energy, reducing reliance on fossil fuels. The GR supports urban biodiversity. Plants on BR absorb carbon dioxide, acting as a small-scale carbon sink, contributing to carbon sequestration. At the same time, they contribute to water management by absorbing and filtering stormwater and they help to absorb pollutants from the air, improving overall air quality in urban areas. Although research on different types of GR is very advanced, the plant-PV interaction should be better understood to explore further the BR's landscape performance, as well as the benefits and constraints of BR's successful installations and management.

## Literature review

PVs offer a viable solution and are particularly well-suited for urban environments with abundant roofs (Catalbas et al., 2021). On the other hand, GRs are an excellent approach to mitigating the urban heat island effect and reducing energy demand (Berardi, 2016; Berardi and Graham, 2020). Biosolar Roofs (BR), a combination of PV and GR, is an emerging sustainable solution that enhances PV efficiency through plant evapotranspiration's cooling effect for more effective energy production. (Talwar et al.2023, Ciriminna, et al. 2019 Lamnatou and Chemisana, 2015a). For BR installations, extensive green roofs are mostly used (Zluwa et al.2021). They are characterized by limited weight due to the shallow substrate layers and are typically planted with succulents or other drought-tolerant species. These challenging conditions require in-depth knowledge of the climatic conditions and plants' requirements to ensure proper vegetation establishment and development on GR (Van Mechelen et al.2015). The substrate layer quality and additional irrigation are key elements, as they can significantly contribute to plant survival (Kader et al., 2022; Paraskevopoulou et

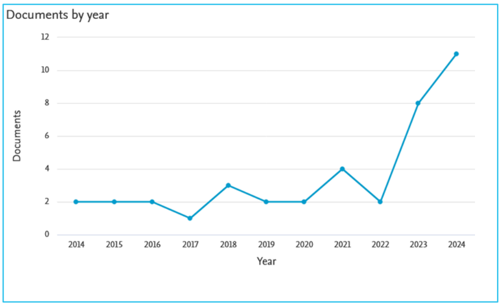


Figure 1: Documents by year (source: Scopus analysis of search results)

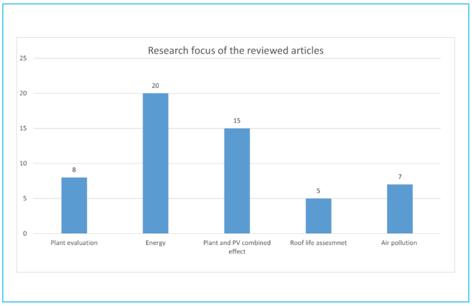


Figure 2: Research focus of the respective papers

al., 2020). As stated by Abdalazeem et al. (2024), there is a lack of experimental research examining the substrate factors, particularly on BR, and specific focus is needed on parameters such as soil type, soil depth, vegetation influence, irrigation, and their integration into the system.

According to Talwar et al. (2023), plant species used in BR are a crucial factor influencing PV- performance, but it is still challenging to evaluate their complete effort. Plants can have properties other than enhancing the panels' performance on the BR. Irga et al (2022) suggested that the combined application of PV and GR could promote biodiversity while reducing the building's surface temperature. However, plants growing on extensive green roofs can improve the urban biodiversity only to some extent (Wang et al. 2022); therefore, it is essential to emphasize proper plant selection criteria for their effective function (Mihalakakou, G.,2023.) BRs operate as partially living systems, requiring time to understand the interactions among their various components fully. Consequently, assessing plant dynamics in such a system should be conducted through long-term studies to evaluate plant communities accurately, mainly since different species employ multiple strategies to endure extreme conditions (Vandegrift et al.2019).

Our paper addresses the following questions:

- What research was conducted on the plant performance of BR and their role in the combined PV/GR system?
- What are the insights about plant performance in combined PV-GR systems?
- What are the research gaps and further directions on plant performance on BR?

**Materials and methods**

To investigate the current state-of-art in research about the plant performance on the BR, a literature review was conducted using the Scopus database with the following keywords: TITLE-ABS-KEY (" photovoltaic green roof*" OR " PV green roof*" OR "biosolar roof*"). We did not apply the criteria of the document type and year of publication. We analyzed only documents published in English. The keywords were chosen carefully to be able to focus our search specifically on plants and green roofs as components of BR. In the next phase, we extracted the studies that presented plant assessment within experimental setups. Experimental research was selected to better understand plant interaction with the surrounding environment and provide critical insights for future research direction for resilient landscapes. For the final review, we selected papers that provided complete data on plant performance measurements and growing conditions, such as substrate and irrigation.

**Results**

The search identified 39 articles published from 2014 until the present. It included conference reviews (1), conference papers (5), reviews (10), and peer-reviewed articles (23). As shown in Figure 1, research on the topic was scarce, and dynamic growth was observed from 2022.

We organized the documents into five categories based on their focus areas: energy performance of buildings, the performance of PV systems, roof lifecycle assessment, air pollution analysis, and plant evaluation (Figure 2). The 39 articles applied three different research methods: experimental research papers, modeling and simulation research papers,

| Authors | Experiment duration (months) | Location | Climate | Substrate | Irrigation | Plant performance assessment | Result on PV |
|---|---|---|---|---|---|---|---|
| Nash, C., et al. 2016 | 36 | London- UK | Cfb | yes | yes | yes | no data |
| Schindler et al. 2018 | 24 | Haifa- Israel | Csa | yes | no | yes | yes |
| Fleck R. et al. 2022 | 8 | Sydney- Austria | Cfa | yes | yes | yes | yes |
| Arenandan, V, et al. 2022 | 6 | Selangor- Malaysia | Af | no data | no data | no data | yes |
| Chemisana, D. and Lamnatou, C., 2014 | 3 | Lleida- Spain | Bsk | no data | yes | no data | yes |
| Rahmaniah, F. et al. 2021 | 2 | Singapore- Malaysia | Af | yes | no | yes | no data |
| Ogaili, H. and Sailor, D.J., 2016 | 2 | Portland- USA | Cfb | no data | yes | no data | yes |
| Abdalazeem, M et al. 2024 | 1 | Egypt | Bsh | yes | Yes | no data | yes |

Table 1: Articles including experiments with plant performance assessment. ( Cfb- temperate oceanic Csa- Hot summer Mediterranean , Cfa-humid subtropical ,Af- Tropical, Bsk- Cold semi-arid , Bsh-Hot semi-arid)

| Authors | Experiment duration (months) | Location | Climate | Plant Type | Growing Condition | Plant performance assessment | Result on PV |
|---|---|---|---|---|---|---|---|
| Nash, C., et al 2016. | 36 | London- UK | Cfb | Annual meadow wildflowers mix | 10 cm of 75 or 80 % brick, 15%- 20 % compost, clay soil with irrigation | 22 original seeded plants + 70 new colonized plant appearances | no data |
| Schindler et al. 2018. | 24 | Haifa- Israel | Csa | Annual meadow wildflowers mix and Sedum sediforme | 20 cm of 70% perlite, | Vegetation abundance was not affected by PV panels, and Sedum growth was 80 % longer | no improvement |
| Fleck R. et al. 2022 | 8 | Sydney- Austria | Csa | Viola hederacea Dichondra repens Dianella caerulea Aptenia cordifolia Crassula multicava | 12 cm of air-filled porosity: 19%, Water-holding Capacity: 47,9%; Saturated repacked density: 1.15 kg/L; Particle size: 48,6% with irrigation | All growing well in partial Shade, *Aptenia* taking over the shaded area | Reduce surface Temperaturs by Up to 9.63 C And 6.93C No data on PV |
| Arenandan, V, et al. 2022 | 6 | Selangor- Malaysia | Af | Wedelia sp. | 10 cm organic soil mix | Reduced plant height and coverage | no data |

Table 2: Plant performance according to plant types and growing conditions

and review papers. Eight articles from the pool of 39 papers tackled plant performance assessments within experimental setups (Table 1).

Only four studies from this selection, which involved complete data on plant performance measurements and growing conditions, such as substrate and irrigation, were included in the final review (Table 2). We compiled data about plant species used in the experiment, growing conditions such as substrate and irrigation (if any), plant performance, and whether their result affects PV performance.

The experiments were developed in four different climates (Cfb, Csa, Cfa, and Af zones according to Köppen climate classification (1884) and span from three years to 2 months only.

**Analysis of the case studies**

Nash et al. (2016) researched the roof of London Queen Elizabeth Olympic Park in temperate oceanic climate (Cfb) to study structural elements of PV panels and habitat piles which can offer shelter for plants, especially during periods of drought, and help form a diverse range of habitats on a green roof, ranging from bare ground to areas rich in flowering plants. The roof was planted on an irrigated substrate with mixed wildflower meadow seeds and integrated with PV panels. After three years of observation, they found that the roof facilitated recolonization once environmental conditions improved. The team recorded 92 different plant species throughout the studies, concluding that PV does not interfere with biodiversity. On the other hand, the PV efficiency was not tested or measured. Another study published by Schindler et al (2018) focused on the Hot-summer Mediterranean climate (Csa). The team evaluated a non-irrigated green roof featuring native Sedum sediforme, and annual plants as a wildflower mix alongside a PV panel for 24 months. They discovered that the presence of the PV panel led to increased substrate moisture, but it did not influence plant diversity. The plant species exhibited enhanced growth in areas with the PV panel, attributed to its shading effect, resulting in greater growth of Sedum sediforme and prolonged flowering periods for annual species. However, the green roof did not enhance electricity generation from the panels, likely due to the lack of supplemental irrigation.

An eight-month study in the humid subtropical climate (Cfa) in Sydney, Australia by Fleck R. et al. (2022) investigated the plant growth and the different plant assemblages on an irrigated roof combined with PV panels. The team used different plant communities related to the location of the PV panel (under, next to, and between) and reported that all plants used in the research had continuous growth. Aptenia cordifolia, planted next to the panels, also increased its coverage under the PV. The team also reported reduced roof surface temperatures by up to 9.63°C and 6.93°C, which could lead to an increase in the solar performance of the PV and might even achieve a maximum increased output of 21-107 %, depending on the month. Still, no data was recorded on this increase.

Rahmaniah, F. et al. (2021) conducted the shortest experiment related to plant performance on BR, which lasted only two months. The experiment used Wedelia sp. species in Singapore's tropical rainforest climate (Af) location. The experiment used different PV heights (60, 80, and 100 cm on the lower edge) and reported taller and more elongated plant growth and higher growing media moisture under the lowest-placed PV panel. The team concluded that these results were due to the most significant solar reduction factor.

**Discussion**

Van Mechelen et al. (2015) stated that climatic conditions significantly influence the development of extensive green roof vegetation. However, our research have found only one study per climate zone, providing insufficient information for a comprehensive analysis.

Also, our literature review revealed that only a few types of plant species are used for research on BR though widespread research has already been published about plant species used on extensive green roofs. (Leotta et al. 2023) The few types of plant species used for BR are mainly succulent and drought-tolerant, as Irga et al. (2022) also stated. The most used plant species on extensive GR are the drought-tolerant Sedum species, which were the only species utilized in more than one study. Still, only the research of Schindler et al. (2018) reported on its performance. Other plant species, such as Viola hederacea, Dichondra repens, Dianella caerulea, Aptenia cordifolia, Crassula multicava, and Wedelia sp. were tested around and under PV panels, but all plant species performed differently. Some performed well such as Viola hederacea, Dichondra repens, Dianella caerulea, and Crassula multicava. Aptenia became aggressive, overtaking areas that were not planted. Wedelia was reported to have reduced height and spread. These results are recorded in different climate zones and reported by only one author.

A key consideration for a successful green roof setup is the substrate layer and its components. In addition to supporting vegetation, substrate layers significantly influence the efficiency of PV panels (Abdalazeem, M. et al., 2024). Our review identified that only four studies reported detailed methodologies for substrate mixtures and irrigation methods. Only one study explored the relationship between different substrates, irrigation, and PV panel efficiency. However, none of the studies comprehensively analyzed the potential interactions between PV panels, vegetation, and substrate characteristics.

The usage of annual wildflower mixed in both locations in London (Nash et al 2016) and Haifa (Schindler et al 2018) was successful in a long-term performance study, and both reported the potential of native meadow plants on BR and their contribution to urban biodiversity. In both studies, plant species richness was not influenced by the presence of PV panels. However, the role of plants in PV panel performance remains unclear. Of the two studies that included annual flower mixes, one reported no observable improvements. At the same time, the other did not collect data on this aspect, limiting the conclusions that can be drawn.

Vandegrift et al. (2019) stated that assessing plant dynamics should be conducted through long-term studies to evaluate plant communities accurately. However, our results indicate that only two studies were conducted for longer than 1 year (3 years in London and 2 years in Haifa). On the contrary, our review highlights that of the original eight studies, 50 % were conducted for less than 2 months, which cannot give any proper insight into the plant performance.

**Conclusion and Outlook**

Our review assessed the research on the plants' performance and its role in the combined PV/GR system. We identified 39 publications that analyzed BR from different perspectives: energy performance of buildings, the performance of PV systems, roof lifecycle assessment, air pollution analysis, and plant evaluation. From the identified pool, we analyzed in detail four case studies that focused on plant performance and provided valuable insights on growing conditions and vegetation assessment. We underscore the necessity of more extensive research on BR, advocating for longer-term studies across diverse climate zones to thoroughly assess plant-PV interactions, species performance, and substrate impact on the efficiency of both components of BR (PV and GR). By addressing these gaps, future research should offer more specific recommendations for optimal plant species, substrate types, and irrigation practices, strengthening the case for Biosolar Roofs as a viable and sustainable urban solution contributing to regenerative landscapes.

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# Landscape integration of agrivoltaic systems

## A methodological approach in research through design and education

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**Keywords:** farmers; community, landscape architecture, social-ecological systems, energy

**Introduction**

Photovoltaics (PV) is widely seen as the main technology that can drive the energy transition faster. The concept of Agrivoltaics (also called agri-PV), making dual use of land for both agriculture and solar energy generation, has been emerging recently (Toledo and Scognamiglio, 2021). Those appear promising in supporting local community energy transition and farming practices, yet not fully exploited since in a early stage in both research projects and implementation. Agri-PV systems are complex systems which require multi- and trans-disciplinarity and co-design (Stremke and Picchi, 2017) and a governance strategy (see e.g. Toledo and Scognamiglio, 2022; Sirnik et al., 2023; Troccoli et al., 2024). EU member states are currently promoting and subsidising agri-PV systems, among the others Italy, Germany, France, where national associations for the development of agri-PV, as the Italian AIAS (Italian Association Sustainable Agrivoltaics) or the French France Agrivoltaisme have been established. Those associations promote the integration of agri-PV systems in the landscape, yet this objective is still vague in definition and approaches, possible methodology and tools, especially with regards to the local community engagement in governance strategy and co-design. Literature currently presents some papers on agri-PV landscape integration that propose some criteria (see e.g. Younas et al., 2019; Fatturoso et al., 2024, Sirnik et al., 2023), yet no one is proposing a design methodological path, intended here as pragmatic series of things to do to approach the agri-PV system landscape integration.

The Social Ecological Systems Framework (SESF) (Ostrom, 1990) is a potential reference, yet this has not been combined with agri-PV yet. The aim of SESF was originally to collect evidence on the variables and institutional arrangements enabling local actors in working together in governance strategies for common-pool resources as renewable energy sources recently defined by Wolsink (2024) as a common-pool resource in need of governance strategies in distributed energy generation (Partelow, 2018). Authors as Partelow and Winkler (2016) affirm that the SESF has been widely combined with concepts from different disciplines beyond social sciences due to its systemic problem solving and pragmatic approach; the concept has evolved in different research mainstream fields related to sustainability goals, focusing on the interdependent linkages between social and environmental change (Fischer et al. 2015; Partelow, 2018). Landscape disciplines too are currently engaging with SESF. Some authors as e.g. Alessa et al. (2008), Vervoort et al. (2012), Zhou et al. (2019), publishing on journals as e.g. Landscape and Urban Planning consider local landscapes as SESs (Zingoni de Baro, 2022). The added value of a SESF approach can be in methodological research when dealing with landscape governance systems in transition, as in the case of agri-PV systems.

The authors of this contribution started from the proposition that agri-PV systems are SESs and that their integration in the landscape depends on the fact that those are designed as SESs interdependent on other SESs by means of governance strategies and co-design processes.

In a recent paper Buckton et al. (2023) affirm in a literature review that the concept of regenerative has encountered numerous applications in different disciplines and fields. The authors stressed the relation between a regenerative lens and SES: a system "cannot be regenerative on its own but only as part of a regenerative ''ensemble'' of interdependent SESs that are mutually supporting each other" (2023, p. 837). The author affirms that a regenerative system would need the individual and mutually reinforcing contributions of five essential qualities: "an embodied ecological worldview, mutualistic interactions, high diversity, agency, and reflexivity" (2023, p. 837). Within to the scope of this contribution authors interpret ecological worldview as the agri-PV systems being part of the web of life and therefore design to not fragment the web; for mutualistic interactions the authors interpret that design must safeguard a high proportion of positive relationships characterized by sense of cooperation, reciprocity and sense of care each other; for high diversity is meant the diversity of the system component, e.g biodiversity, agro-biodiversity, cultural diversity; for agency the authors interpret the fostering of participation and co-creative governance of the agri-PV system, energy justice and the support to farmers; for reflexivity the authors intend the fact that an agri-PV system is an innovation action and therefore require continued experimentation, monitoring and adaptation.
The objective of the presented research is the delineation of a methodological path, a pragmatic sequence of things to do, to design agri-PV systems as regenerative SESs, therefore pursuing the five qualities as identified in Buckton et al. (2023) both in design process and pursued objectives. The approach is developed by means of Methodological Research in a learning by doing and iterative approach, tested in different applications in Italy. The research is funded by Starlight-energy, an international company investing in the development of Agri-PV systems projects and it is advised by ENEA, Italian National Agency for New Technologies, Energy and Sustainable Economic Development.

**Setting the methodological path**

Designing agri-PV systems as regenerative SES require the engagement of local community to understand the actors, the resources and the existing landscape governance systems and to set design principles (see Partelow, 2018, fig. 1) (Castàn Broto et al., 2019, Picchi et al., 2023). The authors drafted a methodological path in five steps shown in figure one. The methodological path has been centred on the community engagement (steps two and three). We will now briefly describe the steps.

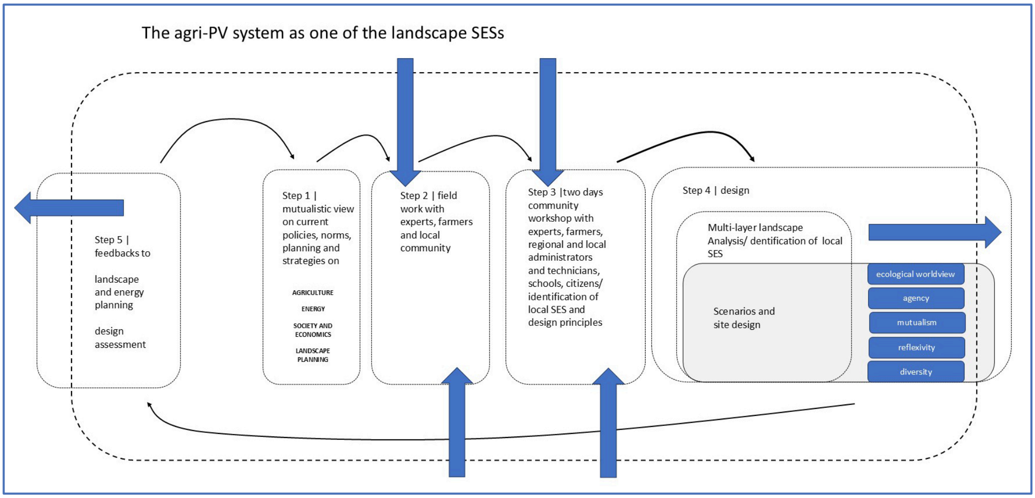


Figure 1: Setting the methodological path

*Step one*

The step one is in preparation of steps one and two. It foresees a synergetic analysis of the policies, planning previsions and near future developments at site level depending on the local and regional level regulations. The analysis embraces different sectors as agriculture and energy, landscape planning quality objectives, economic strategies and societal challenges. This is functional to set the stage of the agri-PV systems, individuating all the possible synergies with current regional and local planning and development strategies. The step one gives therefore indications on possible relevant stakeholders to contact in step two.

*Step two*

Step two aims to acquire direct knowledge on the landscape structure. The fieldwork consists of a direct exploration of the landscape and a direct dialogue with the farmers who cultivate those fields and maintain the landscape structure and the nature. It aims at the comprehension of the local and site SES.

*Step three*

The community workshop is conceived as a process of community imagination and aims at the sharing of themes and values of the landscape to orient possible future transformations of the landscape driven by the agri-PV system. The workshop foresees co-design activities for the conception of design principles creating synergies between energy and agriculture, ecology, recreation and aesthetics. Eligible participants are local farmers, Agriculture Cooperatives, Trade Associations in Agriculture, National or local NGOs active in the experience and maintenance of the landscape, residents. Among experts are eligible Community storytellers, Local experts (historians, archaeologists, agronomists, botanists), Technicians from regional and local administrations, Local representatives of the Cultural Heritage Office. The final aim is to orient codified languages and criteria that can be shared by the community and possibly useful for the assessment of the agri-PV system project as legitimized criteria (step 5) and provide validated design principles for the integration of the agri-PV system in the landscape.

The community workshop includes a first phase aimed at the sharing and reconnaissance of landscape themes and values by the participants, and a second phase of co-design aimed at the shared conception of design principles inherent to energy, agricultural, ecological, recreational and visual themes and values. The first phase consists in an immersive landscape experience and a participatory mapping activity, while the second phase consists in focus groups each one dedicated to landscape themes and issues emerged during the participatory mapping and aiming at the elaboration of design principles to address them.

*Step four*

The step four is the design phase itself. All the information in steps one, two and three are systematized to build coherent knowledge. In order to represent the collected knowledge landscape maps and profile, and other forms of representation as thematic sheets, info-graphics should be set at different levels and representing the different stakeholders perspectives. At this stage mapping requires an inventive and interpretative effort in the

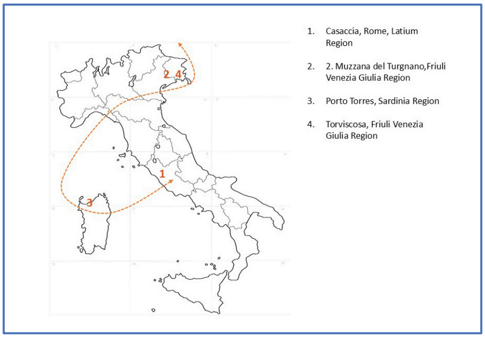

Figure 2: At present, the methodological path has been tested in four applications in 2023-2024


Figure 3: The landscape in Muzzana del Turgnano with crops, poplar groves and drainage systems

way relations in between social-ecological systems can be recognized and valued through the agri-PV system lens: mapping is a design process itself (Corner, 2011; Lambertini, 2013).

*Step five*
Step five foresees feedbacks for assessment and planning in dissemination activities to policy makers.

**Methodological research applications**

The research framework foresaw different applications in order to make critical adjustments on the drafted steps along the two years research partnership. At present the methodological path has been tested in four applications in 2023-2024 (figure 2). Due to the limits of this contribution only two of these applications, relevant for the outcomes presentation, are briefly introduced in this section.

**Muzzana del Turgnano**

The landscape in Muzzana del Turgnano, Friuli Venezia Giulia, is flat with crops rotation with Zea mays, Oriza sativa, Triticum eastivum and set aside grasslands and poplars (Populus nigra) groves for timber production. The landscape is rich in water from resurgences of water coming from the Alps when water encounters heavy clay layers, so wetlands, mostly protected as Natura 2000 sites, are frequent along the resurgence line. The water is canalized in traditional drainage systems which are hot spots for wet habitat. (figure 3). Here land owners and a cooperative of producers of barley for beer are interested the former to rent out their field to agri-PV developers and the latter to cultivate barley in agri-PV system.

The landscape in Muzzana del Turgnano was object of the second year Design Studio at the MSc in Landscape Architecture and a design competition at the University of Florence in 2023-2024. On the 19th and 20th of October 2023, a field visit was organized with the aim aimed to implement steps two and three of the methodological path, respectively the fieldwork and the gathering with the local community of Muzzana del Turgnano. The visit took place in two days. On the first day a field work in the landscape parcels which will host the agri-PV system took place together with the cooperative for barley and land owners, while in the evening a public meeting was held with landowners, farmers, citizens, the Municipality of Muzzana del Turgnano and the Environment Department of the Friuli Region. On the second day, an additional visit to the surrounding landscapes was organized.

Figure 4: Viscose production of viscose from marsh reed (Phragmites australis) neary Torviscosa, with drainage systems as hot spot of wet habitat and biodiversity.

**Torviscosa**

The landscape in Torviscosa, Friuli Venezia Giulia, is mostly similar to Muzzana del Turgnano, with crops rotation with mainly Zea mays, Oriza sativa, Triticum aestivum and set aside grasslands and poplars (Populus nigra) groves for timber production. The landscape is characterized by water from resurgences and drainage systems too and in the study area it presents a sharp demarcation in between the landscape created during the swamp reclamation in the 19th century and the landscape from the more recent reclamation of the 1930' for the production of viscose from marsh reed (Phragmites australis) (figure 4). The landscape of Torviscosa was object of a community workshop in November 2024. Due to local constraints and community availability the workshop was condensed in one day activity and hosted by the Municipality of Torviscosa and the Farm Tenuta ai Laghi.

In the following section we will report and discuss the outcomes.

**Results and discussions**

The four applications outcomes suggest that in order for the agri-PV system to be a regenerative SES and to reflect the five qualities embodied ecological worldview, mutualistic interactions, high diversity, agency, and reflexivity (Buckton, 2023) the most relevant steps of the tested methodological approach are the field work and the community workshop. The direct landscape experience and the engagement with farmers and the local community provide the conditions to earn the knowledge necessary for the comprehension of the local landscape governance and the way the agri-PV system can be designed through a proper compromise among all the actors and stakeholders as a true social-ecological system (SES) reflecting the characteristics of a truly regenerative SES.

With regards to these two steps the emerged issues are centred around the sources of knowledge and the exchange of knowledge to increase the mutualistic interactions. Farmers result the main source of knowledge. It is necessary to conduct an attentive field work with them to understand their needs and to understand how the local SESs work, as well as provide them with new knowledge on the way agri-PV systems can support their crops. This is functional to safeguard the qualities of ecological worldview, diversity and agency.

With regards to agency in the last two years authors have been in contact with Italian farmers who are willing to develop agri-PV system, yet concerned about the compatibility of their farming activities with it. In most of cases farmers want to enhance and protect their production from extreme weather events as summer heat wave or late spring storms through agri-PV systems, further they would like to benefit from electricity economic revenue to maintain the landscape. The landscape structure can have relevant cultural and ecological value and is constantly maintained and shaped by farming and farmers machinery standards. To not afflict the

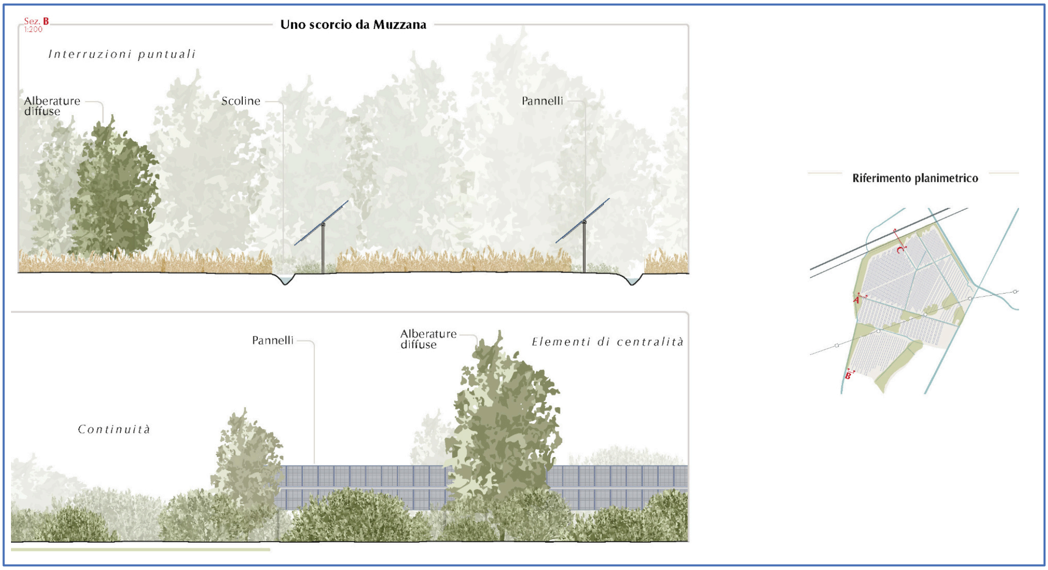


Figure 5: the elaborations show how the designed Agri-PV system fit into the site agri-environmental systems. The PV Trackers rows are aligned to the existing drainage systems (scoline), modules can drop the rain run-off into the scoline.

agriculture production, yet enhance it, agri-PV systems should be designed according to the current landscape structure such as the fields orientations, the drainage systems, the water lines, the hedges systems. A particular attention should be paid to the agri-PV systems with respect to the patch borders as the outcomes from the Design Studio and Competition in Muzzana del Turgnano show: fences and hedges should follow on the field existing borders and integrated in the current landscape ecological network and not creating new ones (fig: 5).

Figure 5: the elaborations show how the designed Agri-PV system fit into the site agri-environmental systems. The PV Trackers rows are aligned to the existing drainage systems (scoline), modules can drop the rain run-off into the scoline. The distance in between rows (pitch) measures minimum 12 meters to enable the farmer's harvester to work along them, yet the pitch is not regular, can be larger or narrower (minimum pitch is six meters to avoid self-shading in between rows) to follow on the existing drainage system (scoline). Since non cultivable, the strip between the tracker row and the scoline can be set for wet habitat development. Further the Agri-PV system hedges are designed on the existing patch hedges, e.g. a drainage collector channel and a linear woodland on the west (Elaboration in step four, Case of Muzzana del Turgnano, Friuli Venezia Giulia) (Dovadoli, Gaspari, Lo Monaco, Zammarchi, 2023, Design Studio Lab 4 PPP, MSc Landscape Architecture, DIDA - University of Florence).

With regards to the knowledge exchange, the community workshops represents a promising tool. In the applications where a community workshop was not systematically organized and fully exploited, the design process resulted not validated by the community, while the resulting agri-PV design was missing concrete support to mutualistic interactions. For example in Torviscosa some difficulties aroused in the stakeholder engagement: the direct involvement of local key actors who in turn reported and invited other key actors (snowball effect) was not so much effective, the workshop reached a peak attendance of 25 participant. A much earlier and professional stakeholder engagement approach would certainly be more effective. Yet the community workshop provided indications on the values of the local landscape and the possible social governance strategies in which agri-PV systems can be engaged in. For example farmers were mentioning how agri-PV system could make crops rotation more competitive than now, and avoid the landscape to turn into a whole and more competitive poplars cultivation. Very clear indications were obtained for the agri-PV

Figure 6: A moment of the community workshop during the focus group tables

systems design in terms of size of the landscape parcels, trackers layout, crops rotation, design of the edges and landscape experience. Those results opened relevant insight on community engagement: there was a positive response from the Local Administration, as this was facilitated in the decision process; there was a positive response from investors, because they received clear and validated indications for a design benefiting the local community in a agency perspective. Furthermore, the workshop showed the potential of bottom-up approaches in addressing the regional level to collect knowledge for planning and regulating agri-PV systems and further creating the conditions for the reflexivity of the system in terms of novel agreements on the innovation and the possible monitoring among parties (figure 6).

**Conclusions**

Concluding a concrete and functional knowledge of the current landscape social-ecological systems is only obtainable when conducting field work with farmers. Agrivoltraic systems are social-ecological systems and farmers appear to be at the centre of the methodological path in order to effectively integrate agrivoltaics systems in the landscape. Farmers role is central when organizing a community workshop on landscape governance and co-design for agrivoltaic systems.

The five attributes of an agrivoltaic regenrative system embodied ecological worldview, mutualistic interactions, high diversity, agency, and reflexivity can be pursued if the design process is a co-design and it starts from people sharing the landscape values and constraints in a workshop environment. We still need more research and data on energy, food production and other related social-ecological systems performance, yet there is already evidence on the positive nexus, and landscape architects can further support farmers and communities in designing it. Landscape Architecture Education in Agri-PV involved through Design Studios and co-design processes is therefore relevant to train future landscape architects on this topic.

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# Landscape as a medium for a shared energy transition: findings from a co-design tool

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**Introduction**

The transition towards a low carbon and less consuming energy system is one of the biggest challenges of our society and these energy strategies are recognized to be changing the landscape we live in (Stremke, Oudes and Picchi, 2022). However, the relationship between energy and landscape has always existed and for centuries, the two were connected by a strong relationship, for example in windy places windmills were constructed. Subsequently, mainly because of the use of fossil resources, this link has been broken, where the territories in the North of the world were mainly consuming energy produced elsewhere faraway (Smil, 2016). So somehow, we lost the knowledge of energy components in our landscapes and nowadays because of the climate emergency, we assist in an effort to reverse this process. The renewable energy production from different sources could be potentially implemented everywhere as well as reduction of consumption, re-locating the energy topic in the landscape we are immersed in. This means that the knowledge and awareness of the energy component in our landscape need to be regenerated in order to develop a new low carbon and less consuming landscape. In this paper, we argue that a regenerative energy landscape is a landscape that regenerates the link between its characteristics /resources and the energy component, both from a material and immaterial perspective. We present a co-design tool ETAPE paysage as able to support the regeneration of this link in an energy transition framework.

**A tool to regenerate a connection between energy and landscape**

Every European nation sets energy goals at national scale, but their implementation takes place at the local one, and several policies, tolls and networks are developed in order to lead local institutions and citizens to engage in the energy transition process. For example, the European Union adopted in 2019 the Clean energy for all Europeans package, which introduced the notion of citizen energy communities, and we see national networks supporting local institutions to set energy ambitious goals for their territory such as reseau Cler, in France which accompanies local stakeholders to commit to become energy positive territories (TEPOS). Nevertheless, the implementation of ambitious energy goals in territories remains a challenge, because these require space and are objects of multiple interests, possibly raising conflicts.

It is to fill this spatial and landscape gap to facilitate the implementation of energy ambitions at territorial scale that the tool ETAPE paysage was conceived. The goal of ETAPE paysage is to support local authorities and other local actors to think and negotiate about the characteristics and resources of their landscapes and choose together how and where to implement their energy transition actions, in a co-design process considering both renewable energy production and reduction of energy consumption. We refer to co-design as a process involving multiple actors, including people not trained in design, with the goal to share knowledge and foster a collective decision making (Sanders and Stappers, 2008).

The landscape co-design in an energy transition framework is also a way to address a just transition (Bouzarovski and Simcock, 2017) cost and benefits are shared as much as possible economically, but also in terms of his spatial and landscape component. In this framework ETAPE paysage is considered as an example how to develop regenerative landscapes, because of the possibility of sharing knowledge, allowing a collaboration among many actors with different disciplinary backgrounds to co-design new connections between energy and landscapes, regenerating a link lost since long.

This tool is conceived by *Collectif paysages de l'après-pétrole [post-oil landscapes collective],* composed of scholars, landscape architects, agronomists, urban planners, architects, philosophers, and others, working together. It took three years and tests with eight volunteer territories, in order to finalise the process and its different components. Even if it takes inspiration from the serious game worlds using a board and cards, we argue that ETAPE paysage is a co-design tool because it is based on the real characteristics of the territory and the outcomes are real and could potentially be implemented.

**The development of an energy landscape shared knowledge and imaginary**

ETAPE paysage aims to group together participants of different backgrounds and knowledge with multiple implication in the transition process of the territory, such as elected representatives, technical public services working on the territory (e.g. project manager in spatial panning, agriculture, climate, etc.), private sectors, such as renewable energy developers, inhabitants. The participants do not need to be experts about the energy topic, but people are experts of their territory and landscapes, which is the basis from which to start. Participants are supported on the knowledge of energy by the animator during the session and via several documents, which merges quantitative and qualitative data.

The tool is divided into three steps, but before engaging with the participants, preparatory work is done by a trained animator. The animator has to get to know the territory and its landscape, through the analysis of documents such as the planning ones or

Figure 1: Step 1 of ETAPE paysage, discussion and identification of natural and human resources that characterize the landscape on the central board map, example from the co-design of the communauté des communes Cauvaldor-Quercy Energie.

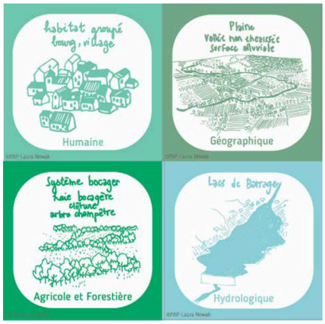


Figure 2: Example of natural and human resources cards

atlas de paysage, in order to prepare a cartographic support and analysis forms presenting the different landscape characteristics (texts, photos, etc.). Moreover, quantitative energy data are also collected both for the current state of the territory and for the ambitions, considering both energy sufficiency and renewable energy production. In this regard, ETAPE paysage could work with another tool that should take place before, called *Destination TEPOS*, which supports local communities to set their energy quantitative goals for the different sectors such as habitat, agriculture and transport.

During step one, participants learn to name their territory in terms of landscape units and negotiate their framing on the map (central board). Moreover, they need to identify and agree together on the essential natural and human resources that characterise the territory, through the use of cards. In this way, they have a discussion together learning from one another and discovering new aspects and subjects of their landscape.

Figure 3: Step 2 of ETAPE paysage, localisation of the energy sufficiency and renewable energy production actions goals on the central board map, example from the co-design of the Oléron island territory.

The second step allows participants to locate the energy sufficiency and renewable energy production actions in the landscape to achieve the territory goals. This spatial choice is based on the previous built up shared knowledge of the landscape and its resources. This step is crucial and the idea is to lead participants to think about what actions the resources in the landscape will allow to develop. If the renewable energy infrastructures are objects of debate but are more easily located, because more visible and with a materiality, the energy sufficiency actions undergo a more complex pattern, because of their lower visibility and at the same time need for individual commitment. For example, the action of retrofitting 1000 buildings is a huge change that participants could locate mainly in urban settlements, but to think about how this is going to affect landscape in our cities is still understudied and underdeveloped in the common imaginary.

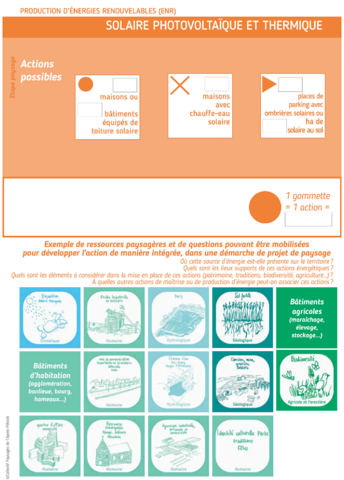


Figure 4: Example of the document about photovoltaic and solar heat energy production comparing its related actions and goals and the different landscape resources.

Figure 5: Step 3 of ETAPE paysage, imagination ant graphical representation of the landscape at the horizon 2050. Example from the co-design of the communauté des communes des Monts du Lyonnais.

At this stage, participants may question the energy quantitative data settled for the territory, requisitioning the balance between renewable energy production and energy sufficiency actions. It is particularly important to make participants deal at the same time with both these two energy groups of actions addressing them according to the same order of magnitude to avoid a focus only on production and possible rebound effects that results in adding renewable energy to the actual fossil fuel mix more than substituting it. This step is also useful to question the different energy goals for sectors on the basis of the landscape resources present in the territory.

For example, in mainly agricultural territories, participants could decide to develop more biogas power plants and erase photovoltaic panels' parks. Subsequently, step three leads participants to imagine and create a new energy landscape through graphical methods (drawings, collage of photos, etc.). They imagine and story-tell the landscape at the horizon 2050, describing what a traveler will see and feel when traversing this territory, thinking about the interrelations of scales and activities. If this is the main outline, according to the need of different territories, these steps could be more or less long and it could happen that, because of lack of time, the last step is not performed.

**Potentials and challenges of landscape co-design processes**

We experienced about 15 times the use of Etape paysage in real-life situations and some reflections on the outcomes of the co-design process could be made, drawing empirical conclusions from our own experience as animators and with interviews with other ones trained to accompany the process.

One first element to be pointed out is that ETAPE paysage is normally used to support other initiatives, for example is often organised when there is in progress the elaboration of plan de paysage on the territory. In this context, the moment of landscape knowledge sharing and co-design is helpful to understand the ambitions of the participants and take them into account for the development of the documents, establishing the landscape quality objectives relating to energy. It is also used to support the elaboration of planning documents such as the Plan climat air énergie territorial [Climate air energy territorial plan] (PCAET) which sets energy long and short term goals for the territory and the use of ETAPE paysage support to verify that the energy goals spatially and if they are settled in line with landscape characteristics and lead participants potentially to adjust them.  For example, in the case of the Oléron island territory, ETAPE paysage was used shortly after the approval of the PCAET (2023), and during this experience with the tool, the participants pointed out a need to make evolve the energy mix. They understood better the forest and hedge system resources present on the territory and wanted to improve the wood-energy sector.

Sometimes according to the goals and the knowledge of energy topics of the participants around the table, the utilisation of the tool does not achieve a defined spatialisation of the energy mix. In this case, the co-design process resulted mainly in shared knowledge, which, however, sets the basis for future implementations strategies. For example, in the Grand Site Vallée de l'Hérault territory the application of ETAPE paysage allowed mainly to make understand all the existing energy actions potentially applicable on the territory, allowing to go beyond the only wind turbine and photovoltaic panels production.

Regarding the renewable energy production subjects, it also happened that divergent points of view among participants prevented a constructive dialogue. This is mainly the case when participants think about landscape as an immutable panorama and not a living environment (Council of Europe, 2000). In these situations, it is crucial for a constructive co-design the capacity of the animator to manage conflicts and support a constructive negotiation. Another attention point is that because participants have different interests and decision power according to their status (public administrations, private developers, citizen associations, etc.) some try to impose their narrative. The role of the animator is then fundamental to assure that everyone around the table expresses its perspective engaging in a shared dialogue. This challenge with participants is a common finding with other researchers exploring the subject (e.g. Gugerell and Zuidema, 2017).

Moreover, it is essential to have in mind that the quality of the results of the process also depends on the commitment of participants. Indeed if the second step of the tool is challenging in order to create a consensus for decision taking, the third step about developing shared landscape future imaginaries is sometimes perceived as useless by some participants because it is not immediately exploitable. On the contrary we argue that this is an open mind phase that supports the materialisation of a shared landscape for the years to come.

**How to regenerate energy landscapes in a changing world?**

We argue that ETAPE paysage could be considered as a tool able to support the regeneration of the link between energy and landscape, using landscape as a medium (Nassauer, 2012) to ground the designing of energy actions on local resources. In this way, the landscape is rediscovered, becoming the basis to generate less consuming and renewable energy systems to achieve a more just landscape (Olwig, 2007).

However, it is a tool of experimentation that is facing new challenges to adapt to the evolving necessities of local communities. For example, ETAPE paysage is designed to be used at a large landscape scale of a territory, but the French law for the acceleration of renewable energy production (2023) has set the municipality scale at the center of decision for future development. Therefore, the question arises about how to manage the new power relations and assure a larger-scale vision while supporting the municipalities in their needs.

Another point for future development is about urban energy landscapes. For now Etape paysage has been thought to support mainly rural context, but the topic of energy spatialisation and landscape concern is also a matter in cities and metropolitan areas, but with different challenges and topics. In the city the focus, for now, is mainly addressed in terms of energy sufficiency, from building retrofitting and transport, compared to renewable energy productions, mainly addressed in rural areas that have the “space”. On this basis future exploration of the co-design tool should explore urban-rural solidarity, developing visions to regenerate the link between rural and urban territories, each one contributing to the energy transition goals according to their different landscapes’ resources, that for now remain mainly taught separately.

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# Mobility Landscapes

## Mobility Landscapes

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**Reflecting our conference experience**

The Mobility Track brought together 22 papers covering a range of topics related to mobility, from landscape mobility and streetscape design, railway regeneration projects, urban regeneration and walkability, to the general topic of public spaces, green corridors and cultural heritage, to the discussion of soft mobility infrastructure and cycling at local and regional level.

In this session, our main theme was to explore possible transition pathways towards based on the possible interactions between sustainable mobility infrastructure, public spaces and green-blue infrastructure. We talked mainly about daily mobility: daily mobility is a form of spatial mobility characterised by movements within a settlement area or landscape over a short period of time. It is therefore different from residential mobility (movement within a residential area over a long period of time), migration (movement outside a residential area over a long period of time) and travel (movement outside a residential area over a short period of time). Across all the case studies presented and discussed, it became clear that mobility is undeniably an essential aspect of modern life: moving people to and from work, providing essential services and connecting people and activities globally. In addition to these benefits, transport also has negative impacts on human health and the environment. Infrastructure is an integral part of the environment in which we live. It is the physical foundation of modern societies, the basis on which we travel, meet, exchange and experience.

We started our track presentations with the topic of urban climate adaptation, which is easily addressed by landscape architects: Prof. Florian Otto demonstrated simple and effective measures that transform streets into climate-proof mobility infrastructure. His presentation was followed by Melissa Cate Christ, who showed how walking design can improve the regeneration of urban landscapes, especially by incorporating water. Iwan Thomson presented the Oslo experience with "Streets for people - the need for a new sensibility in designing streets", followed by Professor Ina Macaione, Alessandro Raffa and Biancao Andalaro, who focused on "Climate streetscapes for green regeneration". We were able to recognise that nature-based solutions offer great potential for redesigning our urban streets and can make all the difference in achieving climate adaptation measures.

After the break, Sofia Sandqvist demonstrated that Research by Design can become an important method for developing the aesthetic skills of design students, e.g. with a five-week course where students were challenged to create large-scale installations in an outdoor environment, working with an artistic research framework. Our colleague Efrat Hildesheim presented in a nice case study the perspectives of a mobility paradigm on highway construction and landscape architecture in Israel. The main idea was to design a highway as a scenic route. Her presentation was followed by the case of the construction of a suburban cycling infrastructure in the Munich region, the so-called "RadlRing" and "Ring der Region", which was initiated during and after the BUGA 2005 and has influenced the leisure development and landscape economy in the region. Angelo Paulo Mogul presented online the case for integrating transit-oriented developments into urban landscapes, which can be demonstrated by improving the mobility experience - it was a case study in the Philippines. His presentation was followed by Ines Prehn, who presented the transformation of mobility practices through real-world experiments: it was an interesting project called "EN ROUTE", which explored the relationship between campus design and mobility, using a campus of the Osnabrück University of Applied Sciences as an example. The Mobility Session concluded with the presentation of the Kolenspoor Limburg by Peter van der Poort and colleagues, a former railway line that has been transformed into a wide cycling and recreational path as the backbone of a multi-productive network in Flanders, Belgium.

The Mobility Track featured a wide variety of interesting case studies and discussions on mobility in general, demonstrating that mobility is a very relevant topic in landscape economics and can make a significant contribution to achieving sustainable landscapes and cities.

# The becoming of a scenic route: Perspectives on the mobility paradigm of highway building and landscape architecture

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**Key words:** scenic route, road, mobility paradigm, landscape of mobility

### Introduction

In considering the ontological question regarding regenerative landscapes of mobility, this article addresses a trifold discourse concerning scenic road building, the mobility paradigm, and landscape architecture. The building of Route 854, also known as "the Rocky Cliff Highway," in the Galilee region in northern Israel (Figure 1) has been explored as a national project focusing on the integration of nature, construction, and art (Hildesheim and Alon-Mozes 2023), while briefly addressing the mobility paradigm. This short article further delves into this perspective, drawing on the notion of the mobility paradigm (Sheller and Urry, 2006) and on studies concerning mobility and landscape (Cresswell, 2010; Merriman, 2007; Merriman et al., 2008). The discussion unfolds different facets of this paradigm – the political; stillness; placeness; tangibility and process – while exploring the becoming of a scenic road as a regenerative landscape.

### Roads, landscape, and the mobility paradigm

Originating in the social studies, the mobility paradigm is a comprehensive approach that discusses and interprets the movement of people, objects, capital, and information, employing interdisciplinary methodologies that integrate sociology, anthropology, geography, culture, architecture, and planning. It does not seek to suggest a new grand narrative, but instead offers "a set of questions, theories, and methodologies rather than a totalization or reductive description of the contemporary world" (Sheller and Urry 2006, 210). Cultural geographer and landscape scholar J.B. Jackson states that "Roads belong in the landscape" (Jackson, 1994, 187), indicating the Gordian Knot between highways, landscape, and mobility. (Re)Introducing the term odology (1984, 21) as a critical notion, Jackson aimed for it to encompass cultural, political, and social interpretations of roads. He proposes a holistic approach whereby the road is not merely a conduit between places, but is rather a place in and of itself, while serving as a cultural agent for spatio-cultural transformations (Jackson, 1994, 189–192). Throughout his work, Jackson highlights the political significance of roads, referring to them as part of a political landscape. However, he does not outline specific research methodologies, thus leaving his approach open-ended.

To a certain extent, it seems that the discussion of mobility is inherent in the discourse on landscape and roads. Aspects of mobility have long been discussed in relation to highways, roads, and landscapes in various contexts, such as the scenic and visual (Appleyard, Lynch, and Mayer, 1964; Halprin 1966),

Figure 1: A (above): the slope and the view from the road. B (below): general view of Route 854 and the Rocky Cliff. Source: the author

speed (Virilio, 2006 [1977]), gardens (Hunt, 2002), highway design (Conan, 2003), or a cultural-historical perspective (Hvattum et al. 2011). Nevertheless, the question remains: How, then, can the mobility paradigm contribute to the discussion on landscape architecture in general and regenerative landscapes in particular?

The answer lies within the organizing framework provided by the mobility paradigm. This framework allows for a critical examination of landscape-related aspects of highways – including visual, political, cultural, social, and environmental aspects – demonstrating the convergence of aspects of the regenerative and main themes pertaining to the mobility paradigm. This short inquiry addresses the fine thread that connects Jackson's odology and critical notion of landscape with the (new) mobility paradigm.

**Making a highway into a scenic route**

Route 854 is an eight-Kilometer-long scenic road that connects the regions of the Lower and Upper Galilee in Israel, cutting through the elevated slopes of the Rocky Cliff natural reserve. The route now merges with the surrounding scenery, vegetation, and thriving orchards (Figure 2; Figure 3). However, achieving this seemingly natural appearance required extensive efforts from environmental activists and professional landscape architects, significant statutory planning, and on-site struggles. Route 854 was planned, designed, and built over two decades (1976–1996), paralleling the awakening of environmental activism in Israel. The route was initially articulated on the first National Plane for Roads and Highway (TAMA 3) in 1976, expressing the state's strategic plans to strengthen transportation connections to the Upper Galilee and the state's northern regions. Its subsequent evolution involved

Figure 2: A (left): Roadside micro-landscape design, B (right): The curves of the road merge into nature and the agrarian landscape. Source: the author

the planning of five alternative routes, and the final approval of the one suggested by the environmental activists (1976– 1985); the statutory declaration of 'Change No. 3' in TAMA 3, which initiated rigorous landscape planning, rehabilitation, and environmental regulation (1985–1988); on-site planning, design, and construction, including rehabilitation of the natural vegetation (1988–1992); and, finally, the rehabilitation of existing quarries (1992–1996). The successful outcome emerged mainly thanks to the joint efforts of three active parties: environmental agencies; Avinoam Avnon, the landscape architect acting on behalf of the state's Public Works Department; and landscape architect Judith Garmi, who provided in-situ design consulting and supervision.

This progression, and the implementation of rigorous regulations and design led to the formation of an exclusive category of scenic roads in the National Plan for Highways and Roads, known as 'Change No. 7' (1991), which has since influenced all planning and design of highways and roads in the country. Consequently, Route 854 officially became a scenic road.

**Visibility and the scenic**

Since the roads of Humphry Repton (Daniels, 2012) in the English landscape gardens and the invention of the American Parkway in the early 1900s, the making of official centrifugal roads and highways was a demonstrative act that employed the landscape to manifest the power and presence of the sovereign. Roads were prominently visible, becoming a dominant feature in the landscape, while embodying two ideas: that visibility operates as a political expression of mobility; and that the materialization of a mobility infrastructure operates as a political power (Cresswell, 2010). In the course of the 20th century, and especially after McHarg's Design with Nature (1969), landscape architects pursued the idea of the regenerative, seeking to balance constructive needs and efficiency requirements with changing environmental demands and landscape conservation[1]. The discussion on visibility, sight and site, and the striving for minimal damage to the landscape and for the lower visibility of roads and highways was a catalyst for the becoming of regenerative landscapes. The heightened visibility of the Rocky Cliff and the vicinity of the eight-kilometer highway, which can be seen from a distance of several dozen kilometers, sparked a debate over the highway's route, which lasted for more than a decade. Initiated by environmental activists and supported by a PWD landscape architect, along with the National Council for Planning and Building, the debate focused on minimizing damage to the landscape, and involved cost-benefit analysis and consideration of construction demands, landscape features, and spatial-geographical entities[2]. However, selecting the optimal route was not solely about choosing the least damaging option; it also involved the collaborative efforts of multiple agents, guided by two landscape architects. The seamless integration of the highway into its surroundings resulted from meticulous

1 See also the McHarg parametric method for delineating highway routes in Ian McHarg, 1967

2 See Hildesheim and Alon-Mozes 2023, 10–15.

Figure 3: Rest areas and lookout in the old quarries, environmental art and picnic area. Source: the author.

planning and regulation, including construction methods aimed at minimal earthwork, the restoration of vegetation by means of local plant surveys, dual planting cycles, and quarry rehabilitation.

Ranging from the macro to the micro, the landscape architecture design methods included: preventing significant excavation and piles of dirt from appearing conspicuous from a distance; balancing surplus excavation material and soil within the site, and reusing boulders for landscape restoration and construction; a hands-on design practice that enhanced a sustainable design method, relying on cross-sections and designing the slopes differently at each point along the route depending on the geological conditions, visibility from afar, the relationship to nearby plots, and construction-related needs; encouraging innovative construction solutions tailored to specific on-site micro demands; protecting olive groves and farmland along the route, and maintaining agricultural dirt paths; coordinating on-site with engineers, local Arab-Palestinian landowners, NRA representatives, contractors, and environmental artists (Figure 2)[3.]

**Five perspectives on the mobility paradigm and the scenic road**

The course of events suggests that environmentally conscious planning and design processes were the driving force behind the road's transformation into a regenerative landscape of mobility, alongside factors including visibility, space and placemaking. The subsequent discussion explores five perspectives on the mobility paradigm, its convergence with regenerative landscapes, and the practice of building a scenic road.

*The Political*

The political facet of mobility (Cresswell, 2010) was initially expressed in the state's preliminary decision to build the route within the conflictual political landscape of the Galilee, expressing territorial, ideological, and strategic considerations (Feitelson, 1993). Within this context, the paradigmatic shift in the visibility of highways was conveyed by landscape architects, who were engaged in on-site planning and innovative design solutions while mediating between locals (mainly Arab-Palestinians from nearby rural towns) and planning agencies, representatives of associated disciplines, and environmental activists. This approach resulted in the highway being subtly integrated into the landscape, minimizing its visibility while serving the interests of both regional populations and the state. Thus, the political is revealed as an inherent facet of the scenic road, pointing to the dialectical character of the regenerative landscape.

*Place and placeness*

The notion of place inherent in the mobility paradigm follows upon the 'spatial turn' in social studies, which emphasizes the intertwining of social, cultural, national, and (geo)political facets. Indeed, as Jackson already stated, "Roads no longer merely lead to places; they are places" (1994, 190). The meticulous planning and in-situ design of Route 854, which

3 For more on the regulations put forth by landscape architect Avnon and the work of landscape architect Gami; construction methods and hardscape design strategies; softscape and vegetation design; and the rehabilitation of the Nahef Quarries, see Hildesheim and Alon Mozes 2023, 15–22.

resulted in the formation of Israel's first scenic road; its naming (albeit unofficially) Rocky Cliff Highway; and its expansion by means of rest areas and lookouts elicit the notions of place and placeness as another facet of the mobility paradigm. Taken together, these elements indicate the intricacy of Route 854 as both a scenic road and a regenerative landscape.

*Stillness*

Scholars of mobility (Hannam, Sheller, and Urry, 2006; Merriman, 2014, 177) have attended to "the new turn to stillness" (Cresswell, 2012, 648) and to immobility, sedentarism, and the arrest of movement. Stressing "an awareness of stillness as part of our inquiry" (ibid, ibid), they position the idea of contemplation as countering, and yet inseparable from, the mobility paradigm (Merriman et al., 2008, 198-200). Cutting deep into the cliff, the Nahf lime rock quarries, which had long been operated by locals, had acquired a conspicuously disruptive appearance. The rest areas and lookouts were planned as part of a quarry rehabilitation process involving paths, picnic areas, a communal outdoor gathering space within an olive grove, and environmental art. The reclamation of the quarries was aimed both at restoring the cliff, and at welcoming travelers and locals to enjoy the view while taking a pause[4.] Landscape architect Judith Garmi, however, held a strong position regarding the reclamation of the quarries, arguing that they should be preserved as a manmade landscape rather filled up with excessive excavation material (Figure 3; Figure 4). By maintaining the concept of a manmade landscape, the reclamation of the quarries further enhanced the social aspect of the regenerative landscape as a landscape that forms a bridge between past and future, nature and culture, while forging connections between modernization and progress, conservative environmentalists, state authorities, and locals.

Route 854's rest area and lookout materialize the idea of stillness, showcasing designed spaces for resting and the practice of viewing as prominent parts of the overall mobility paradigm of the scenic road. It also suggests that the idea of a regenerative landscape addresses not only the environment, but also the cultural, social-communal, and (geo)political aspects of the landscape.

*Tangibility and phenomenology*

Scholars of mobility (Merriman et al., 2008, 197; Cresswell 2010, 25) also address tangibility and phenomenology as aspects of mobility within the landscape. This perspective may be relevant to both designers and users, including drivers, travelers, viewers, and visitors. The design of Route 854 adapts to the topography, weaving through old and new olive groves within the surrounding rehabilitated landscape, bringing users closer to the land and creating a tangible experience of it. The lookouts and rest area elicit an immersion in the landscape,

4 For details on the rehabilitation of the Nahf quarries, see Hildesheim and Alon Mozes 2023, 20–22.

Figure 4: Communal gathering space in rehabilitated quarries. Source: the author

Figure 5: General view of the road from the rest area: picnic area within the olive grove, the town of Nahf and the road in the background. Source: the author.

allowing visitors to experience the view, atmosphere, light, strong winds, and scents of the land and vegetation. The discussion on practice and landscape (Merriman et al. 2008) also invokes the idea of viewing as a practice in the landscape. Indeed, following Jackson, Cresswell (2003) posits viewing as a leading practice, identifying Jackson as the first to point to the converging practices of viewing and mobility.

*Process*

Finally, the mobility paradigm underlines mobility as a process. Merriman addresses the constantly evolving character of mobility, stressing that "Processual philosophy, therefore, invites us to understand movement not as an exceptional effect in an otherwise static universe, but to examine how we can imagine things as static and finite in a world of incessant becoming, flow, flux and movement" (Merriman 2012, 6; 2014, 178). The notion of mobility as a process of becoming implies that the processual character of the scenic road  is integral to the idea of a regenerative landscape. In reflecting on the ontological question of regenerative landscapes in the context of mobility, the "re" in "regenerative" underlines their processual character, emphasizing it as a process of renewal, restoration, or growth, and indicating that the landscape is being reclaimed and restored to a better state.

**The scenic as regenerative: processual, dialectical, political, and inclusive**

The article presents five viewpoints concerning the mobility paradigm, which frame the concept of a regenerative and becoming of Route 854 as a scenic road. It employs the mobility paradigm as a critical conceptual framework for exploring the convergence of landscape and highways, addressing multiple aspects of the regenerative landscape that encompass its visual, spatial, political, social, and environmental layers.

The article suggests that a regenerative landscape of mobility embodies a dialectical character that is capable of reconciling contradictions. It suggests that the ontological question of the regenerative landscape pertains to a process, yet not only that of the landscape itself, but also the process of landscape architecture planning and design. Concurrently, the argument stresses that a regenerative landscape is a political process affected by the involvement and interests of various agencies. It thus reveals that the scenic road operates as a process of becoming, a regenerative landscape that is inclusive and embraces opposition and conflicts. The article also suggests that the ontological question concerning the regenerative landscape addresses not only landscape transitions, but also the mediating character of the discipline of landscape architecture.

Engaging the mobility paradigm in relation to the notion of the regenerative landscape suggests avenues for further investigation, including the concept of present-absent in the landscape, further accounts of visibility, seeing, viewing, and gazing (Merriman 2012, 6; 2014, 200–201), social dimensions, and hybridity. These perspectives warrant further study.

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# The relevance of green frontage zones for multifunctional streets

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**Abstract**
Streetscapes are central in achieving regenerative urban spaces by supporting the urban blue-green infrastructure (BGI) network. The interface between street spaces and private adjacent spaces is central to extending the potential for ecosystem services (ES) provision in streetscapes, but overcoming ownership barriers represents a challenge for urban planners. Although they lie under private ownership, green frontage zones represent a large share of urban spaces and play a key role in creating lively and ecologically beneficial street canyons. The objective of this article is to gain insight into the significance of green frontage zones for the BGI, drawing upon existing literature, and to identify research gaps for further investigations on how to overcome ownership barriers and plan regenerative streetscapes. The results show a lack of clarity of the definition of these zones, a lack of an integrated social, ecological and technological approach and an imbalance in the urban forms covered by existing literature.

**Keywords:** Frontage, Front Yard, Setback, Urban Blue Green Infrastructure, Streetscapes

## Introduction

Streetscape transformation is essential in achieving regenerative urban landscapes as these spaces are ubiquitous in the urban realm and hold the potential to strengthen the blue-green infrastructure (BGI) network by connecting larger green structures, improving the urban heat island effect and reducing stormwater runoff (Mullaney, Lucke and Trueman, 2015). Nonetheless, streets are already under intensive use, and accommodating ecological functions requires rethinking existing land use to achieve multifunctional streets (Pogačar and Šenk, 2021).

Central texts in urban planning theory have established the importance of street edges in achieving lively and attractive streets (Gehl, 2010; Soulier, 2012). In the more recent discussion around planning for a continuous BGI, those street edges should be reconsidered to strengthen the BGI. For example, trees on private frontage zones can contribute to the shading of public streets and improve outdoor comfort for cyclists (Klemm et al., 2015). Frontage zones are defined as the interface zone between the plot border of the street and the facade of the building (Gehl, 2010; Soulier, 2012; Vialard et al., 2020). In the case of a building setback, the frontage zone offers space for interaction or a buffer to public life (Vialard et al., 2020). Urban typology differences are essential in defining these zones; in the case of single-family homes, they are often called front gardens or front yards. In the case of multi-family units, they are named frontage zones or setbacks. In this study, we use the term "Frontage zones" to describe the strip of land between the building façade and the street property line independently of the urban type.

Frontage zones and gardens, more generally, are private green spaces, and these have been less studied than public green spaces despite the large share of urban spaces they represent (Haase, Jänicke and Wellmann, 2019). Many scholars and planners call for a better integration of private green spaces in BGI strategies (Cameron et al., 2012; Braaker et al., 2014; Haase, Jänicke and Wellmann, 2019; Mimet et al., 2020; Michaeli, 2023), and this applies even more to frontages, which are the interface between public and private management, thus offering a synergy potential. Moreover, studies addressing the impact of private green spaces across the local, neighbour-hood, and city scales are rare (Cook, Hall and Larson, 2012) and only a few studies explore the relationship

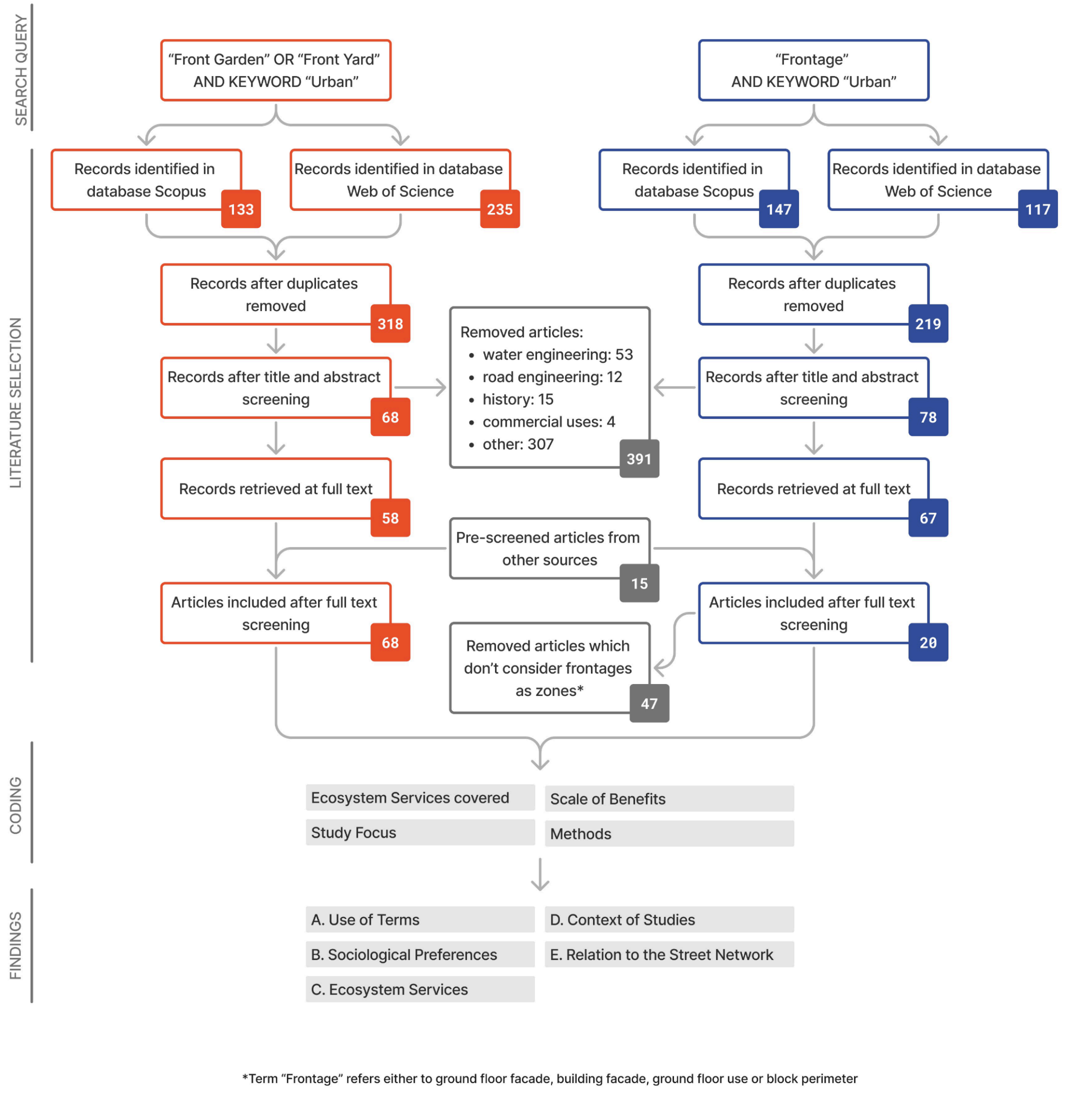



Figure 1: Systematic review method based on the ROSE method (Haddaway et al., 2017). Reference: Author's representation

between urban typology and vegetation on private land (Guyot et al., 2021). The aim of this paper is to explore to what extent and in which context frontage zones have been considered by scientific literature for their capacity to provide BGI across public and private land. Through a review of the existing literature, we will explore the ecosystem services (ES) covered, the scale of benefits studied and the studies' focuses. This serves as a basis for further research on the contribution of private frontage zones to regenerative streetscapes.

**Method**

This literature review is conceived as a systematic review of scientific papers on the databases Scopus and Web of Science. Articles in English language from 1993 until 2023 were collected based on the following research query: firstly, Title/abstract/keyword "front garden" OR "front yard" AND keyword "urban", secondly Title/abstract/keyword "frontage" AND keyword "urban". In order to gain a broad overview of literature focusing on the topic of green frontages, it was interesting to review the keywords "front garden" or "front yard", and "frontage" separately to compare the use of these terms in literature. A systematic procedure for article selection based on the ROSE framework (Haddaway, 2017) was followed as described in Figure 1.

The goal of this review is to gain an overview of the topics covered in the research literature and to understand the benefits of green frontages that have already been studied. In planning, multiple cities have addressed the need to plan with accounting for private frontages such as Leeds where frontages were identified as a pain point in flood events (Leeds flood report, 2004) or Munich where a booklet on front gardens and their cultural importance was released (Munich Front Gardens Brochure, 2011). Nonetheless, very few cities have a quantitative approach to the identification of these zones or to the benefits they provide.  There seems to be common knowledge of the relevance of these zones, but an overview of their coverage by scientific literature is missing, although it is essential to provide the tools for ensuring the operationalization of urban planning strategies.

**Results and discussion**

*Use of Terminology*

The different keywords are used in different research focuses, with "Front Garden" and "Front Yard" predominantly used in studies with an ecological (26 studies) or socio-ecological (53 studies) focus and "Frontage" commonly used in studies related to technological domains such as morphology (42 studies), coastal engineering (53 studies), road engineering (15 studies), and commercial uses (4 studies) (Figure 2). Other studies (301) use these terms in a different manner that is outside the scope of this study.

The prevalent socio-ecological perspective for the studies using the term "Front Garden" or "Front Yard" (53 studies) is expected as "gardens" are highly

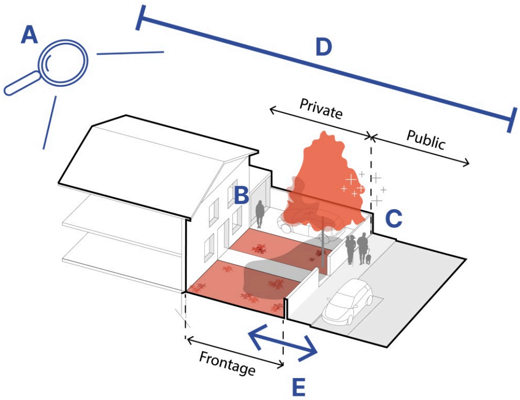
## Findings of the literature review

### A Use of Terminology

- “Front Garden” or “Front Yard” mostly used with an ecological or socio-ecological focus
- “Frontage” has multiple meanings and mostly used in domains such as morphology, coastal engineering, road engineering, and commercial uses.

### B Cultural ES and Social Preferences

- 48 % of studies cover people’s preferences for garden design, eg. choice of vegetation. The sociological focus is strongly represented
- 23% of studies focus on cultural ES
- These zones serve as a transition zone balancing intimacy and community and therefore are important in creating a sense of place




### C Provisioning and Regulating ES

- 27% of studies focus on provisioning ES. This is strongly related to habitat biodiversity and people’s preferences in terms of design
- Regulating ES are less covered: 14% of studies cover water infiltration ES, 8% of studies cover climate regulation ES
- 18% of studies don’t focus on any specific ES

### D Context of studies

- The case studies are mostly set in single-family homes urban fabrics (52% of studies) and based in North America, the United Kingdom or Australia
- Mixed urban types with denser dwellings are less represented (26% of studies) and cases are based mostly in European context.

### E Relation to the street network

- A minority of studies address spatial characteristics of frontages at a neighbourhood and city scale
- Studies rarely consider streets and frontages as complementary spaces. They usually either focus on one or the other

Figure 2: Summary diagram of the findings from the literature review

managed private green spaces and can be described as social-ecological systems (Cook, Hall and Larson, 2012). Fewer studies (26 studies) focus solely on the ecological benefits of gardens, particularly regarding biodiversity provision.

The term “Frontage” has a rather broad use and multiple meanings; it may, for example, refer to waterfronts, motorway connector roads, or shop facades. In the morphology disciplines, it can describe ground-floor facades (active/inactive), entire building facades, or the space between the street and the building facade. However, only a minority of these studies mention vegetation (9 Studies) and address both technical and ecological aspects. These two different perspectives and the confusion in the use of the term “Frontage” show a lack of integration of social, ecological and technological dimensions, which are central to understanding urban green transformations (McPhearson et al., 2022).

*Cultural ES and Social Preferences*
The review highlights that 48% of research focuses on sociological preferences in garden design, addressing themes like identity expression through front yards and social influence related to their design and maintenance (Chalmin-Pui et al., 2019; Minor et al., 2023). Social factors such as mimicry (Gawryszewska et al., 2023), social pressure, socio-economical background (Avolio et al., 2020), lack of time or skill

| | Front Garden | Frontage |
|---|---|---|
| Ecological | 26 | 8 |
| Social-ecological | 53 | 4 |
| Morphology | 3 | 42 |
| Road engineering | - | 15 |
| Commercial uses | - | 4 |
| Coastal engineering | - | 53 |
| Other | 15 | 286 |

Table 1: Number of articles reviewed based on term use and their research focus

and sense of place (Chalmin-Pui et al., 2019) are key in shaping front garden designs, which in turn influence the provided ecosystem services.

Cultural ES are also the focus of many studies (23% of studies). Frontages are described as transitional zones between public and private areas, balancing intimacy and community (Vialard et al., 2020). Gawryszewska et al. (2023) found that, in Warsaw, cultural ES were a priority for designers. Some studies also mention the important role of frontages in creating lively and secure streets (Swapan, Marinova and Bay, 2018) , thereby suggesting that planners should concentrate on achieving active frontages, i.e. lively and transparent frontages which connect ground-floor activities to the street. Health benefits provided by frontages as they encourage spending time in nature were extensively explored by Chalmin-Pui et al. (2020)

This dominant focus on the owner's preferences in terms of design emphasizes the social-ecological nexus of green frontage zones and their cultural relevance in creating a sense of place. This focus stems from the private status of these spaces, which are under the strong influence of owners' decisions and only a few exterior regulations. This highlights the importance of considering the owner's and inhabitants' preferences when planning green frontages in order to foster a sense of identification with the project. This also underlines how those transitional spaces both play a role in the private and the public sphere.

*Provisioning and Regulating ES*

The second most mentioned type of ES is provisioning (27% of studies), which is related to habitat biodiversity. The focus is often set on the strong link between sociological aspects and biodiversity (Avolio et al., 2020; Minor et al., 2023). Moreover, social expectations for front gardens can limit plant biodiversity as owners aim to reproduce socially constructed aesthetics (Locke et al., 2018). Animal biodiversity is supported by front gardens, with species such as hedgehogs using those zones as habitats (Gazzard and Baker, 2022) and native bee populations as feeding grounds (Threlfall et al., 2015). Although tree canopy continuity is stronger in backyards with higher canopy cover and taller trees, front gardens are relevant to the overall canopy connectivity (Ossola et al., 2019) and habitat provision.

Regulating ES are covered in a lesser manner. Water infiltration (14% of studies) is mostly studied in the context of its degradation as conflicting uses such as car parking or owners' preferences for maintenance lead to a reduction of unsealed ground (Stone, 2004). Multiple studies have addressed the risk this causes at a large scale and researched the drivers of this process. Climate regulation ES is mentioned only in 8% of studies, but the benefits trees provide in streetscapes, in general, are extensively explored by literature, and their location in frontage zones supports this further (Nawrath, Kowarik and Fischer, 2019). Additionally, 18% of the studies don't focus on any ecosystem service at all.

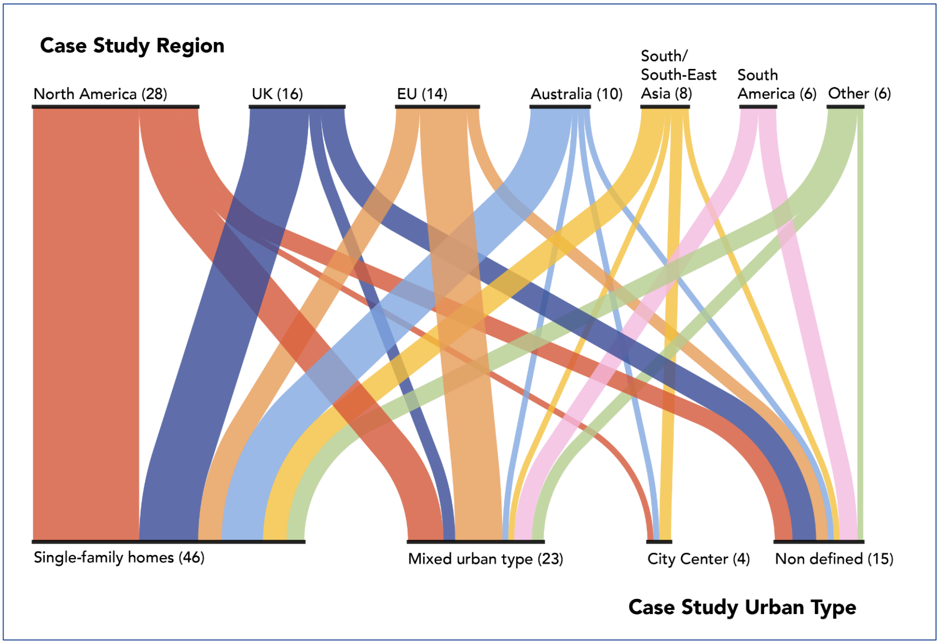



Figure 3: Results of systematic literature review based on the context of case studies and number of articles reviewed

The ecological services are central in planning BGI in cities as they have become a priority for climate adaptation strategies of cities (Pauleit et al., 2011). In the highly sealed environment of the street, green frontages are sometimes the only leftover green space, and their seiling or poor care can have a drastic impact on the area's resilience to climate stress (Laćan et al., 2020). Moreover, frontage zones can be beneficial for façade greening climate adaptation projects. This is, for example, integrated into a masterplan from the city of Stuttgart, which includes a requirement for a 50cm wide and, in some cases, 5m wide green strip along buildings for planting green facades (Stuttgart Masterplan Rosenstein 2022). Studies modelling ecological services of frontage zones and addressing their governance are limited and would be beneficial to support BGI strategies.

*Context of studies*
The articles were classified according to the urban typologies of the case study mentioned, which were either single-family homes, mixed urban fabrics or city centre types. The analysis underlines that urban types mentioned in the studies have an unbalanced representation in the literature corpus. There is a large representation of single-family houses urban fabrics (52 % studies), with caste studies located mostly in North America (18 Studies) , the United Kingdom (10 Studies) or Australia (7 Studies) . Mixed urban types with denser dwellings are less represented (26% of studies), and case studies are located predominantly in the European context (8 studies) and North America, with studies conducted at a city-wide scale (6 studies). The remaining studies either have city-centre case studies (4 studies) or do not mention a specific case study (15 studies).
The large representation of single-family homes' fabrics correlates with the strong focus on owner preferences and garden management, as these frontage zones are individual gardens managed by the homeowner or tenant. This topic is important as residential settlements often have very limited public space, and streets have little vegetation cover; however, urban spaces also consist of large areas with multi-family units in perimeter blocks, linear buildings or large building complexes urban fabrics (Zhu et al., 2022). The latter urban fabrics have a different governance structure and maintenance scheme for green spaces than single-family homes.

Another rarely mentioned urban type is non-residential areas such as industrial halls or large building complexes, which are also known for having setbacks and green frontages. Further studies on denser urban types are required to leverage the potential of frontage zones for the mitigation of heat island effects and the continuity of the BGI network.

*Relation to the street network*
A minority of studies address spatial characteristics of frontages at a neighbourhood and city scale (26% of studies). GIS methods enable some researchers to identify patterns and scale up results to understand the relevance of frontages at a neighbourhood scale. A typological approach can help to identify groups with similar characteristics (Gawryszewska et al., 2023), but studies with this approach are rare. Studies by Vialard et al. (2020) and Guyot et al. (2021) scale up results found on the plot level to the street and the neighbourhood level and identify how frontage zones are related to street hierarchy and urban fabrics. Some studies address the role frontage zones have in the streetscape by creating visual interest, canopy continuity, and participation in the sense of security (Heffernan, Heffernan and Pan, 2014).
Finally, studies rarely consider both ownership statuses and spatial continuity. Studies with a morphological approach consider mostly spatial and visual continuity of the street and frontages but disregard ownership status. On the contrary, studies focusing on social preferences concentrate mostly on private ownership of green spaces and rarely address the continuity with street green elements. From a planning perspective, this means that there is little scientific support for planning public street space and private green frontage zones in a symbiotic way.

**Conclusion**

This literature review has highlighted that there is a lack of clarity in the definition and use of the terms for frontage zones, leading to a fragmented discussion across disciplines. Further research on a spatial-ecological level is needed to support the implementation of BGI strategies with a valuation of the benefits of frontages in terms of ES and to model complex interdependencies in regenerative streetscapes. There is a need to extend research on dense urban types such as multi-family homes, which represent a large share of built spaces in cities worldwide and are particularly challenging regarding climate adaptation due to the lack of space. This calls for more studies that consider morphological and vegetation issues simultaneously. Finally, further research on the governance of the public-private interface of streetscapes is necessary to support practitioners with planning continuous BGI in streetscapes across ownership barriers.

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# Improvement of mobility environment for urban regeneration through integrating transit-oriented developments

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**Keywords**: transit-oriented developments, TOD suitability index, regenerative mobility, mobility environment

### Introduction

Mobility and transportation are an integral part of daily lives of the modern world. It provides people access to education, jobs, services, and goods. Transport systems affect the health of the population. Trip distance and ease of travel movement influence the need for car ownership and public transport patronage. These current systems bring not only large economic benefits but also large negative impacts on health. The negative effects are mainly because of car dependency, which can be reduced by shifts to public and active transport (Nieuwenhuijsen, Khreis, 2020). The usage of private vehicles for mundane activities and daily commuting affects the overall energy consumption and environmental impact (Bruck, Haslauer, 2013). The amount of generated greenhouse gas emissions increases with the number of vehicles in the urban area and can be reduced by deemphasizing the use of private vehicles. Moreover, active travel (walking or cycling for transport) is considered the most sustainable form of personal transport. Opportunities for active travel will greatly increase the reduction of mobility-related CO2 emissions of citizens. Making travel choices available is important in potentially reducing CO2 emissions, instead of being forced to always use private vehicles (Brand et al, 2021).

### Mobility, health and environment

In developing countries, a study by Thondoo et al. (2020) assessed common transportation solutions such as the light metro system, bus modernization scheme, and road decongestion program considering six citizen's needs extracted from the literature. The needs were the following: improvement of sidewalks, public spaces, green spaces, pedestrianization of strategic areas, centralizing street-vendors at bus stations, regulation of private vehicles in town. The three solutions only addressed three out of the six needs because they were not able to integrate active modes of travel, and the healthy and social co-benefits of transport. The emphasis on the economic agenda of transport infrastructure often overruns the collective benefits for the community. Therefore, better use of alternative transport infrastructure will occur if it is integrated better into the social and economic life of citizens. Citizen-centred approaches will create potentially equitable urban transport planning policies (Thondoo et al., 2020).
Moreover, in Berrill et al's study (2024) of European cities, three recommendations were given to reduce the greenhouse gas emissions and reduce car dependency. The solutions include concentrating future residential developments and population growth close to city centres, implementing measures to reduce car use and increase transit modal choice for longer trips, such as targeted solutions encouraging active travel and improving transit accessibility for disproportionately car-dependent population subgroups and trip types. These are all closely related to the integration of accessibility and integration of users into the public transport infrastructure. The restriction of urban development to a certain distance to the centre to increase density

can be tricky as poorly identified areas for development can potentially still induce longer trip distances, if they are farther from employment locations (Berrill et al., 2024).

The impact of transport infrastructure on the environment and health are well-known. . They range from beneficial (social connectivity, independence, physical activity, and access), to detrimental (air pollution, road travel injuries, noise, stress, urban heat island, electromagnetic fields, contamination, climate change, community severance, and restricted greenspace, blue space, and aesthetics) (Glazener et al, 2021). Over the course of that study, five new pathways connecting transportation and health were added such as, land use and the built environment, transportation infrastructure, transportation mode, emerging transportation technologies and disruptors, and inequity. These highlight the need for stronger interdisciplinary collaborations to further interpret the overlaps and interactions and help devise integrated strategies and solutions which address multiple issues, rather than focusing on isolated pathways. A narrow focus proves harmful as policy makers could induce "unintended consequences" by solutions targeted at isolated pathways (Glazener et al., 2021). Conversely, the environment impacts on public transport uses and pedestrianization, as showcased in a study done in Berlin, Germany where weather affects the willingness of commuters to use public transport. Therefore, convenience of using public transport, adoption of active transport, and protection from the elements will increase ridership and reduce the desires for car ownership (Nissen et al, 2020). In the Philippines, weather conditions range from extreme heat to torrential rain leading to floods. This presents a challenge to policymakers and planners to create transportation centres that cater to commuters and active transport users. Alternatively, this presents an opportunity to enhance the urban environment to reduce hot weather conditions and flood susceptibility. All these policy and land-use considerations and urban transport recommendations need to coordinate their developments to achieve the most benefits for all stakeholders involved such as public transport sector, travelling public, developers (commercial and residential), small-medium enterprises, and the like.

**Transit-oriented developments as regenerative landscapes**

Regenerative landscapes are any application of landscape architecture that aims to restore and improve a current man-made process. The processes of urban mobility and transport need cohesive and integrated planning concepts that shape urban areas to prevent negative impacts of urban development like environmental degradation, health risks, and socio-economic distress. Originally, transit systems were treated as key locations that are planned independently from their surrounding area. The surrounding areas usually try to adapt to the changes that the presence of a transit area brings. This leads to areas that are disjointed to their transit station that often create more issues like pedestrian inaccessibility, increased need for paratransit, and limited last mile options. TODs are strategically planned areas that aimed to concentrate jobs, housing, and services around public transportation stations (Salat, Ollivier. 2017). Policies should include equity of development wherein there are considerations for transportation, communication, and housing for all groups. This also entails providing adequate space for streets and public spaces, densification to promote sustainable urban growth, and a range of compatible land uses with a balanced mix of activities (Mogul, 2024).

There is a need for an urban transport system that answers the pressure of increased motorization, urbanization, and population growth. TOD model already integrate multi-modal transport accessibility and efficiency, pedestrian accessibility and conducive environment for public transport, and opportunities for equitable housing and varied businesses and employment opportunities. TODs therefore changed how transit areas are integrated into the urban fabric. The TOD Suitability Index (TSI) has been introduced to guide planners and related government units in determining the best development decisions for integrating a new TOD or improving an existing TOD in their area. It is a multi-criteria site analysis and assessment tool that considers three main values, using the 3V approach of Salat and Ollivier to split the index into three groups: Node, Place, and Market Potential. The Node value is focused on the accessibility, convenience of usage, and multi-modality of the transportation option of the area. The Place Value gives importance to the quality of the environment where the transportation options are located. This emphasizes on the usability and experience of the users. The Market Potential Value rates the potential of the area to accommodate optimal residential density, economic capacitation, and investor interest (Mogul, 2020).

The TSI is reliable for standard usage and flexible for more varied site conditions. Indeed, the criteria can be manipulated by the user about the specific requirements of the area being studied to add or remove any applicable/inapplicable items. The TSI summarizes the analysis and assessment of TOD requirements into a layman format for easier application of potential users that might come from different backgrounds. This opens more TOD type of planning to decision-making bodies in the local government units (LGU) and planning industry professionals. This tool can be used for both existing and future TODs study area and helps them in determining the priority items for development. Data gathered and analysed from using the TSI can be used in-depth specific studies would be needed to proceed further in the design process (Mogul, 2020). TODs create avenues for regeneration through the creation of liveable urban areas that have more sustainable mobility options to reduce environmental impacts of daily movement, accessible and permeable open spaces, and better pedestrian

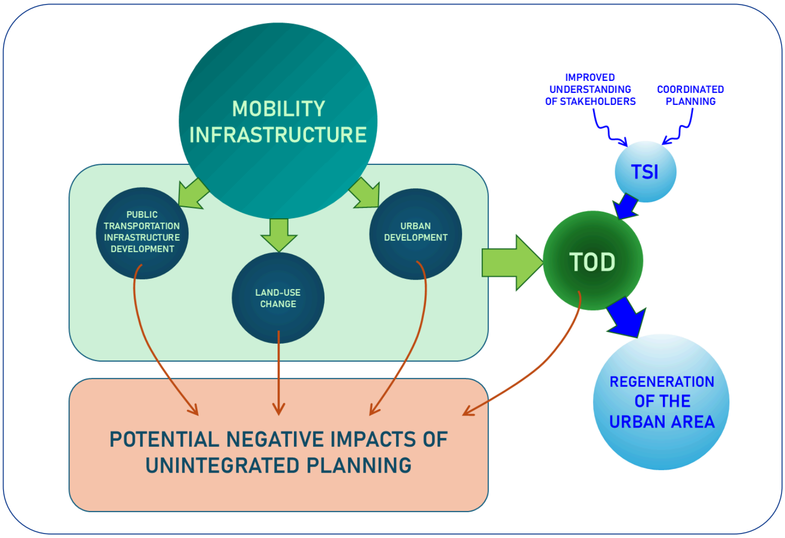

Figure 1: TSI reinforced TOD for Regeneration Diagram, source: author

experiences (See Figure 1). Typically, TODs are concepts generally perceived to be only applicable in cities and countries with better transportation infrastructure such as mass transit rail, bus rapid transport, and citywide tram systems. However, planning tools allow developing cities to properly integrate concepts and characteristics of TODs in given their current transportation and infrastructure condition. Specific transport situations must be considered in TOD planning and design to facilitate adoption of the concept by the recipients of the development. As shown in the case study of General Santos City, this is consistent with the acceptance of the TOD concept to be incorporated in the development of their comprehensive land-use plan (CLUP) for better urban mobility and quality of life.

**Regeneration of General Santos City**

General Santos City (GenSan) is the southernmost and 15th-most populous city in the Philippines. It is the regional centre for commerce and industry. As of June 2024, GenSan is updating the CLUP. Currently, the city is non-pedestrian friendly, affected by urban heat island, and traffic congestion in certain areas. The new CLUP aims for a walkable, pedestrian friendly city that integrates public transportation, reduces car use, and benefits from a generally better environment. The plan envisions a shift to electric vehicles for public transportation: electric jeeps (public transit mode up to 20 passengers) and tricycles (paratransit). Integrating transit-oriented developments (TOD) in the city will additionally increase the potential for better coordination of job generation, equitable residential opportunities, public transportation usage, private vehicle reduction, and smart mobility.

In May 2024, a TOD workshop was organized by the GenSan City Planning Office in coordination with the Philippine Institute of Environmental Planners (PIEP), CleanAir Asia, and the ASEAN-GIZ SMMR Project. During the workshop, the stakeholder engagement was high, and specific topics of interest were the integration of electric vehicles, and better pedestrian environment. Using the TOD Suitability Index, participants among different groups were able to identify several common locations that can be developed into TODs.

One of them intends to prevent all types of vehicles from going into the city centre and create a modal transfer station for public transportation coming from other provinces and municipalities. This will lessen vehicle count inside the actual city centre and create potential new commercial and residential concentrations around the new modal hub that can capitalize on the transient populations.
A second group looked at the implication of the desired shift towards electric vehicles (EV) in terms of the location of charging stations or battery swap stations. Indeed, some door-to-door routes of tricycles reach the maximum range of EV tricycles. This might entail the need for long waiting times that might affect the revenue of operators and drivers. Proper location of these stations will reduce the threat of running out of battery power before reaching the next charging/swapping station. The group envisioned that these locations could be designed as micro-TODs (mTOD) that are located in-and-around residential areas and can influence environmental improvements and commercial developments. mTODs will service the general community around it and will be conducive for increasing general interest for public transportation usage and reduce car dependence. Multi-modal, door-to-door mobility and quality first-last mile conditions are key to enhancing mass transit services and decreasing car dependency. This can also be achieved by encouraging active mobility (Hussin et al, 2021).

The City Hall area was also an identified potential TOD. It will create a pedestrian-centric administrative core that will be complimented with mixed use residential and commercial land uses. This will form stronger connections between the centre that has many employment locations, institutional establishments like schools and universities, and existing open spaces. Another TOD that was common among the participants was located in the future esplanade development along the Silway River. It is focused on the open space development along the river to develop mixed-use residential-commercial areas integrated with a public transportation node that maximizes the pedestrian accessibility and experience of the planned esplanade.

Last of the common specific identified TOD was suggested by a group of department heads, and commercial mall representatives which focused on a commercial hub TOD, initially dubbed as the GreenLoop, that is centred around major malls in the city. There were recommendations on elevated walkways to improve pedestrian connectivity between the malls. Although pedestrian connectivity is a positive development, without proper planning, there might be a lack of the other important key points of a TOD like public transportation integration, residential accessibility and densification, and job generation. The benefits of the TOD should not only be for the big commercial corporations, but the prioritization of spaces must maximize improvements to benefit all sectors and stakeholders. The GreenLoop TOD is currently slated to be further developed into detailed studies and planning by the LGU.

With the various examples presented of the output during the workshop, the regeneration of GenSan's urban landscape through the integration TOD in mobility planning brought together various stakeholders and community members in formulating better plans for enhancing the social, economic, and environmental quality for the city. Even in its infancy stage of planning and development, signs of change and steps towards regeneration of the city was observed because of the improved capacity and changed mindset towards sustainability of the city in relation to its transportation schemes.

**Conclusion**

The TOD is a planning methodology that is aimed to regenerate the urban environment from the impacts of unsustainable land-use, mobility, and transportation practices. However, to ensure that these will be developed consistent to the ideals of a regenerative landscape, various considerations of health, commuter comfort, active transportation safety, shifts in the urban planning and transportation infrastructure, residential and economic equitability and diversity, and better environment are some of the non-negotiable requirements. In the case of GenSan, the TSI served as a guide to help in the planning process to encourage more sustainable considerations of the potential developments. The data gathered and derived from the workshop spurred the awareness to the needs and wants of the stakeholders for TOD. The empowerment of stakeholders to contribute and act upon regenerative practices in their urban areas will allow them to sustain and maintain environmental policies and changes. TODs present opportunities where the landscape is not an afterthought within the urban ecosystem, but as part of the driving force urban regeneration through the planning of transportation and mobility infrastructure.

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# Disruption for regeneration: Transforming mobility practices through real-world experiments

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**Abstract**
At Higher Education Institutions, student and staff mobility significantly contributes to overall CO2 emissions. To design 'regenerative landscapes', mobility must be considered in context. For the last two years the research project EN ROUTE has used real-world experiments to investigate the connection between campus design and mobility at Osnabrück University of Applied Sciences, asking: How can real-world experiments disrupt unsustainable mobility practices in landscapes of higher education? (How) Can campus design influence this? In a transdisciplinary process, the researchers co-designed real-world experiments with students at campus. The group started disrupting the status quo by engaging with the landscape, intervening in it, adding new uses, testing new practices and inspire others through spatial changes. The experiments served as a communication tool and catalyst for a transformation process, vividly demonstrating how new uses of the campus could look and how they would alter mobility practices.

**Keywords:** Real-world experiments, living lab, campus design, mobility practices, educational landscapes, en route

Education-related travel accounts for 7% of all journeys in Germany (Nobis and Kuhnimhof, 2019). At Higher Education Institutions (HEI), student and staff mobility significantly contribute to overall CO2 emissions, with studies reporting shares of up to 91% of mobilty-caused CO2 emissions (Helmers, Chang and Dauwels, 2021). Thus, both spatial planning disciplines and HEIs are actively seeking effective strategies for sustainable educational mobility (Delmelle and Delmelle, 2012). In order to design strategies for these 'regenerative landscapes', mobility must be considered in context. Since the campus remains the centerpiece of on-campus universities, the research project EN ROUTE investigated the connection between campus design and mobility, exemplified by two campuses of Osnabrück University of Applied Sciences (HSOS). Today, one of the campuses is not a park for students but a car park for employees, showing that mobility practices have long been inscribed as routines in this urban mobility landscape. In between this status quo and 'regenerative landscapes' lies a vacuum. This paper presents a way to fill it and start a process transforming mobility practices in landscapes of higher education through real-world experiments. They generate transformative knowledge allowing collectively generated knowledge to be tested and applied within the research process (Schneidewind, 2018). These experiments aim at answering the questions: How can real-world experiments disrupt unsustainable mobility practices in landscapes of higher education? (How) Can campus design influence this?

The results of this paper were generated as part of the research project EN ROUTE at HSOS. In a transdisciplinary process, researchers from various disciplines use the HSOS as a case study to develop concepts and strategies on how students and teachers can be on the move in physical and virtual learning spaces and thus make educational landscapes more sustainable and resilient. This paper focuses on students mobility.

**Research Questions and Goals**
Osnabrück University of Applied Sciences defines itself as an on-campus university and serves as a model for analysing the relationship between campus

design and mobility. The research project EN ROUTE has developed a student typology, visualising the different needs of students regarding their learning preferences, their preferred learning spaces and their requirements at campus.

As centrepiece of the on-campus university following research questions are explored:

- Which requirements and functions must the campus fulfil to meet current and future demands for high-quality (on-campus) study?
- Can the campus enable further uses so it can become (even more/again) a place to stay between classes rather than commuting back and forth between campus and home and thus reduce mobility?

Based on previous research findings, the EN ROUTE research team co-designed two real-world experiments with HSOS students to implement various uses to the campus, addressing the needs of different types of students. These real-world experiments serve to generate tested and thus robust knowledge (Nowotny, 2000) of the required use extensions on campus (research objective). To ensure that this robust knowledge will be applied, the results are fed back to various university committees so that target group-specific strategies and recommendations can be developed in a joint process between the research team and the university as partner in practice (practical objective).

**Methods**

The project is designed as transdisciplinary, transformative research, using real-world experiments as one of the essential research methods. Real-world experiments are a comparatively young research method in transformative science. They intervene directly in real-world problem contexts and can therefore be applied at any scale (Schäpke et al. 2024). First universities use real-world experiments to make their campuses more sustainable. The Utrecht University in the Netherlands even institutionalised real-world experiments by founding their "Centre for Living Labs", serving "as a testing ground in which students, staff and societal partners perform real-world experiments to co-create solutions to complex sustainability related challenges" (Utrecht University, 2024).

Real-world experiments aim to initiate changes in people's perceptions and routines, to test and practise sustainable everyday practices, serving both the application of existing knowledge and the generation of new knowledge (WBGU, 2016). Three types of knowledge can be generated through these experiments:

- System knowledge, which refers to the analytical and descriptive knowledge about the status quo of a system.
- Target knowledge, which encompasses knowledge about the desired future developments of the system.

- ransformative knowledge, which pertains to the knowledge of how to achieve the transition from the status quo to a more desirable, sustainable state.

*System knowledge EN ROUTE*

A mixed-method approach was used to obtain valid findings. Based on an explorative qualitative survey, mobility diaries and semi-structured interviews as well as a qualitative content analysis and typology construction (Kelle and Kluge, 2010), six types of students were identified, which differ in terms of their study, mobility and living practices (Jutz et al., 2024). This typology served as tool for analysing all HSOS campuses, not only describing how the different student types already use the campus, but also to anticipate which uses are still missing.

*Target knowledge EN ROUTE*

The research project aims to develop sustainable strategies for the HSOS based on

- identifying needs-based (digital) and more sustainable teaching/learning scenarios
- identifying the potentials of the HSOS educational landscape for sustainable, multifunctional mobility.

*Transformative knowledge EN ROUTE*

Interim results are applied, reviewed, and discussed with stakeholders within the research process to achieve socially robust, tested knowledge beyond the status quo. In a transdisciplinary process, the EN ROUTE researchers co-designed real-world experiments with students at campus. The group started disrupting the status quo by engaging with the landscape, intervening in it, adding new uses, testing new practices and inspire others through spatial changes. While the developed student typology suggests which uses the campus needs to offer for the different student types, it is only through implementing the results that this can be fully clarified. This approach allows analyzing the impacts and feeding the findings back into the research process.

**Results**

Two consecutive real-world experiments were developed and conducted in co-design with students at HSOS campuses.

*Real-world experiment at Caprivi Campus (RWX1)*

RWX1 took place for one week in November 2023, investigating the relationship between campus design and mobility. The campus itself serves as an example of unsustainable mobility practices: instead of a park for students, the campus is a car park for employees. A state that is not questioned anymore. The co-design process with 21 students of various study programs – e.g., open space planning, administration, engineering – started by exploring and perceiving the campus through walks. The research team then encouraged the group to experiment with new, unusual uses and describe the changing


Real-world experiment at Caprivi Campus (RWX1):

- Exploring and perceiving
- Campus Walk
- Campus Living Room

Source: EnRoute

perception of the campus. Among the students, a process of active awareness and questioning the status quo began. Alternative forms of use became imaginable. Within three days, the group developed an idea for an experiment aimed at enabling other students to undergo the same learning process they experienced. They created a Campus Walk focusing on the unsustainable status quo of the campus design. At the endpoint of the walk, the group set up the "Campus Living Room", showcasing a social meeting point that was currently lacking on campus. Participating students mentioned in interviews that campus designs that encourage socialising would change their mobility practices. Rather than commuting back and forth between classes and home, more time would be spent on campus and thus reduce mobility. Based on this thesis, RWX2 was developed and co-designed with HSOS students.

*Real-world experiment at Haste Campus (RWX2)*
To verify the findings from RWX1, from the student typology and the campus analysis through application, following uses were added to the Haste campus for one week in June 2024. Since it was the last week before exams, the space concepts and uses were customised for this specific semester period. The following (re-)uses of existing buildings and outdoor spaces were implemented:

- *Hastelier:* In a light-flooded conservatory an open studio was applied, offering to complete upcoming semester assignments or to take a conscious creative break during learning stress. Some students met there for self-organised painting events in the evening.
- *Cafete:* The student-run bistro offered drinks and snacks after the campus cafeteria had closed. The relaxed atmosphere enabled conversations across different semesters and study programs. Every evening, a communal dinner was offered at a long table.
- *HQuschelecke*: In vacant containers, chill and relaxation rooms with seating and sleeping facilities were set up, offering students a private space to recharge between classes. Some students even took a nap or used it for making phone calls in private.
- *Campus Camp:* Eight big tents were placed on campus. Students could book them to spend the night and thus reduce commuting. Despite the rainy, cold weather all tents were fully booked almost every night.

Similar to RWX1, students began to discover opportunities to contribute their own ideas and add further uses. For example, some added sports by setting up a mobile table tennis or playing various sports on the lawn. Others added creative activities by playing music or painting silk-screen. Social activities such as playing board games and grilling marshmallows around campfire were also observed.

**Discussion**
The findings show that all involved actors – from facility manager to students – were challenged in their perspectives and disrupted in their routines,



Real-world experiment at Haste Campus (RWX1):

1. Cafete
2. Campus Camp
3. Hastelier
4. HQuschelecke

Source: EnRoute

enabling new forms of use. Even though initial assumptions about further uses on campus could be anticipated based on the student typology and campus analysis (system knowledge), verification was only possible through testing and implementing (transformative knowledge). Asking "What requirements and functions must the campus fulfil to meet current and future demands for high-quality (on-campus) study?", the high use of the modified spaces confirmed that more social meeting points, as well as inspiring learning environments and quiet spaces for relaxation are needed at campus. By adopting and intervening, participants added further uses, such as exercising, painting, playing. While the design and aesthetics of the real-world experiments appealed to certain student types and expanded their possibilities of campus uses, the EN ROUTE research team must critically ask whether this design discouraged other student types from participating.

The question "Can the campus enable further uses so it can become (even more/again) a place to stay between classes rather than commuting back and forth between campus and home and thus reduce mobility?" can only be partially answered. A basic requirement is that the university supports the idea of a multifunctional campus and creates opportunities as well as conditions promoting a culture of experimentation. HSOS actively supported the co-designed real-world experiments with the necessary scope of action and approvals. If the real-world experiments set the starting point for further uses so the campus can become a place to stay beyond classes needs further investigations. One indication that this is the case is the participants' wish for permanence of the applied spatial changes. A 'regenerating back' to the former status quo is neither desired nor possible since the "Hastelier" and the "HQuschelecke" permanently remain at campus. The EN ROUTE research team will continue to investigate the use of these spaces. Beyond the spatial permanence, the real-world experiments also served as a communication tool and reason: The experiments attracted the attention of the university's social media team. They interviewed members of the research team and shared a video on the HSOS Instagram account, promoting the real-world experiments. The Dean's Office team invited the research team to share their initial impressions and experiences from the real-world experiments at the Faculty Day, showing that the topic had been placed on the university's agenda.

In addition to these aspects of communication and agenda setting, further developments were initiated at HSOS through the real-world experiments: Inspired by the Campus Camp, campus-near housing is now considered for a future university construction project. Furthermore, the research team got several requests for borrowing the tents of the Campus Camp for specific purposes in the future (e.g., international workshops), enabling temporary overnight stays on campus.

The real-world experiments served as a catalyst for a (still ongoing) transformation process. They vividly demonstrated how further uses of the campus can look and how it would alter mobility practices, starting by disrupting the status quo.

**Conclusion**

Asking "What requirements and functions must the campus fulfil to meet current and future demands for high-quality (on-campus) study?" this paper presented real-world experiments as a tool to envision and to test further uses of the campus in order to become a place where students stay between classes rather than commuting back and forth between campus and home and thus reduce mobility. Through the transdisciplinary process, participating students were inspired to contribute own ideas and add missing uses, which qualify campuses not only as places of learning but also as places for social interaction, exercise, and creativity. Through real-world experiments, system knowledge was tested and applied, generating socially robust transformative knowledge about sustainable campus transformation. The caused disruption enabled various university members—from participating students to the janitor—to gain experience with new, more sustainable routines. A 'regenerating back' to the former status quo is neither desired nor possible as two of the spatial changes – the Hastelier and the HQuschelecke – permanently remain on campus. The findings suggest that campuses have to be understood and developed as hubs not only in the context of sustainable mobility but also for an integrative approach to design multifunctional university campuses both in a regional network and their direct neighbourhoods.

**Cross-cutting questions**

*Regenerative Landscapes: How might we define them?* "Regeneration" is defined as the ability of (eco)systems to reverse a change caused by disruption. In the escalating climate crisis, 'regenerating back' to the status quo is obsolete. It is time to focus on disruption. To transform unsustainable mobility practices, real-world experiments were developed in transformative research (WBGU 2016).

*Regenerative Landscapes: How do they work?* Transformative research generates system knowledge of what is (status quo), target knowledge of what should or should not be (future vision) and transformative knowledge of how to get from the status quo to the future vision. Real-world experiments serve as a way to generate the latter by testing and applying the collectively generated knowledge within the research process (Schneidewind 2018).

*Regenerative Landscapes: Why do they work?* Real-world experiments are characterised by co-design, co-implementation and co-evaluation (Wanner et al. 2018). The latter empowered the students to become researchers themselves, documenting the real-world experiment in writing and photos, conducting interviews with participating actors and analysing surveys. They then presented their findings to a group of students and lecturers.

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# Foodscapes

# Foodscapes

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**Introduction and reflection**
Food-related activities have shaped the relationship between humans and their landscapes since the dawn of civilisation. Historically, this interaction maintained a balance between human societies, food production, and the environment. However, industrialisation and urbanisation have disrupted this equilibrium. Today, food systems are embedded in global networks of material flows, creating disconnection from the finite natural resources, such as soil and waterm, that sustain them. The need to transform food systems, both locally and globally, is critical to address converging crises in biodiversity, climate, water, public health, and food security. Modern foodscapes are characterised by this disconnection, with production and consumption often separated by vast physical and cultural distances. This fragmentation has weakened local and regional food systems, contributing to high carbon emissions, diminished climate resilience, and biodiversity loss. Conceptualising landscapes as "foodscapes" provides an integrated framework for reconnecting people with their environments. This approach promotes sustainable food systems by addressing ecological, social, and cultural dimensions.

Agroecology emerges as a foundational approach to this transformation. By integrating ecological principles with social equity, agroecology addresses structural inequalities and fosters sustainability across the food system. Unlike industrial agriculture, it prioritises biodiversity, soil health, and community-driven practices. However, caution is necessary regarding terms like "regenerative agriculture," which are increasingly appropriated by corporate-led sustainability agendas, risking dilution of their transformative intent.

Recent global crises have highlighted the vulnerabilities of food systems. The 2008 agricultural price crisis, multiple health emergencies (e.g., BSE and avian influenza), and disruptions caused by Russia's invasion of Ukraine underscore the fragility of global food supply chains. Speculative practices and logistical barriers have exacerbated these challenges, further destabilising food security in many regions. Addressing these issues requires a shift from top-down policymaking to context-specific, localised strategies. Organisations like IPES-Food advocate for a city-region approach, recognising that system change is more feasible when driven by local governance and community-led initiatives. This model responds to increasing urban demand for healthier, more sustainable diets while integrating territorial approaches such as urban agriculture, farmland preservation, and local food procurement for institutions. Agroecological urbanism reflects the shift from global policy frameworks to tangible local action.

In this track of the ECLAS 2024 Conference, participants explored the relevance of foodscapes within the fields of landscape architecture and spatial planning. Discussions ranged from EU-level policies to experimental gardens in densely built neighbourhoods, highlighting how foodscapes serve as critical interfaces between ecological, cultural, and social dimensions of sustainability.

At the international level, the European Union's Urban Agenda and its Thematic Food Partnership demonstrate how high-level policies can be bridged with local food system innovations. For instance, cities like Ghent and Vitoria-Gasteiz exemplify integrated urban food policies that align grassroots initiatives with EU objectives. These policies highlight the potential for urban and peri-urban foodscapes to address multiple challenges, including climate resilience, food security, and biodiversity loss. Regional studies provide valuable insights into the interplay between food systems and sustainable development. In Portugal's Central Algarve region, for example, foodscapes have been integrated into urban planning to address environmental challenges and strengthen urban-rural connections. Drawing on the region's tourism-driven growth, this landscape-oriented approach fosters socio-ecological regeneration by preserving biodiversity and promoting sustainable practices.

In Sweden, municipalities are advancing integrated food policies to tackle rising food insecurity and climate challenges. Regional workshops reveal the need for tailored strategies that align local governance structures with broader sustainability goals. Similarly, in Matosinhos, Portugal, urban agriculture has been recognised as a vital tool for enhancing resilience. By mapping food-productive areas such as vacant lots and community gardens, planners have identified opportunities to integrate agriculture into green infrastructure. These spaces not only support local food systems but also address environmental and social challenges, offering a blueprint for sustainable urban ecosystems.
Urban agriculture has emerged as a form of regenerative infrastructure capable of addressing challenges such as urbanisation, climate change, and food insecurity. Research in Trentino-Alto Adige, Italy, demonstrates how integrating edible plants into urban green spaces revitalises abandoned areas, enhances biodiversity, and mitigates urban heat. Community-driven management systems generate economic benefits through zero-mile products while enhancing the social and ecological functions of urban ecosystems.

In Worcester, South Africa, rapid population growth, climate change, and food insecurity present significant challenges to urban planning. Research in this region explores regenerative food landscapes, proposing strategies to align food production with urban needs through collaboration with local institutions. A multidisciplinary approach underscores the importance of socio-ecological dynamics in crafting context-specific solutions.

Some cities have integrated food production into their urban development frameworks. For example, the Oosterwold project in Almere, Netherlands, pioneers self-organised foodscapes that combine urban agriculture with residential planning. Residents dedicate half of their land to farming, creating a model of self-sufficiency and sustainability. This innovative approach demonstrates how urban planning can enhance resilience while promoting community-led governance.

In India, urban farming addresses cultural disconnection from soil and natural ecosystems. By proposing Ecological Green Infrastructure as a designated land use, urban farming integrates food production with urban ecosystems, transcending colonial landscaping traditions and advocating for nature as a living entity within cities.

Foodscapes play a crucial role in preserving cultural heritage by maintaining traditional agricultural practices and culinary traditions. In Mexico, ancestral methods such as the Método del Chapín demonstrate the ecological and cultural significance of sustainable agricultural techniques. By combining these practices with regenerative building methods, they provide valuable lessons for integrating traditional knowledge into contemporary food systems.

In Antalya, Turkey, local observations reveal the intricate relationship between food, culture, and landscape. Sustaining these practices requires active engagement through education, policy, and community involvement to ensure that both heritage and biodiversity are passed to future generations. Similarly, historic markets in Palermo, Italy, showcase how foodscapes can preserve culinary heritage while fostering community resilience and promoting environmental education. In Lahore, Pakistan, traditional street vending exemplifies how food systems can balance accessibility and sustainability through adaptive practices.

Community gardens and peri-urban agriculture serve as vital tools for connecting inhabitants with agroecological food systems. The Horta das Flores community garden in São Paulo, Brazil, highlights the complexities of land tenure in urban agriculture. Despite municipal neglect and development pressures, local residents sustain the garden through collaborative management and environmental education.

In Bucharest, Romania, peri-urban agriculture is proposed as a solution to urban sprawl and climate challenges. Similarly, in Tamil Nadu, India, the Hortifarm market garden exemplifies a climate-smart landscape that integrates organic farming, biodiversity conservation, and community participation. These initiatives highlight the potential of localised foodscapes to address global challenges while catering to the specific needs of communities. In shrinking cities like Kobe, Japan, vacant land presents opportunities for urban gardening. Through initiatives such as the Vacant Land Bank, local

governments encourage the use of underutilised plots for food production. These efforts address food security while revitalising local communities. In Oslo, a permaculture garden employs regenerative practices, exploring ecological balance through storytelling methods inspired by Tim Ingold's "walking as a method." This approach reveals the productivity of regenerative landscapes and their capacity to integrate human and non-human actors.
To drive systemic change, capacity building is essential, not only for planners but also for local authorities, community members, and NGOs. Living labs offer a practical framework for embedding sustainable food planning into education and practice. By aligning academic curricula with real-world challenges, these labs foster collaborative problem-solving and societal impact. Experiences across five countries illustrate both the successes and challenges of integrating these models into higher education.

The discussions at the Panel: Foodscapes in the Regenerative Landscape conference highlighted the diversity of approaches required to foster sustainable food systems. No singular pathway exists; rather, engaged planners and communities must identify opportunities within local food systems and act where interventions can create the greatest impact. Whether through governance reforms, city-region planning, green infrastructure development, or the activation of productive peri-urban areas, foodscapes have the potential to become transformative agents for creating equitable and resilient systems. By connecting global frameworks with local action, foodscapes can redefine the relationship between humans and their landscapes.

Foodscapes co-creation session during ECLAS 2024, photo credits: Didier Vancutsem

# Almere Oosterwold
# A self-organised foodscape

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**Keywords**: Foodscape, Almere Oosterwold, Self-Organisation, Urban Agriculture, The Netherland's most planned unplanned area

**Introduction**
Oosterwold is a new peri-urban settlement situated at the fringe of the city of Almere in the Netherlands. It can be considered as a prime example for a self-organized foodscape and as pinnacle in Dutch urban planning with two key features. The first feature is the "self-organisation" ethos of the new community, which means that residents take the lead in organizing and developing their property, whilst the role of the authorities is to check that the residents keep to the rules. The second unique feature of this area is that 50% of the land, that is about 2,000 ha, is earmarked to urban agriculture. Oosterwold is regarded as a next practice example for an adaptive and self-sufficient planning culture and therefore nicknamed "The Netherland's most planned unplanned area". This article will explain both key features and their functionality in setting up and managing a regenerative and self-sufficient foodscape.

**Planning regenerative Foodscapes**
Oosterwold is a large, peri-urban area in the Dutch city of Almere, where the municipality has designed a planning strategy that allows residential development while retaining agriculture. In addition, Almere has set itself the goal of producing ten percent of its future food needs in this new area. Oosterwold therefore offers an interesting opportunity to observe planning practice when it comes to overcoming the conventional dichotomy of urban design and agriculture. It is also a unique case study for observing planning with and for urban agriculture. There are almost no other examples at this scale level, which have comparable features. Against this backdrop Oosterwold can be regarded as a prototype of Howards' Garden City concept, which remained mostly a utopian vision although it was critically acclaimed and gained international renown (Howard 1902).

Oosterwold is located on the eastern outskirts of Almere, the eighth largest city in the Netherlands and was established in the 1970s on the reclaimed Flevopolder. The Flevopolder was originally intended for large-scale conventional agriculture, primarily arable farming and livestock breeding. Due to the urgent need for housing, urbanisation is increasingly expanding in this agricultural area. Today, around 210,000 people live in Almere, the population density is almost 1,700 inhabitants per square kilometres and further population growth is planned. The Almere 2.0 master plan (Almere 2009) envisages around 15,000 new homes on an area of around 4,300 hectares by 2030, which are to be located on the Oosterwold polder close to the city. Prior to the planning of Oosterwold, spatial planning in Almere was a conventional top-down process that resulted in an urban expansion that was strictly separated from the agricultural hinterland (Jansma and Wertheim-Heck 2021). The first years of Oosterwold' s planning were still in line with conventional planning practice, which is reflected in the official planning documents.

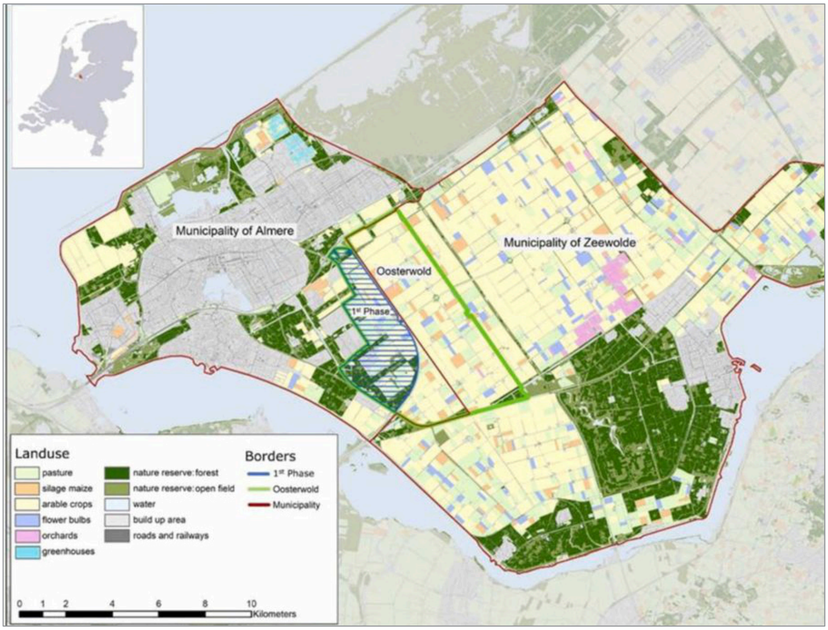

Figure 1: Basemap of Almere Oosterwold

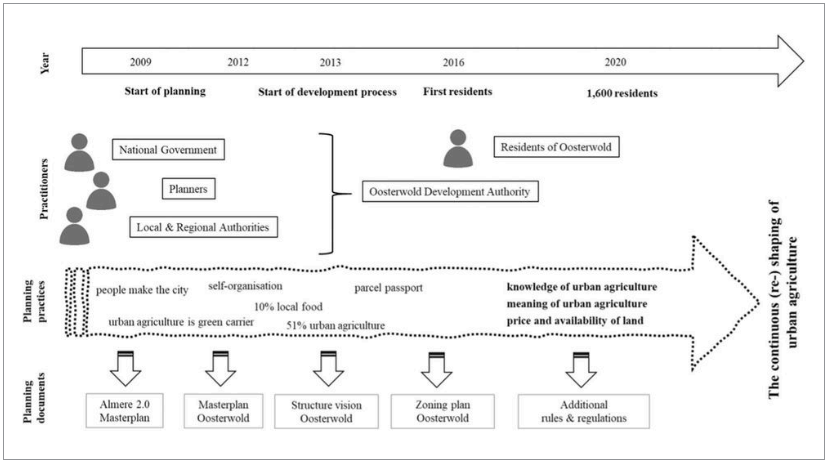


Figure 2: Planning Process in Oosterwold, derived from: Jansma and Wertheim-Heck, 2022

Figure 3: Drone Shot of Almere Oosterwold (Daniel Münderlein)

However, the planners paved the way for a participative and co-creative planning process, which is open-ended and iterative. Oosterwold' s planning process has two unique features.

Firstly, the development of Oosterwold is not determined by a detailed and descriptive plan, but by the self-organisation of the residents. Oosterwold includes not only the planning and building of the residents' houses, but also the individual or cooperative self-organisation of all kinds of infrastructure and facilities that are normally provided by municipal institutions. This self-organisation process is governed by a set of formal rules and regulations.

Secondly, the planning of Oosterwold aims to combine rather than separate agriculture and housing. The master plan for Oosterwold (Almere 2012) integrates urban agriculture in the local green infrastructure and aims to produce ten percent of Almere's future food needs in Oosterwold. This goal resulted in a spatial plan that allocated 1,869 ha, or 51 percent of the available 3,645 ha, to (urban) agriculture. This means that every new resident in Oosterwold is obliged to dedicate at least 50 percent of his/her plot to urban agriculture.

**A Parcel Passport for Ecosocial Diversity**

To support the development of a diverse landscape with different forms of urban agriculture, the planners have divided the polder into different types of plots that residents can purchase and farm themselves. Buyers of an agricultural plot, for example, must reserve approximately 80-90 percent of their plot for urban agriculture and may use no more than seven percent of the plot for a house, shed and yard. When purchasing a standard or commercial lot, a buyer should set aside approximately 50-60 percent of the lot for urban agriculture. The exception is the landscape plots, which do not require urban agriculture. In order to manage and control the development of urban agriculture in Oosterwold, a parcel passport was developed, which can be understood as a contract, that legally binds the new plot owners to all spatial and plot-specific development rules. For example, the parcel passport defines the spatial division of the different functions of the plot (Jansma and Wertheim-Heck 2021).

**Managing Self organisation**

With the self-organisation of the future residents, an innovation was introduced in planning practice. Originally, the professionals of the Oosterwold Development Agency (ODA) were the only stakeholders. Since 2016, however, a new and fast-growing and diverse group has been involved in the planning process in Oosterwold. These new residents organized themselves in formal and informal groups to share data, experiences and knowledge and to collaborate on the development of roads and housing, but also to negotiate with the ODA on the interpretation of rules and regulations. An example of a formal group is the street association, where

Figure 4: Drone Shot of Almere Oosterwold (Daniel Münderlein)

Figure 5: Self-sufficient building with kitchen garden (Daniel Münderlein)

residents using the same street must organize to coordinate construction and maintenance. An example of an informal group is the Oosterwold platform, which is considered by residents to be their unofficial interactive learning community and consists of several working or learning groups. Despite its informal status, this platform meets regularly and officially with the ODA. Negotiations with residents and their interpretations have in some cases led the ODA to reformulate or adapt the rules and regulations. The interactions between the actors involved in the planning process - the ODA and the residents - have shaped the planning practice and thus the way agriculture is being transformed in Oosterwold.

**Planning with and for Urban Agriculture**

Although many studies recognize that peri-urban agriculture is important for food supply and food security in the urban region, its potential is often overlooked or marginalized by urban planning. Concepts like Garden City (Howard 1902) or Broadacre City (Wright 1944) proposed ideas for agri-urban settlements, which were rarely realized on a larger scale.

Prevailing planning practice and planning paradigms are still based on the dichotomy of agriculture and urban development. Agriculture should take place in areas reserved for it and several studies highlight that dealing with (peri-)urban agriculture is a challenge for urban planning. It is assumed that there is a lack of strong visions beyond political traditions in order to overcome the dichotomy between urban and rural areas. Spatial planning focuses primarily on the aesthetic qualities of the green urban fringe rather than the agricultural functions (Münderlein and Pszola 2024). The development of updated and comprehensive agri-urban visions is still up in the air (Münderlein and Pszola 2022). Against this backdrop it can be stated, that convincing spatial images for foodscapes are a necessity to activate new types of public policies and innovative forms of governance (Pszola et al. 2021).

As a basis for spatial planning with urban agriculture, a comprehensive typology is proposed that describes and characterizes it (Jansma et al. 2024). For the development of foodscapes such as Almere in peri-urban areas, it can be stated that peri-urban farming is characterized by a heterogeneous pattern of holdings with intensive and specialized production, high participation in diversification, and low-intensive hobby and lifestyle-oriented farms. Against this backdrop, three generic types of peri-urban agriculture can be extracted: (1) garden farming, (2) multi-functional farming, and (3) conventional farming (Jansma and Wertheim-Heck 2022).

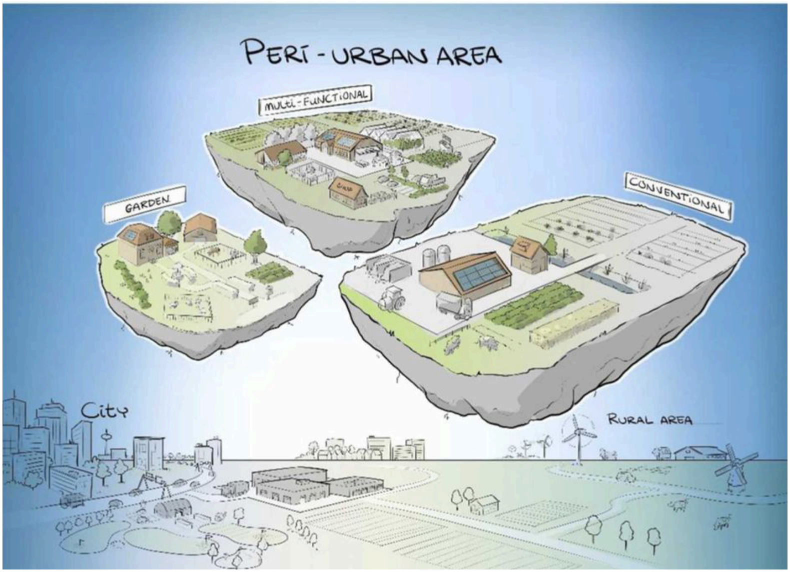

Figure 6: Exemplification of the three types of farming in the peri-urban area
(derived from: Jansma and Wertheim-Heck, 2022)

These basic types are cleverly combined in different ways and characterize the foodscape of Almere Oosterwold. The associated planning for peri-urban agriculture requires participatory processes to develop sustainable local foodscapes from these agricultural patterns with the involvement of numerous stakeholders. Three aspects of this participatory process in Almere had a major influence on the design of the foodscape.

The first aspect is related to the planning practice, which is based on basic development rules as the parcel passport, instead of imposed prescribed regulation. This stimulates and facilitates creativity in different ways. In Oosterwold we can observe creativity in a spatial sense as well as in entrepreneurship and building style. It shows that integrating agriculture into urban planning is possible and contributes to a multifunctional, productive and attractive landscape. The planning practice stimulates new types of entrepreneurships (e.g. a farmer developing housing on his property), which result in new communities such as an area cooperative in food.

The second aspect is related to the distribution of land, in particular the measures for pricing the land and the spatial allocation of the different types of plots. It can be assumed that the rising land prices have had impacts on the acquired cultivation area per plot, as the investment capacity of the new residents has not increased to a comparable extent. The resulting smaller cultivation area means fewer opportunities for farming per plot, which inevitably contributes to residents concentrating on small-scale cultivation (kitchen garden as type 1 garden farming).

The third aspect is related to the skills and knowledge of the new inhabitants of the foodscape. The residents appeared to be predominantly newcomers to (urban) agriculture, which still must gain agricultural know-how. It is not to be expected that these non-experts would immediately start and experiment with new forms of agriculture on their plots. For example, the inexperienced gardeners and farmers who are at the forefront of the first phase of Oosterwold could benefit from more experienced actors and infrastructure that support the local development of know-how and skills in agriculture.

This would be the basis for the multifunctional agriculture in Oosterwold, which was foreseen in the masterplan.

Influenced by the three aspects mentioned above, the planning practice in Oosterwold can be considered as an open and iterative process, which still offers opportunities to include a wider range of agricultural activities in the area. Unique in the planning with and for urban agriculture process is the shared effort of residents, farmers and planners. This is based on a redistribution of responsibilities and involves negotiating each stakeholder's position in the process of development. This goes way beyond defining and drawing a new productive area, which is traditionally considered a task of landscape planners.

**Conclusion**

Oosterwold can be understood as a unique breeding ground for the development of a self-organized foodscape, which produces new spatial images, a hybrid of urban and rural structures as well as governance structures, which emphasize self-organisation. The context of Oosterwold is not easily comparable to many other urban regions, and its planning practice is not yet a universal blueprint for the simultaneous development of urbanisation and the promotion of agriculture in peri-urban areas. But the scale level on which Oosterwold operates is unprecedented and daring. The merit of its planning practice is the exploration of new principles for planning peri-urban agriculture and broadens our understanding of self-sufficient neighbourhoods. Oosterwold expands the toolbox of urban design and landscape planning for the sustainable and participatory development of foodscapes.

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# The possibility of building a small local food system through urban gardening using vacant land in shrinking cities: A case study from Kobe, Japan

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**Introduction**

In shrinking cities, the problem is how to deal with scattered vacant land as the population declines. It is necessary to move away from top-down urban development and encourage a precise optimization process by local residents to restore the city to a desirable state on a smaller scale. The regeneration of abandoned places in cities can also reduce stress levels of residents (Escolà-Gascón et al., 2024). Greening of vacant land could lower crime prevention costs (Sadatsafavi et al., 2022). Shrinking is a challenging situation, but a chance to regenerate cities as well.

The concept of a regenerative sustainability paradigm is suggested by Du Plessis and Brandon (2015) as strengthening the health, adaptive capacity, and evolutionary potential of the fully integrated global social-ecological system. By this, built environment can open up new opportunities for growth and development within communities and their ecosystems, reintegrate human habits and habitats with nature and obtain tools for reflection that enable the making of wise decisions (Du Plessis and Brandon, 2015). In this sense, 'regenerative landscape' can be defined as landscape to realize such a paradigm.

There is a movement to use vacant land for urban gardening to revitalize food systems and local communities. Such gardens can be regarded as "regenerative landscape" because urbanized spaces can be redesigned in harmony with nature and modify the design with flexibility. The gardens can function for food self-sufficiency, biodiversity enhancement and climate mitigation, which is important for tackling human and ecological issues in an integrative way. Focusing on food security, while there has been a focus on urban gardening in the past due to rapid urbanisation and population growth, particularly in developing countries, its importance for regenerative cities has been further heightened by the supply chain disruption caused by COVID-19 (FAO, n.d.). From the perspective of earthquakes and other disasters, securing spaces for urban gardening is also important for emergency nutrition (Sioen et al., 2017). The system to promote the use of vacant land for urban gardening should be developed and assessed in this sense.

In Kobe City, a Japanese metropolis at the forefront of shrinking (Fig 1), urban gardening is being promoted under the name of "Gastropolis" while the city's agriculture and fisheries are also being promoted. The city has also established a system to support the use of vacant land for community use, subsidizing maintenance costs and providing guidance. Landowners can register their land to "Vacant Land Bank" and people can apply to use the vacant land of their choice (Kobe Smile Net, n.d.). Examples of community uses suggested by the city are childcare spaces, cafe for the elderly, community rest areas, meeting places, free meal spaces for children, libraries and community gardens. This study determines the productive potential of vacant land registered in the system.

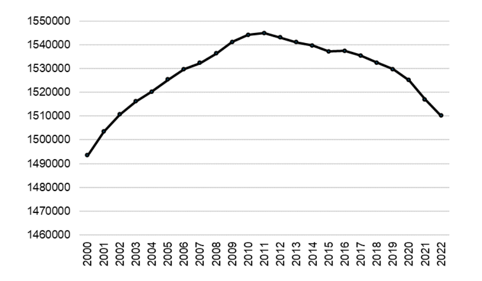


Figure 1: Population of Kobe City (Kobe City, 2023a)

Table 1: Registered information of vacant land

| Basic information | Landowners' intentions regarding utilisation |
|---|---|
| Location | Form of contract (sell/rent, free/charged) |
| Access (nearest station) | Available part of the land |
| District of elementary school | Availability of modification |
| Area [$m^2$] | Available period |
| Photo of the land | Desired sale price/rent |
| | Things to tell users |

Discussions on shrinking cities continue in American and European cities for a long time (Martinez-Fernandez et al., 2012). For example, in Western Europe, public programmes and funding have fostered a reuse of vacant space for redevelopment in inner urban areas or as a way to introduce green structures, improve the quality of life and functioning of urban ecosystem services (Großmann et al., 2013). On the other hand, recently many of Asian cities are also facing with rapid decreasing birthrate and population declining (Ryan, 2019). It is important to investigate the phenomenon of urban shrinkage globally and discuss the theory of measures. This case study in Japan will provide hints for necessary administrative support needed for the bottom-up use of vacant land.

**Methods**

The author collected data on registered vacant lots through online information (Table 1) as of January 1, 2024 and determined whether they could be used for urban gardening. Specifically, it was assumed that any size of lot could be used for urban gardening, taking into account the use of raised beds as well as direct cultivation of the land. Cases that were considered too steeply sloped and that were forested and considered difficult to cultivate were excluded. This study does not account for soil contamination by assuming that the soil would be replaced.

The production potential food self-sufficiency of each vacant lot was calculated. Based on a previous study of the production potential of allotment gardens, it was assumed that 4.16 kg/$m^2$ of vegetables can be produced per year (Tahara et al., 2011). The average annual household vegetable consumption in Kobe City from 2020 to 2022 was 166.261 kg, which is derived from the statistics provided by the Statistics Bureau of Japan. The self-sufficiency X is obtained by the following formula. In the formula, S represents the area of a vacant lot.

$$X=S*4.16/166.261$$

In addition, in order to explore the potential for future urban gardening use of vacant lots, we determined how many organizations and volunteer groups looking for vacant lots were registered as of June 30, 2024, and how many of these groups were interested in using the lots for community gardens.

**Results**

In the system, 20 vacant lots were registered, and based on the condition of the photos, 16 were considered to be suitable for urban gardening. Three of the rest were too steep and forested, and one was too forested. 10 of the selected cases were located within 15 minutes' walk distance from a train station. The size of the lots varies. The smallest lot of the

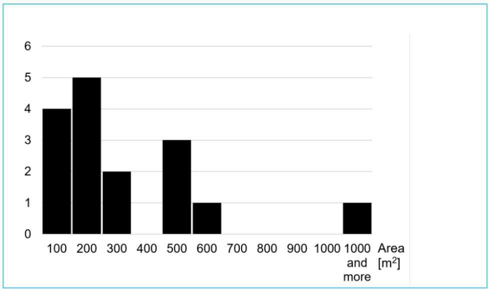


Figure 2: Histogram of area of the registered vacant lots

selected cases was 40 $m^2$, the largest was 2,769 $m^2$, and the median was 180.71 $m^2$ (Figure 2).

The vacant lots had the potential to produce fresh vegetables ranging from 165 kg to 11,5 kg, which are equivalent to average consumption for from 1 to 69 households (median: 4.5 households). It was shown that 70% of the vacant lots were less than 500 $m^2$, i.e., the majority of the vacant lots could supply vegetables for up to 12 households. There were 41 organizations/volunteer groups that are interested in utilizing vacant land, 16 of which are interested in using the land as a community garden. It was not possible to determine in this study why they were not matched with vacant lots that are currently registered and listed, as each organization would need to be contacted.

**Discussion**

Although the sample size was small, it was found that the size of vacant plots registered in the vacant land bank varied, as did the amount of vegetables that could be produced from them. However, 70% of the plots are less than 500 $m^2$ and could generate a supply of vegetables for up to 12 households, which means that they have the potential to become food hubs for small neighbourhood communities. In Kobe City, demolition is subsidised because of the significant decline in the population and the risk of collapsing and crime if the resulting vacant houses are left unattended. Therefore, the number of vacant lots is expected to increase in the future. Since the percentage of vacant houses is skewed toward wards further away from Osaka, the second biggest city in Japan (Kobe City, 2023b), there is a possibility that vacant land tends to arise and could be used for food self-sufficiency, especially in more inconvenient areas to live in. Considering the withdrawal of supermarkets and the difficulties in maintaining public transport such as buses, the use of vacant land for urban gardening should be actively considered.

The fact that 41 groups were looking for vacant land to create a community garden indicates that the use of vacant land for urban gardening may spread if the matching of land and prospective users is made smoother. It was not clear from the registration information what kind of access, area, and surrounding environment the groups would be willing to use. If these conditions are identified, they could be introduced into a GIS-based vacant land assessment system (Zhang and Park, 2023) to display suitable sites at a glance.

In terms of evidence on food system restructuring, this study employed the data obtained in the suburbs of Tokyo to determine how much vegetables can be produced by citizens who are not professional farmers (Tahara et al., 2011). Since this value varies depending on the local climate, if data on production potential is collected for each region, it should be possible to calculate in various places how much self-sufficiency can be achieved if vacant land is used for urban gardening.

In this study, the use of vacant land for gardens has been evaluated from the perspective of bringing food production back to the city, but in order to consider such spaces as ‘regenerative landscapes’, the design of harmony with nature should also be considered. Unlike conventional agriculture, gardening with ecological considerations may change the production potential. The situation will be even different if spaces are designed in response to climate change – e.g. pergolas are installed to create cooler spaces in response, or if extra land for rainwater infiltration is also provided. It will be necessary to acquire new data, for example, on how much vegetable production will change if the idea of permaculture is adopted.

**Conclusion**

If properly used for urban gardening, vacant lots can contribute to some extent to a local food system at the neighbourhood level. In other words, it is currently difficult for many households to replace all of their vegetable purchases, but as the population declines and more land becomes available, more gardens will be created and more households will have access to the food they grow. In fact, there are already a growing number of examples of vacant lots that have been transformed into urban gardens. Local governments need to strengthen support systems to encourage the use of increasing vacant lots.

As future research challenges, given the small sample size of vacant lots in this study, the results need to be validated in other cities. There are other cities in Japan, such as Kashiwa City, that have a vacant land bank system and are encouraging its use for community gardens. It should also be verified in other countries. In addition, in order to match vacant lots with potential users, it is necessary to interview potential users about conditions such as access and surroundings to determine what type of land they would be willing to use for a community garden.

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# Seeding change: The EU Urban Agenda's Thematic Food Partnership as a catalyst for bridging high-level policies and grassroots food system innovations

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**Abstract**
This paper explores the transformative role of the EU's Urban Agenda through the Thematic Food Partnership, whose mission is bridging the gap between high-level EU policies and grassroots food system innovations. The crucial role played by cities, exemplified by notable examples such as Mouans-Sartoux, Vitoria-Gasteiz, and Ghent, in shaping and implementing integrated food policies cannot be overstated. These cities serve as inspirational models of how local initiatives can drive transformative changes in urban food systems. Within the framework of the Urban Agenda for the EU, the Food Thematic Partnership assumes a pivotal role in supporting and amplifying these efforts. Its mission is not only to bridge the gap between high-level EU policies and grassroots food system innovations but also to actively contribute to the resilience of the European landscape. By aligning local innovations, best practices, and policies with broader EU objectives, the Food Thematic Partnership creates a synergy that fosters the sustainability and resilience of urban landscapes. Through collaborative partnerships among cities, regions, academic institutions, and other stakeholders, this partnership catalyses the development of regenerative foodscapes that are in harmony with the principles of the EU's Urban Agenda. In conclusion, the partnership's support for European landscape resilience is not just a strategic choice; it is a necessity as the integration of urban food policy becomes an imperative path forward. The role of cities and the dedicated efforts of initiatives like the Food Thematic Partnership are instrumental in shaping a more sustainable and resilient future for European landscapes.

**Ex-Ante Assessment (EAA)**

The European food system's reliance on global networks and corporate agro-food business players presents significant vulnerabilities inadequately addressed by current policies. The absence of overarching legislation on food systems, as highlighted in the IPES report "Toward a Common Food Policy" (2019), underscores this gap. Although the need for a systemic approach to food at the EU level is recognized, its implementation remains limited.

The Urban Agenda for the EU (UAEU) was launched to enhance the quality of life in urban areas by fostering sustainable and integrated urban development across the EU. It aims to promote better regulation, funding, and knowledge exchange among cities, regions, Member States, and the European Commission. The Thematic Partnerships within the UAEU bring together these stakeholders to tackle specific urban challenges through collaborative efforts, developing Action Plans that propose concrete measures for improvement.
The Thematic Partnership on Food within the UAEU focuses on narrowing the divide between overarching EU policies and grassroots innovations in food systems. It advocates for acknowledging and strengthening various local food systems and their potential to foster equitable and sustainable practices through relocalisation and re-territorialisation. A strong multi-level governance framework within the EU is essential, with the partnership aiding cities in formulating comprehensive food policies.

The article is based on the critical interpretation of the ex-ante assessment (EAA) on the Food Thematic Area conducted in 2023 for the Urban Agenda for the EU. The EAA involved comprehensive desk research, interviews, and participation in relevant events to gather information for establishing the UAEU Food Partnership. Publications, initiatives, and case studies were categorized and analysed to highlight policy trends, gaps, challenges, and best practices. Interviews with representatives from European Commission Directorates-General and key organizations provided deeper insights into the thematic area.

This preparatory work aimed to address critical challenges in food systems identified through fragmented policy frameworks, inadequate inclusion of externalities, food justice issues, and dependence on global supply chains, insufficient multi-level governance, and funding gaps. Based on the findings from the EAA, strategic directions and priorities were determined to address the identified challenges. These priorities are set to be treated by the upcoming Food Thematic Partnership and include the following:

- Develop an Overarching Policy Framework: Integrate various aspects of food systems into a comprehensive policy framework to guide the transition towards resilient food systems.
- Internalize Externalities in Food Pricing: Implement policies that reflect the true environmental and social costs of food production, making sustainable practices economically viable.
- Promote Food Justice and Improve Access to Land: Ensure equitable access to nutritious food and strengthen rural-urban linkages to enhance food system resilience and equity.
- Reduce Dependence on Global Supply Chains: Promote decentralized and diversified local food systems to reduce reliance on global supply chains.
- Enhance Multi-Level Governance: Strengthen coordination and coherence between EU, national, and local policies through multi-level governance frameworks.
- Support Effective Dedicated Funding: Create innovation funds for local food systems through collaborations with banks and NGOs.

Realisation of the Food Thematic Partnership in December 2023, the Food Thematic Partnership was formally established, marking a significant milestone in addressing urban food system challenges. Led by the City of Milan's Food Policy Department and the Lisbon Metropolitan Area, the partnership is strategically positioned to influence food policies and practices at the local and EU levels. The partnership comprises 21 members, including 10 cities, various national authorities, European institutions, NGOs, academic institutions, and other stakeholders. This diverse membership ensures a comprehensive approach to food policy across Europe.

This partnership’s broad representation of stakeholders ensures that various perspectives and expertise are integrated, allowing for holistic and effective solutions to the complex challenges faced by urban food systems in Europe. The collaboration among these diverse partners is aimed at fostering innovative and sustainable practices, ultimately leading to more resilient and equitable food systems.

**Conclusions**

*Bridging High-Level Policies and Grassroots Innovations:* The EU Urban Agenda's Thematic Food Partnership serves as a critical link between high-level EU policies and grassroots food system innovations. By focusing on cities' roles in leading food systems transformation, the partnership effectively aligns local innovations with broader EU objectives. The comprehensive assessment has demonstrated that cities are pivotal in driving sustainability, resilience, and equity through innovative policies and practices. The partnership's mission to support multi-level governance and participatory processes ensures that diverse stakeholders are involved, promoting transparency, accountability, and coherence. This inclusive approach is essential for addressing the complex challenges of the food system and fostering sustainable outcomes.

*The Role of Cities in Shaping Integrated Food Policies and Landscape Resilience:* Cities like Mouans-Sartoux, Vitoria-Gasteiz, and Ghent exemplify the transformative impact of local initiatives on food systems and landscape resilience. Through integrated food policies and supportive regulatory frameworks, these cities have successfully enhanced urban resilience and contributed to the regeneration of surrounding rural landscapes. The UAEU Food Partnership's emphasis on better regulation, better funding, and better knowledge empowers cities to develop comprehensive and effective food policies. By promoting collaboration and knowledge exchange between urban and rural areas within the city-region framework, the partnership facilitates the development of integrated approaches that address the complex challenges of food resilience at the local level.

*Innovative Multilevel Governance for Regenerative Landscapes:* The UAEU Food Partnership demonstrates the importance of innovative multilevel governance in creating regenerative landscapes. By integrating policies, subsidies, actors, and participatory processes, the partnership ensures the widespread adoption and sustainability of regenerative practices. Aligning local food initiatives with broader EU frameworks, such as the Common Agricultural Policy (CAP), the EU Sustainable Food Systems Framework, and the European Green Deal, reinforces consistency and mutual reinforcement of objectives. Financial incentives and collaborative networks support ongoing efforts to maintain and enhance landscapes, while local community involvement builds social capital and strengthens resilience. The partnership's strategic focus on better regulation, better funding, and better knowledge is instrumental in driving systemic transformation within the EU, ultimately promoting sustainable and resilient urban and rural landscapes across Europe.

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# Integrating education into living labs: The food planning experience

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## Introduction

AESOP4Food aims to regenerate landscapes adapting the concepts of agroecology and an agroecological urbanism. This is urgent because there is a need for a more inclusive and comprehensive pathway toward food system transformation, connecting social and environmental aspects of sustainability, which considers power inequalities and fair income for farmers, growers and processors. Our project includes a series of local living labs which contribute to the transformation of foodscapes, with more local food, short chains, food hubs, agricultural parks and closer connections between the city and the region. Our approach to regeneration works because it improves environmental quality by organic farming and proposes a wide range of spatial and organisational interventions that foster agroecology, food democracy and justice.

## Online seminar and living labs for food planning

Higher Educations programmes organise living labs (LL) to fulfil their third mission using a mix of research methods. In the Erasmus+ collaboration project AESOP4Food higher education institutes from Belgium, France, the Netherlands, Poland, and Spain partnered with NGOs. They delivered an open access online seminar on sustainable food planning. Connected to the course are a series of LLs. The online seminar focused on city regions and agroecological urbanism and was organised in phases: (1) exploring the field of play, (2) analysing your local foodscape, (3) collaborative goals and vision, (4) strategy and interventions, and (5) evaluation and monitoring. Participants could follow the course in lecture mode or also take up an assignment. The assignments for local students were connected to the LLs, and students who worked remotely could support the lab by answering a research question.

Linking an online seminar to existing university programmes and local LLs posed various challenges. Changes in higher education programmes take a long time, and programmes are not tailored to include thematic courses on current needs of society, such as sustainable food planning, renewable energy, climate adaption. Programmes are already densely packed and need to meet educational requirements for broader competences. The project met challenges for integrating the assignments into existing university courses, such as the timing of the lectures, intermediate and final presentations of the assignments, the difference with academic calendars, the difference in goals of local participants.

Organising a LL takes longer than the length of an educational course and to have impact needs to run at least some years. This meant that the online seminar had to connect to LLs which were in various stages of development: from the starting phase to a current process.

| Type of educational mode | comments | (1) exploring the field of play | (2) analysing your local foodscape | (3) collaborative goals and vision, | (4) strategy and interventions | (5) evaluation and monitoring. |
|---|---|---|---|---|---|---|
| Planning or design studio and project | Food planning can be part of an integrated planning studio by applying the concept of the 5 step studio | X | X | X | X | X |
| Bachelor / master thesis | Phases 1, 2 are most relevant for the problem definition and analysis. Phase 5 serves as back ground for whole process. | X | X | Depending on the discipline | Depending on the discipline | X |
| Research assignment | Phases 1, 2 are most relevant for the problem definition and analysis. If it is a participatory action research collaborative goal setting (Phase 3) and monitoring and evaluation (Phase 5) | X | X | X | | X |
| Internship supporting a living lab | Depending on the stage of the living lab. | X | X | X | Depending on the stage of development of the lab | X |
| Learner defined elective subject | It depends completely on the aim of the module which phases are relevant. Anyhow the first two phases and the final phase are relevant. | X | X | Depending on the subject or the task | Depending on the subject or the task | X |

Table 1: Linking teaching modes to phases of the seminar

**Connecting the seminar to an educational programme**

AESOP4Food aimed to integrate the course into existing curricula, either into an existing course or as an elective subject. The integration into existing courses was sometimes hindered by strict regulations on study content and objectives, which were not compatible with our learning aims. Many universities do not offer elective courses, and in these cases the seminar students had to follow the course as an extra task. Since the seminar follows the phases of design thinking it is best suited to a planning or design studio or project. Other types of teaching and learning modes could also be linked or could use the course material as is shown above in table 1.

For all learners, phases 1, 2 and 5 are the most relevant as they give an overview of the system, challenges and current developments. For learners who are active within the context of a LL the introduction on LLs characteristics, phases, roles and actors are informative. For those who carry out a research, the introduction to participatory action research is essential. Phase 2 presents various tools for mapping the food system, its actors and power mapping. The principles for monitoring and evaluation are relevant, even if learners do not carry this out in a collaborative way.

**Linking assignments to living labs**

The LLs serve as open platforms in an educational environment that aims to prepare students for the period after graduation, and therefore their future roles. This concept offers opportunities for higher education to work closely with professional practice and communities with the emphasis on innovation research in "real life".

When forming and running a LL, it is important to remember that it should be able to (1) facilitate collaborative research and learning, and (2) contribute to sustainable transition challenges. Participants collaborate within interdisciplinary groups to address real-world issues, taking on the role of engaged stakeholders in minor transformation processes, thereby engaging in valuable learning encounters (Schneidewind et al., 2016; Wiek and Kay 2015). The learning activity and its real-world impact could be organised as research-oriented learning or project-oriented learning. The different stages of LL organisation are described in the following section.

**Phases of the living labs**

The three main phases of the LLs are: establishing, operating and evaluating. These do not necessarily occur one after the other in linear order. In a process of setting-up, running and evaluating LLs a crucial

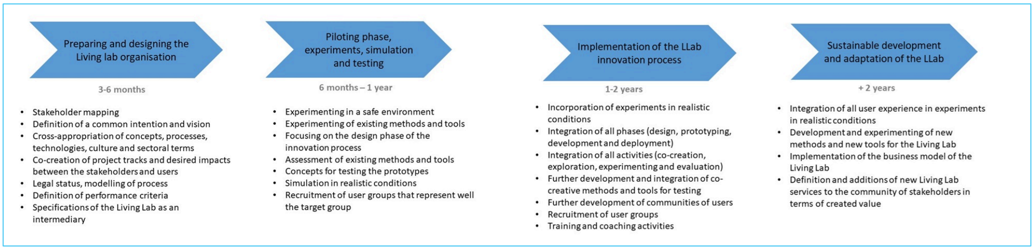


Figure 1: Phases of a Living Lab (LL) elaboration based on AESOP4food LLs experience and literature review (Bouwma et al., 2022; Homann-Kee Tui et al., 2013; Schut et al., 2017).

element is maintaining a significant level of reflexivity and transparency, facilitating reciprocal learning (Schneidewind et al., 2016; Scholz, 2000). The above can be fostered by iterative evaluation. Steps of the three main phases might be implemented in a different order and activities are repeated at various stages (Figure 1).

LLs develop over a longer period than a seminar or a semester-long teaching activity. Usually it takes several months to start up the lab, involve the actors, define the needs and challenges. In the first year, we structured the assignments according to the phases, with several moments of presentations. This provided a too strict harness for what was going on locally. In the following years we offered the assignment, while learners could choose their own pace. We also made a distinction between local learners and remote learners. For the latter, each LL provided several research questions of which they could select one.

During the lab process, students can contribute to the different phases in the lab, ranging from the first definition and analysis, to power mapping, goal-setting, visioning, co-design and prototyping. Various types of educational modes can be integrated in the lab, either for long term contributions or short interventions.

Integrating sustainable food planning in studios
Integrating societal challenges like food security, food democracy, and sustainable food systems into planning and design education is essential. However, developing specific modules on these themes is time-consuming, and programs must balance numerous subjects like flooding, sea level rise, urban sprawl, disaster management, and renewable energy. Sustainable food planning requires an integrated spatial approach, considering social, economic, and environmental factors.

Incorporating sustainable food planning into an existing curriculum can utilise the five-step approach in a studio setting (De Waal et al, 2012) focused on a city region. This can be part of a 3-month studio (15-18 ECTS) involving students from different disciplines. The studio is structured in three phases, irrespective of the area.

The study comprises five steps: (1) analysis of the current city region landscape, including historical developments and main driving forces; (2) inventory of near-future developments; (3) exploration of possible far-futures through scenarios; (4) formulating goals, visioning, and illustrating desired futures based on group themes; (5) developing a plan with interventions for sustainable food systems.

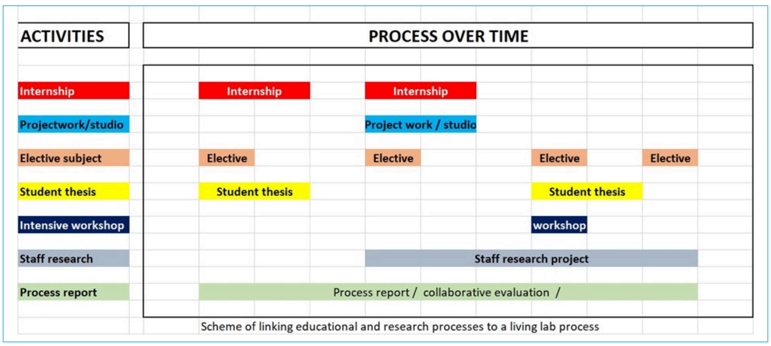


Figure 2: Overview of the LL process and various educational and research modes.

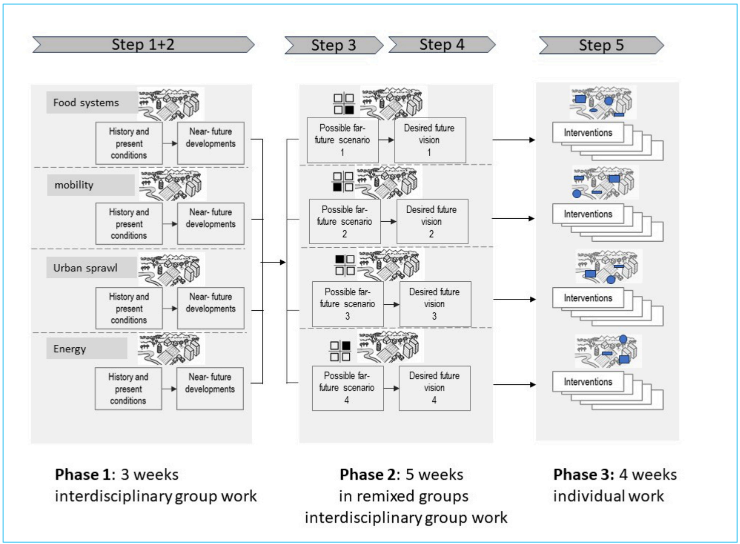


Figure 3: Proposed structure of an integral regional planning studio or atelier in which the subject of city region food planning is incorporated. Adapted from De Waal et al, 2012, figure 20.6.

Students work in interdisciplinary groups for phases 1 and 2, remixing groups after phase 1 to share knowledge. Phase 3 involves individual projects where students formulate their assignments, focusing on the city region scale and elaborating local plans and interventions.

In the first phase the scope of the study can be defined, while stakeholders and decision-makers can be interviewed and/or asked to give their feedback during the intermediate presentation at the end of phases 1 and 2.

**Experiences of AESOP4Food**

*Online session with mixed international groups or locally oriented groups:* For intercultural and interdisciplinary exchange collaborating with remote students of other countries is valuable. These took place in the exercises during the seminar and while working on the assignments. Mixing participants in the breakout rooms was mainly appreciated during the first sessions of getting to know each other, sharing experiences and motivation for the course. In the latter stage of the course, it worked better if the meeting rooms were allocated to learners who worked on the same LL or local assignments. Mixing learners with local actors in the LLs was not productive. The local actors are focused on their own challenges and goals, hardly interested in the theoretical background. What worked best for the students were the Mural boards for collaborative goal setting and visioning using the nominal group technique. This experience could be used in an onsite setting with local actors using flip overs.

*Combination of on-site living lab work and the seminar:* In the first year, the assignments were structured according to the phases of the seminar, with several short presentations. This was too prescriptive for the students who also took part in the on-site LL process. Therefore, we made a more flexible structure with only one assignment, while students could phase the assignment according to their local process. We also made a distinction between the tasks of local participants and people who contributed online to the lab. They later could for example explore challenges of the LL by carrying out case studies or dive deeper into a general question of the lab.

*Seminar phases versus living lab phases*: In some cases, the goals of the LL were already defined, before the online seminar started. So, the goal setting phase by students was not very useful. In this case the students could work on a collaborative evaluation of the goals.

For this the easiest combination was when learners followed the seminar in lecture mode. Then they could use the lectures, references and methods as background and supporting material. For this we made all the presentations and recordings of the lectures available in the wiki. Learners can skip a live session, review later and use the material when it is suitable in their progress. Still, they worked on the assignments only in the local context. However, this caused less exchange between what was happening locally and the other LLs.

There was a need of strengthening local activities by support of students in various ways. The relatively small assignment of 5 ECTS did not always suit the LLs. So, it worked better to relate existing elements of the education programme to tasks in the LLs. For instance, in the form of a thesis, such as a design for the MOST farm in Warsaw or the work of students in Gent on the issue of common public land.

*Local actors and international students:* Local participants in the labs have quite often language problems with international students. For the Madrid LL it worked well to have online, remote students from Argentina and Mexico who spoke Spanish. Eventually they could present their final work in English, while in between communicating in the local language.
For local actors the engagement of students means extra work and time. So, there should be a clear benefit. If they do not feel the benefit of the students work directly, there could be a compensation in the form of practical help. Such as surveying the area, joining forces for working in the community garden, helping to organise community events.
We also reduced the time for local actors by making short videos which could be later presented to the participants. For instance, in the Ghent LL 'Future Agricultural Heritage', which was used for the workshop, to be viewed on You Tube.

*Integration into the broader strategies:* It helps to embed the LL into a broader strategy and research agenda of the partners. In Ghent for instance into the aim of the university to strengthen collaboration with the city, in the form of the Stadsacademie, which has now a research theme on food democracy and public land. Linking with the Ghent Food Strategy, which resulted in a series of strands such as public procurement, urban agriculture, food kitchens, etcetera. Further elaboration was carried out by a PhD study and two cycles of master students research seminars.

**Conclusions**

Mixed online groups of international participants are better suited to getting to know each other, exchanging experience, expanding your horizon. As soon as there is real work on the assignments, it is better appreciated when the online rooms are organised according to the local LLs. In order to create a feasible working process, the link between the online seminar and the LL process should be flexible. One can provide different types of assignment questions that serve both the learner and the LL, while presenting online in their own working pace.

In order to contribute to the LL results not only the seminar assignments are relevant. A variety of educational modules and modes can be part of the LL process (Fig. 2). To integrate the specific thematic of food planning or any other specific subject into a comprehensive planning and design studio, one can build upon the principles of the five-step-studio (Fig. 3). This way subjects can be integrated into studio work, without the need to change the principle of a comprehensive planning studio.

To develop a LL which is durable and can have a long-term impact, a broader integration of its goals and mission into the strategies of university, local authority and other actors is essential. After an initial explorative phase this can result in a formal establishment of collaboration between academia, local and regional authorities, non-governmental organisations, industry and residents. At the same time universities should be open to mid-term engagements to serve local communities.

*An elaboration of this paper is also part of a teacher's guidance on sustainable food planning published in autumn 2024.*

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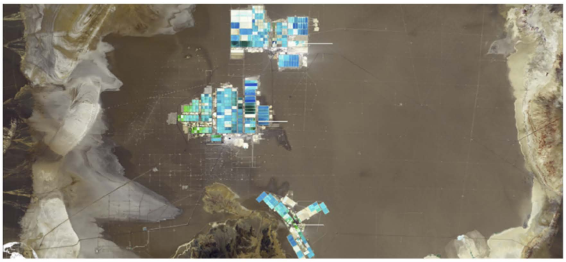
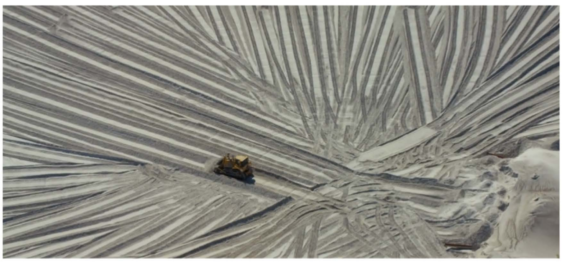
# Hidden Landscapes of the Global Value-Added Chain





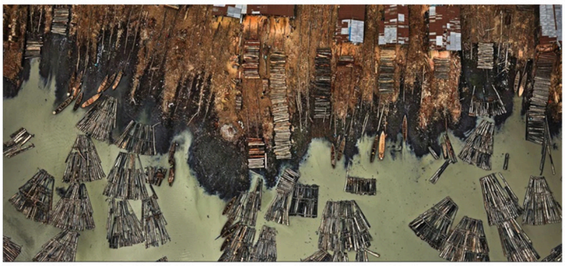













**About the Cover**

The cover of this chapter is composed of a mosaic of images—fragments drawn from the short video projected at the beginning of our ECLAS conference session, The Hidden Landscapes of the Global Value-Added Chains. The video served as a visual and emotional entry point, setting the tone for the discussion that followed.

This collection of stills captures more than just imagery; it reflects the entangled realities of our material world, the traces of extractive processes, and the human-made transformations that define the Anthropocene. Some of the photographs were taken by the session moderators during their fieldwork and research travels, while others are drawn from the documentary film Anthropocene: The Human Epoch, directed by Jennifer Baichwal, Edward Burtynsky, and Nicholas de Pencier. We are grateful for the evocative power of their work and acknowledge their visual language, which has influenced and supported the framing of this session.

The final quote in the video encapsulates the underlying message of the chapter:

*"Our collective actions have consequences that ripple through the entire planet. Humanity's power to shape the world is both awe-inspiring and terrifying. We are the architects of our own destiny, for better or worse. The Anthropocene is a reminder that the choices we make today will determine the world of tomorrow."*

This visual collage is not only a reflection of planetary-scale processes but also a prompt to reconsider the visible and invisible landscapes we help shape—through design, through research, and through the daily choices we make.

*Image credits:*
Photographs by the session moderators (2024)
Still images from Anthropocene: The Human Epoch (2018) by Baichwal, Burtynsky & de Pencier.

# Hidden Landscapes of the Global Value-Added Chain

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Karolina A. **Krośnicka**, Gdańsk University of Technology, Poland
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**Introduction**

Disciplines of the built environment, including landscape architecture, focus on the specific local territory of a region, town or commune. This territory is the main reference for analysis, vision-building and design. But what about all the landscapes of the global value-added chain, invisible from a local perspective? Can they be considered in approaches to landscape architecture? The material flows and supply chains moving in and out of contemporary urban landscapes stem from a global network of 'other' territories. Consumption patterns and global supply chains put extreme pressure on these 'other' environmental and social systems. In this session, moderators and participants discussed the opportunities of spatial planning disciplines to support system change towards more sustainable and responsive global value chains as a prerequisite for an alternative to present-day consumption. While this discourse is well established in other disciplines (e.g., economics, sustainability studies, or international affairs), it seems to be peripheral in landscape architecture and urbanism. Radically new collaborations and thinking across disciplines, methods, and knowledge domains are needed to convincingly propel the discussion forward.

The session took the format of a moderated discussion and co-creative actions to advance ideas for education, research and professional practice. Moderators and participants engaged in a dynamic dialogue, through individual paper presentations and an end workshop. Together, the discussions illuminate the interwoven and multifaceted ways in which value is created, obscured, and distributed in the global economy. Below are opening statements of the session's moderators. These perspectives collectively enrich understandings of global value-added chains, offering critical insights into their complexities and hidden dimensions. Through this collaborative inquiry, new pathways for research and dialogue have emerged, pushing the boundaries of existing frameworks and methodologies.

**A Plea for Radicality**

*Kelly Shannon*

The contemporary neo-liberal economic system has radically shifted consumption patterns and global supply chains. Local, value-and supply-driven and self-renewing systems have been replaced by global, cost- and demand-driven and exhaustive networks. The latter takes no responsibility of externalized costs of pollution and remains largely extractivist (without leaving any benefit for places of the resource extraction). Decades of irresponsible consumption patterns have compounded the devastating and irrecoverable exploitation of the surface of the earth in era of the Anthropocene. In the contemporary world there is a seemingly availability of everything, everywhere, all the time. Except when there are crises and upheaval (social, cultural, economic, and environmental). A cascade of crises is omnipresent in today's world of excessive turmoil and volatility linked to systemic disruptions in climate, technology, epidemics and geo-politics. Humankind is grossly unprepared for both the unexpected suddenness (scope and scale) of Anthropocene-driven natural disruptions and the algorithmic quickness brought by technological disorientation.

Disruptions are bad for business and economists speak of value-change resilience. However, when there is growing supply-constraint (scarcity and evermore competition) radical adaptation would be more indicative. The constant state of value chain disruptions, resource competition and ruinous consequences of global warming requires fundamental rethinking of consumption (and production). The unfettered neo-liberal economic model is ill-suited to the 'new normal.' Growth and abundance are literally in short supply. It is no wonder that concepts such as circular (bio)economies, waste and resource management, reuse, repair, recycle, and remanufacturing are gaining traction. The move from a take-make-waste linear economy to a circular economy focuses on regeneration and the re-building of healthy natural capital of water, soils and biodiversity.

Regenerative landscapes necessitate radical change—of present-day economic systems, production means, consumption patterns and political systems. Radicality is necessary to fundamentally question the dominant practices and discourse, rearticulating multiple forms of knowledge, and addressing the excesses and injustices of capitalism. Radicality is essential for the sake of fundamental societal transformation. The ethics of production and consumption hinge on capitalist desire, the entire system which needs questioning. Once upon a time, the landscapes of the global value chain where hidden. Out of sight, out of mind. Clearly, this is no longer the case: territories large and small have been lain? to waste in the name of progress.

The earth is at a critical tipping point. In order to continue and go forward, to regenerate landscapes, perhaps we need to relearn from pre-industrial circular models of rural development, where no resource was wasted and from indigenous knowledges systems and practices (IKSP), where use went hand in hand with the longue durée of the cultural and natural values of landscapes. Architects, landscape architects and urbanists can radically re-design territories, where socio-ecological systems are prioritized and embrace an ethics of mutuality and equality. Projects, plans and policies can be created which underscore context specificity and local embeddedness, unlocking inherent systems of diversity, connectivity and adaptive capacity. The political project of regenerating the built environment for biodiversity and equitable distribution of prosperity begins with its radical reimagination and innovative experimentation.

**Towards a Planetary Observation**
*Samaneh S. Nickayin*

In the era of globalization, as the entire planet becomes urbanized and planners debate "planetary urbanization," economists discuss "global cities," ecologists describe the planet's biodiversity hotspots, climate change highlights a "global" crisis, and our daily lives are driven by material flows and supply chains moving through a "global" network, it is necessary to shift the landscape planning paradigm from a local and regional scale to one that meets these planetary challenges.

What we eat, what we wear, and what we build all transform landscapes in distant lands—whether through cultivation, extraction, industrialization, or consumption, humans are no longer merely inhabitants of the planet; they have become its architects and creators. Viewing the world as one interconnected city offers a holistic perspective for managing our resources more accurately and protecting our Earth's landscapes.

"The Hidden Landscapes of the Global Value-Added Chains" opens the door to more debates about the planetary scale of interactions that transform our landscapes. This planetary scale might not be about planning or designing in a traditional sense. Instead, it is a visionary scale where the integrity and interconnection of issues are considered globally. Driven by an economic understanding of global resources, these debates may hopefully lead to the inclusion of transboundary cooperation as an active conservation goal for our landscapes. Richard Weller pointed out that in the 19th and 20th centuries, the conservation of national parks reflected the vision of pioneers who recognized the integrity of biotic and abiotic systems. However, today, the IUCN's ever-growing list of protected areas indicates that the predominant political unit of the 21st century transcends national borders.

The primary challenge for such global collaborations arises from the multistakeholder, multipurpose, and multijurisdictional nature of these initiatives. However, the concept of a planetary scale can be addressed in academic studies of landscape architecture. This could be the first step toward conceptualizing and designing our 'daily life' based on our global footprint on distant landscapes.

**Transportation, Interconnections and Responsibilities**
*Karolina A. Krośnicka*

Anthropogenic landscapes reflect in space the human activities that take place in a given area. In today's global economy, these activities are very often interconnected through cause-and-effect loops and integrated into a complex system of value chains. If we consider a landscape associated with any type of land use, such as production, industry, transport and logistics or even retail, it soon becomes clear that a change in one of the 'links' in this chain (for example, a change in the technology used to produce a particular good in an industrial landscape) can cause a dramatic change in another 'link' located in a distant area (for example, it can cause the closure of the mine on another continent). These long-distance interrelationships between human activities around the world, based on the value chain, obscure the clarity of cause and effect in the process of landscape transformation in a given place. So if we are transforming a particular type of landscape locally, we should also be aware of the effects we are having on distant landscapes, hidden behind a series of functional linkages. This raises the question of the limits of a planner's responsibility in transforming the local landscape. But also other questions, such as: Do we have sufficient awareness and knowledge of these linkages? Do we have the tools to understand and teach about them? To what extent are we able to influence these relationships?

In my view, one of the keys to the answer could be transport and logistics, which play a particularly important role in enabling the flow of goods and supply chains. Their infrastructure, which currently covers about 30% of urbanised land, creates vast industrial landscapes. Transport and logistics are critical activities for the functioning and security of cities, enabling both global and local flows of goods. In most cases, they also determine the well-being of the inhabitants and the development potential of the city. The role that transport patterns play in the interrelationships between local and hidden landscapes is therefore a very interesting and not yet fully explored topic of study, which could help in tracing hidden landscapes.

**Bridging Economics, Design, and Sustainability for Systemic Change**

*Dirk Funck*

The main reasons for ecological and social problems are our consumption patterns and the global production and logistics networks, which are predominantly designed and organized according to economic criteria. Sustainable development, therefore, requires a holistic awareness and understanding of the relationships between economic, social and ecological systems. These must be considered and designed together under overarching criteria. The interdisciplinary approach of "Hidden Landscapes" offers the opportunity to combine key economic concepts and principles with those of architecture, urban and spatial planning and landscape architecture. Our track addresses three central questions:

- How can value chains be further developed into (preferably local/regional) material cycles?
- What strategies and measures are there for regeneraton and transformaton?
- How can awareness of these topics and relationships be raised and integrated into education and training at various levels?

While preparing and running the conference, I would like to better understand the extent to which the concept of "Hidden Landscapes" can lead to solutions that support systemic change towards more sustainable and resilient value chains, which then also leads to more sustainable consumption. As a result, I would like to see more clarity on relevant theories, models and design principles and a heightened awareness of existing hurdles and challenges. This may lead to further or more in-depth (research) questions and project ideas.

# All you can store!
# Designing regenerative landscape frameworks

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**Keywords**: landscape frameworks,  urban development, regenerative landscapes, permaculture, logistic parks

## Introduction

'New landscapes' are being created with the construction of logistics parks in the metropolitan hinterland of Oslo. These are linked to the distribution of goods in a global economy and are shaped by the short-term efficiency of the value chain, rather than supporting long-term environmental processes. As an inherent element of urban development, counterplans for more meaningful designs at interrelated ecological and aesthetic levels need to be explored. Regenerative landscape frameworks are proposed as a means to harness the momentum of property development and project life-supporting infrastructure to make the existing landscape stronger, more resilient and diverse than it was before the intervention. (Gabel, 2015) This paper first provides a discursive framework within which the proposed model for managing these processes from a landscape perspective is situated. It then outlines the design formats and pedagogies used in a master's course at the Oslo School of Architecture and Design to develop the framework.

## Oslo's developing metropolitan backstage

With the growing importance of digital commerce in supply chains, a large number of logistics parks are emerging in the 'hinterlands' of Western cities. In addition to efficient access to transport corridors, these developments require large expanses of flat terrain. In the case of Oslo, a region with a rather uneven topography based on a rich and varied geological past, this implies considerable efforts to level the land, with a significant change in the perceptual qualities of these landscapes. In line with sustainability goals, there are strategies to reduce the environmental and visual impact of construction: developments are built on rocky hills, rather than on fertile land, and are surrounded by a ribbon of trees to create wildlife corridors. Nevertheless, these plans continue to adopt what can be described as a 'degenerative' position towards land consumption: the culverting of watercourses, the reduction of vegetation cover and water infiltration, and the increase in runoff pollution, all in the face of climatic challenges.

Figure 1: Photographic site documentary of the logistic park in Vestby, Norway. Student work. Tutor: Giambattista Zaccariotto.

Accepting the inevitability of such programmes today, the approach outlined in this paper operates on the hypothesis that these developments fail to understand that they are creating 'new landscapes'. Their ecological, social and aesthetic consequences are concealed as necessary but unpleasant infrastructures, rather than embraced as an environmental design task that sets the conditions for a future cultural landscape that will continue to function as a framework beyond the programme that initiated it.

**Regenerative landscape frameworks – Discourse**

This dynamic context of "land take" calls for a model of planning and design that steers urbanisation from a landscape perspective and supports long-term environmental processes. The proposed model of a regenerative landscape framework is based on the landscape urbanism discourse (Waldheim 2006) and its predecessors. More precisely it draws on a line of landscape architectural practice in which landscape is understood a prerequisite of urbanism. This was put forward in Europe, predominantly in France, in the 1970ies (Ananiadou-Tzimopoulou & Charistos, 2013) in the face of sprawling suburbanisation (Corboz 1983). Here, the reformulation of the landscape's geological and cultural identity through spatial landscape elements served to prefigure sequences of public spaces and routes for further expansion. (Desvigne, 2003) The design methodology is based on a close reading of the existing and its particularities and pursues the goal of aesthetic and spatial enhancement, but also durability, as A.W. Spirn claims: *"A design that reveals and responds to the deep structure is likely to be more functional, economical and sustainable than a design that ignores it"* (Spirn, 1983, p.12).

The model also incorporates the concept of frameworks, formulated in the Netherlands in the 1970s as the 'casco' concept for more ecologically sound spatial planning, where long-term hydrological and ecological support structures give way to more flexible development in the spaces opened up by the framework. (Tjallingii, 2012) The associated notion of 'carrying structure' resonates with distribution patterns of landscape ecology (Forman & Godron, 1986) and in blue-green infrastructure. (Ghofrani, Sposito and Faggiani, 2017). The framework approach has been elucidated in the field of architecture as "support and infill" (Habraken, 1972) and "pace layers" (Brand, 2018). Consequently, these terms have been adopted in this model.

While these approaches provide a solid foundation, a regenerative landscape will only emerge if the self-renewing and synergetic processes of the 'work of nature' and man are allowed to unfold their dynamics. (Lyle, 1994) In recent years studies to systemise regenerative approaches have been conducted, mainly in relation community development (Mang and Reed, 2013) and food systems (Buckton et al. 2023). A primary source remains permaculture (Mollision, 1988). In accordance with the principles delineated therein,

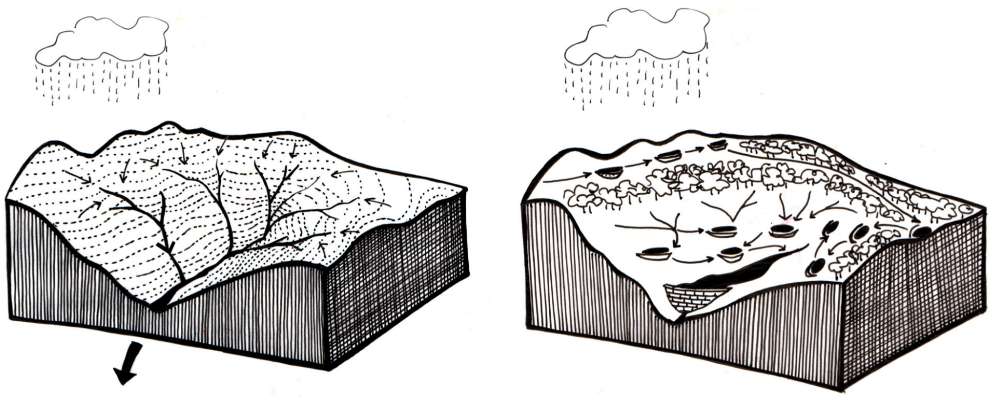

Figure 2: Energy and water flows in a degraded and regenerated landscape, based on Yeomans' keyline technique, adopted from Mollision, 1989, p.14

a landscape framework is conceived as an "interception net, (...) a compound web of life and technologies (...) designed to catch and store as much energy as possible on its way to increasing entropy" (ibid, p.13), providing 'niches as opportunities in space', and 'cycles as opportunities in time', "to give harbour to many events and species" (ibid, p.23).
To derive the premises for a design approach, the aforementioned discourses imply, firstly, a cross-scalar and time-based method in which the site is understood as part of a wider territory of biophysical flows and forces, and therefore beyond its legal boundaries (Hill, 2005).
Secondly, design is understood as an intervention in a socio-ecological system, most succinctly put by Mollison's statement that 'we can assist rather than impede natural (...) evolutions' (ibid, p.15). Finally, the question of beauty is inextricably linked to the enhancement of a co-evolving human-nature relationship. Designers can 'manifest the inherent elegance of ecological processes in visible forms' (Lyle, 1994, p.45) and provide cues for care, expressions of neatness and tended nature (Nassauer, 1995), thus promoting a culture of dialectical entanglement.

**Designing landscape frameworks**

In the following we present the model and methods developed in three succeeding design studios carried out at the Oslo School of Architecture and Design as part of the International Master of Landscape Architecture. The concept of the landscape framework is examined as a potential approach for guiding municipalities and developers in the context of significant land use transformation, as well as a pedagogical exercise that exploits the scale of the task to introduce students to the potential far-reaching impact of landscape architecture in an urbanising context.

The structure of the course involves working at three interrelated scales, usually referred to as contextual analysis, planning scale and design scale. With the intention of foregrounding their spatial interdependence and addressing different 'scales of permanence' (Yeomans, 1958) or 'layers of pace' (Brand), these will be referred to here as Foundation, Framework and Infill. To meet the prerequisites for achieving regenerative effects, namely awareness and optimism of interdependent human-nature relationships and cross-scalar system integration, a

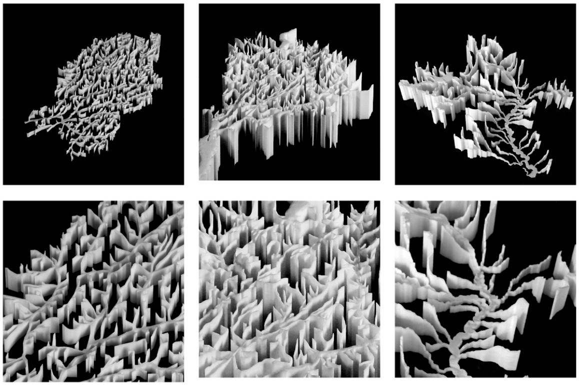

Fig. 3 Foundation: Watershed models of the three studio sites

multi-method educational approach has been developed, alternating between digital and analogue tools and combining scientific and artistic techniques. The latter aims to enhance the students' experiential and embodied engagement with the subject, facilitating the development of a collaborative relationship with landscape. To train attentiveness for the interconnectedness in systems the studio phases oscillate between overview or large scale and eye-level view or ground scale.

**Foundation - Portrait of a landscape**

The logistic parks as conceived today conflict with the underlying geological, hydrological, ecological and social infrastructures that traverse the sites. To ground the conception of a framework that takes in fertile soil, watercourses, groundwater recharge areas, ecological corridors, recreational areas and connections, the course promotes to 'portray' the larger landscape system, giving it character and expression as to engage with it as a partner and not as a set of data or surface to act upon. The 'portrait' involves understanding the rationalities and inherent systemic relationships of the larger context but aims to make them haptic and narrative in order to tactilely engage in its pro-active development.

The reference system of the watershed is visualised through the production of a delicate sculpture, in which two-dimensional GIS data of rivers, streams and tributaries are extruded and intersected with three-dimensional data of topographic elevation. Surface water flow is represented as an omnipresent spatial structure that weaves through and structures the land. Landform, use pattern and the visual forces (Bell, 1999) within the greater geological scale are examined with 'Territorial Tracings' that take a "pen for a walk" (Ingold, 2007, p. 47) on an aerial perspective. While tracing, the act of wayfinding with its close-up perception and the analytic extraction of forms and directionalities collapse to produce a sensorial comprehension of the environment.
To investigate and put forward the relation of 'deep structure' and 'surface structure' (Spirn) 'scape maps' are generated from GIS data and image editing tools. While overlaying the layers that condition another, e.g. geology affecting topography, soil affecting vegetation, the mapping is driven by questions of evolution, force and process and rendered with 'thickness' to evoke a sense of plasticity, tactility and depth.

Bound together through a narrative, a written story in the tradition of landscape description, the characterization of the landscape shall be too strong to be overwritten by the large dimensions of the spaces required for logistic plots and the often over-dimensioned roads. Together these formats provide the foundation or the larger system into which the landscape framework intervenes to promote its enhancement and particularity.

**Framework – Landscape structures to pre-figure development**

The framework, although confined to the regulated plot, is designed to have regenerative effects on the larger system in which it is embedded, resulting in effects such as flood mitigation, groundwater recharge, forest conversion and soil improvement. As a support structure, the framework has two main functions: infrastructural and aesthetic. It must ensure the connectivity of the landscape and its ecological and hydrological performance by activating links and closing cycles. At the same time, to involve human society and engage collective perception, it must enhance the character of the landscape, promote its distinctiveness by amplifying its latent qualities and contribute to its 'coherence, complexity, legibility and mystery'. (Kaplan, Kaplan and Brown, 1989)

The challenge is to negotiate the often 100-hectare-plus development sites with the water and ecological flows that pass through them. One possibility is to divide the area into individual plots, usually 10 hectares in size. Necessary gradients between different flattened plots can potentially become ecological or riparian corridors if earthen slopes are used as an opportunity both for a cheaper way of grading and to expand vegetated areas. Based on this freedom of design, the creation of the framework involves a deliberate process of projecting a system of plots onto the rich foundation, while at the same time revealing aspects of its specific geological and cultural evolution. The resistance to change, permeance, and opportunity for form and process are both embedded in the ground. Their detection is facilitated by precedent studies and 'transplants' derived from regenerative forestry and agriculture, such as the keyline technique for pasture management (Yeomans) or other site-enhancing projects. The framework may be considered a layer of the landscape's 'palimpsest', reaffirming some of the earlier traces, introducing new elements, and designating areas open for further 'writing'. Its configurations may be aligned with the structural elements of landscape ecology, the layered landscape pattern found in various cultural landscapes, or place-specific 'territorial figures' (Gregotti), depending on the site and the projected vision, as the studio outcomes have shown.

The medium used to conceive the landscape framework's topology is a laser-cut sheet of cardboard, which in its abstraction foregrounds the structural surface elements, such as vegetation bands and riparian corridors, but also paths that weave out and in from the site to facilitate horizontal integration. Nevertheless, this method involves a haptic experience: The 'lace' would fall apart if it were too thin or not dense enough. This is a didactically relevant analogy for the degree of systemic interconnectedness required to constitute a support structure. A higher resolution medium to successfully explore and craft the vertical interrelation of landform, water and vegetation is a physical model at 1:2000 scale. A physical model allows for the active manipulation of existing topography, the testing of the alignment of cut-and-fill operations with the visual forces and flow of the terrain, the situating of swales, the niching of water storage dams, the layout of wooded areas. The use of a physical model to design facilitates time and care, and despite the bold measures, an engaged relation emerges as if the working hand would "garden".

The framework requires further development at eye level, which is accommodated through the design of a spatial 'scene'. This is constructed as a physical model based on the scenographic layers of foreground, middle ground and background, which are modelled separately at different scales. This allows the haptic dimensions of texture and colour to merge with the spatial depth of the mid-ground and the context of the background. Working through a photographic lens at eye level provides an immersive experience and the frame through which aesthetic issues can be addressed, for example, how the abstraction of buildings can foreground the character of rock or vegetation and thus provide a stage for 'nature' as delicate, vibrant, robust or powerful.

**Infill**

If the landscape framework provides a long-lasting carrying structure, the infills are treated as separate, complementary systems with individual flexibility and shorter time spans (Habraken). The first stage of use - the logistics park - requires large areas for truck manoeuvring and car parking, which impermeate the ground. Run-off needs to be redirected and managed. The design of swales, retention and infiltration basins therefore becomes a driver for integration into the landscape framework and ecological edge effects. In addition, the opportunity to integrate vegetated areas and trees in coordination with driving patterns must be used to enhance the environmental, social and visual performance of the area. Other regenerative technologies such as solar panels, green roofs and timber constructions and composting may be employed here. However, it is of greater importance to integrate these potentially ephemeral elements into the higher-order system, both functionally and spatially.

A proven medium for establishing rules pertaining to the planting of vegetation, the guiding of water, and the formulation of the edge is through the use of large physical models. The iterative design process enabled by working models allows for the weighing of established aesthetic questions, such as those of place specificity or autonomy. An equally important, if not more pressing, aesthetic issue is best addressed in 1:20 scale sections. This medium, because of its close-up scale, is suitable for investigating materiality as part of system integration and for testing the ecological 'messiness' of the framework against 'clues of care' (Nassauer).

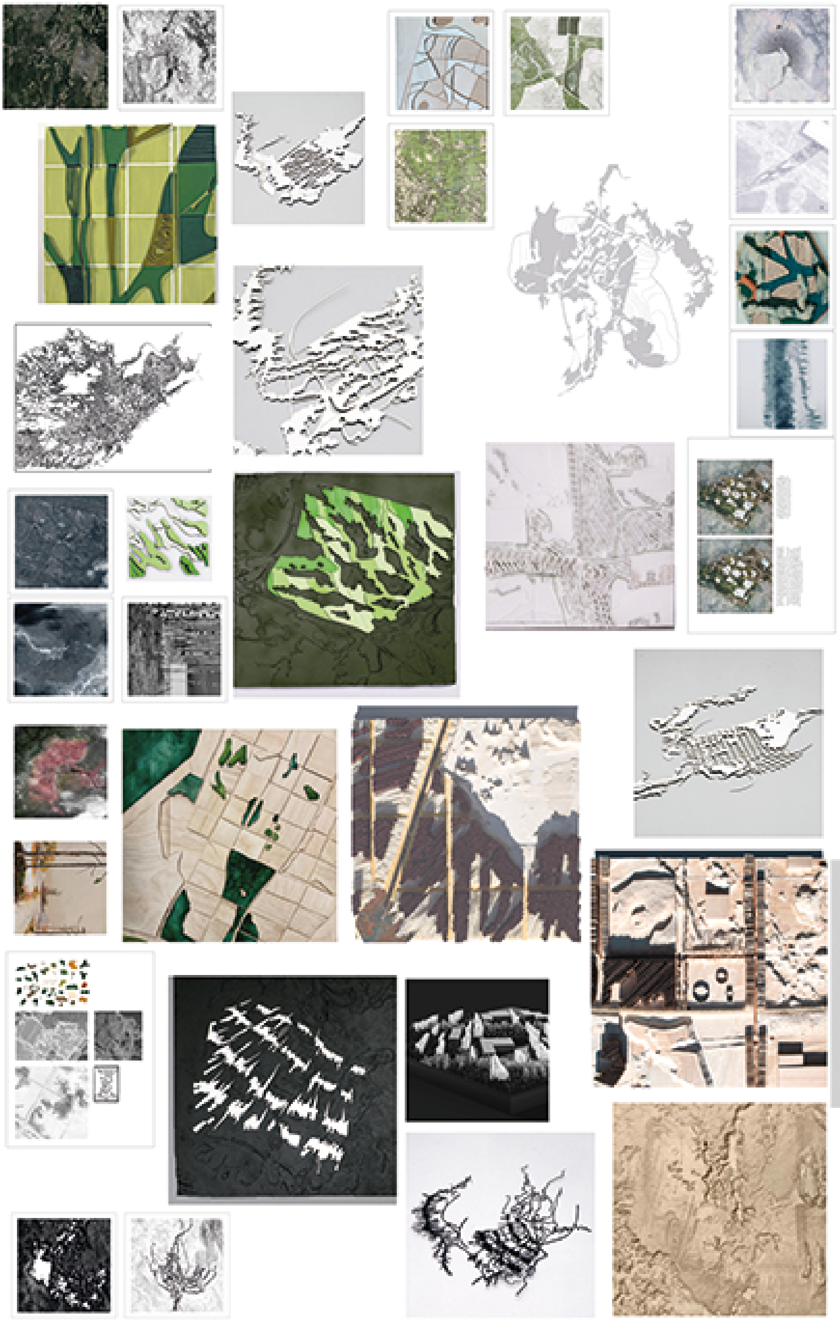

Figure 4: 'All you can Store!!' International Landscape Master Studio AHO, Spring 2023. A logistic park next to the Oslo Gardermoen Airport. Norway. Exhibition Layout. Group and individual work by Alice Ming Yan Wong, Alona Kamkova, Hedda Gran, Hanna Podladowska, Roger Walvåg, Inge Rosén Langdalen, Thea Brendesæter, Mari Dalheim, Lisa Clausen-Schaumann, Hui Zheng, Christopher Fettke von Koeckritz, Taylor Steel. Tutors: Sabine Müller, Miguel Hernández Quintanilla, Giambatistta Zaccariotto, Mattias Josefsson.

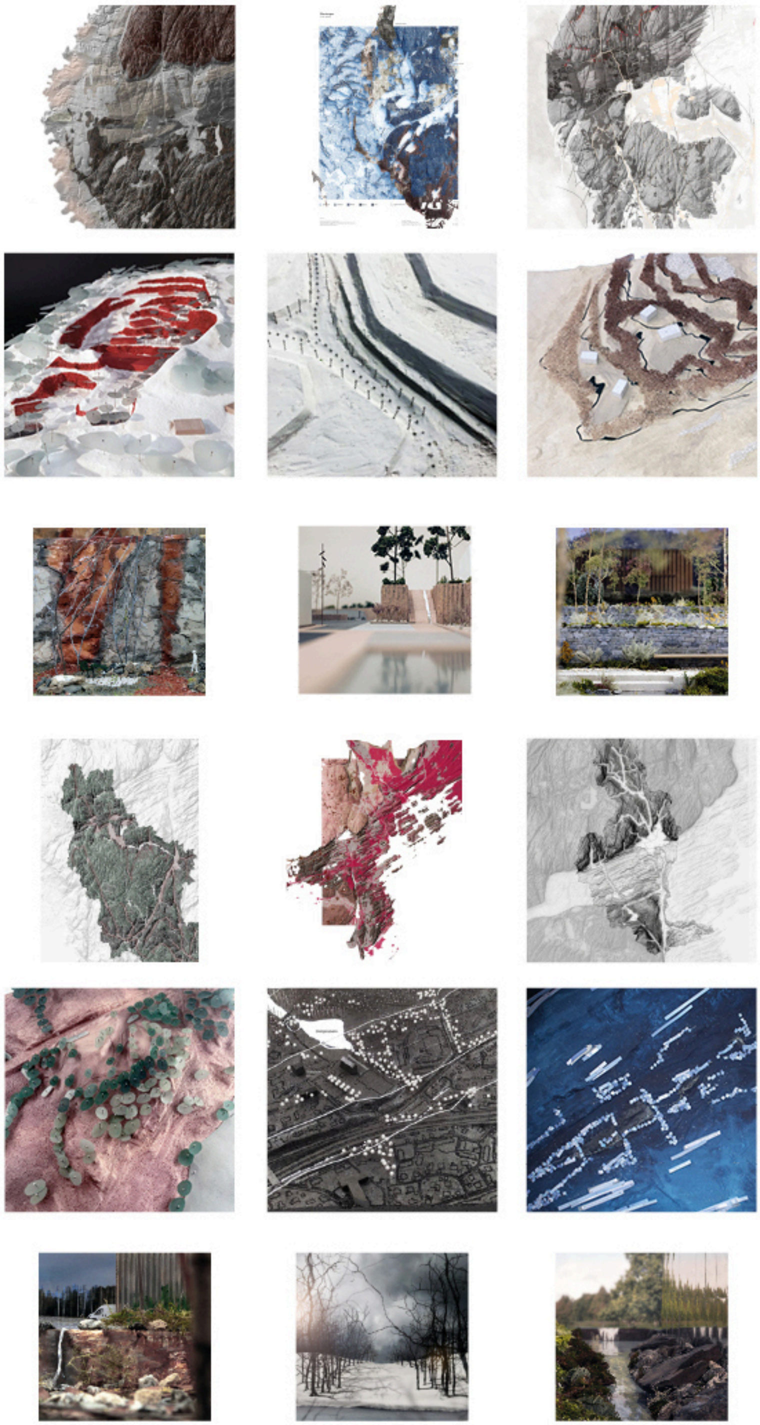

Figure 5: 'Fresh to your door, water and more!' International Landscape Master Studio AHO, Spring 2024. Six commercial parks along the A 18 between Lier and Asker, Norway. Scape Maps, Framework Model and Scene. Group and individual work by Thomas De Loof, Kamil Rød, Christian Østgaard, Maria Kyriakaki Grammatikaki, Isabelle Berre, Dimitra Peppa, Arina Perevedentseva, Zoi Aramian, Axel Ottar, Hui Zheng, Cecilia Bekkevold, Lisan Westerhof, Florian Bugnon, Anna-Julia Granberg, Francesco Di Lucchio, Floor Van der Vliet, Makena Hugh. Tutors: Sabine Müller, Miguel Hernández Quintanilla, Giambatistta Zaccariotto, Mattias Josefsson.

**Discussion and Conclusion**
**Evidence and Challenges**

This paper has attempted to demonstrate that the construction of logistics parks can trigger the implementation of landscape frameworks that would regenerate designated areas of low environmental and social value resulting from poor management, such as industrial forestry or extraction and mining. The model put forward represents a regenerative approach to landscape, as it aims to put a long-lasting support structure linking landscape process and urban development into action. The landscape itself becomes active, initiating the closing of interrupted local hydrological cycles, stimulating self-sustaining processes of forest succession and reviving the cultural, aesthetic relationship with 'nature', while leaving room for programmatic development towards more regional and circular goals. At the same time, the paper outlines the model's association with an educational method that trains the prerequisites for achieving regenerative effects, i.e. a physically engaged relationship with matter and cross-scalar system integration, through the use of appropriate media.

The evidence that the presented landscape framework model will have regenerative outcomes is limited due to the speculative academic nature in which it was developed. However, the expected positive ecological and aesthetic effects can be derived from the predecessors used to generate the model, namely the recognised benefits of landscape ecology and blue-green infrastructure at landscape and planning scales (Ghofrani, Sposito and Faggian), the documented success of agricultural precedents (Yeomans, 1958, p.195), and lesser-known examples such as Reserva el Peñón, Valle de Bravo, Mexico, a water-autonomous country house development that regenerates the local water cycle with its new landscape infrastructure (Müller and Quednau, 2020, pp.261-264), at property development scales.

An obvious challenge is to establish the model among relevant stakeholders and to intervene in the project development process, which is often driven by private developers themselves, while affected municipalities remain under-equipped to manage the process. Enforcement of existing laws, such as the requirement for environmental impact assessments, pressure for stronger legislation, such as the EU Nature Directives, and civil society, together with intrinsically motivated developers, could address this challenge. Perhaps this is where a real opportunity for regeneration lies, in harnessing the momentum of property development linked to the global economy, and thus the financial input of powerful stakeholders, as an investment in self-sustaining landscapes.

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# Urban Metabolism
# A circular approach to foster regeneration in São Paulo's central region


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**Keywords:** systems thinking; urban metabolism; circular economy



**Abstract:** This short paper discusses regenerative practices in the scope of an urban requalification proposal for the surroundings of São Paulo's Municipal Market. The presented project was awarded at a competition promoted by the Instituto de Arquitetos do Brasil and Associação Escola da Cidade, in December of 2023. The perimeter defined by the competition brief has been central to public debate for decades. Beyond the building of the Municipal Market, which undoubtedly has a significant presence - shaping, transforming and, conditioning the territory, the brief invited proposals to investigate the area, agents, and dynamics around it, inquiring on possibilities to overcome the programmatic and spatial super specialization that hinders an effective transformation of the area. In addition, the perimeter of the project holds a critical role in affordable housing production, and this is one of the leading factors in our argument for the necessity of regeneration. Given this scenario, the proposal outlines transversal planning strategies, capable of defining interventions in a contained perimeter while fostering vectors of urban requalification in a long-term scenario. To generate design guidelines which address and instrumentalize such complexity, we developed an analysis methodology. Beginning with a morphological reading, we identify economic clusters that drive the region and track origin and destination flows for an array of critical topics, such as people, waste, energy, goods, among others. A metabolic approach to the territorial flows, inputs, and outputs allowed us to enhance existing value chains and Aprompt a transition to a circular economy. Circularity, in this case, becomes a crucial factor to promote regeneration. It is key to relieve natural, human and physical systems which today are heading towards exhaustion. While much of the literature on regeneration today focuses on critical natural landscapes under severe environmental threats, this project can expand the discussion by inquiring on the topic in already highly consolidated urban contexts, acknowledging it as a hidden landscape, by observing flows and effects that arise from the spatial convergence of value chains, as well as opportunities for the implementation of circular economy practices.


**Introduction**

The Municipal Market is a representative figure of the city of São Paulo's socio-economic role as a strategic hub between the state's productive hinterland and the port of Santos. While the Market emerged as a critical commercial nexus, connecting inland regions to the coastal areas (Prado Jr., 1998) through railways and roads, it is now extending its influence as a gastronomic center offering specialty goods and raw materials. Furthermore, its establishment just north of São Paulo's historical triangle, on the banks of the Tamanduateí River, induced a commercial occupation of the area, attracting related economic activities. Since the Market's inauguration in 1933, the area around it has consistently reinforced its commercial identity, with a concentration and specialization of tertiary sector activities, mainly textile, food, retail, and electronics. Accordingly, the region is a well sought destination for retail and wholesale businesses from the city and state. During the diagnosis phase, we identified economic activity clustered around four industries in the adjacencies of São Paulo's Municipal Market - food, textile, retail, and electronics (figure 01). While the food industry has been a driver for the area's occupation since the early 20th century, the introduction of manufacturing activities with the textile industry significantly transformed the region's character. Later, it happened through the development of electronics repair and retail business activities. The preeminence of tertiary sector activities characterizes the region as an intermediate link in the value chain (see figure 2). This means that goods which are commercialized in the area are either arriving from the state's hinterland (in the case of fresh food items and specialty goods) or from the Santos port (electronics, textile and other retail items). Currently, the industrial framework located in São Paulo's central region configures a decentralized production network, whereas resources and labor do not depend on proximity with the consuming public (Leite, 2012). The lack of tax incentives and a structured industrial policy led industries to install in the periurban area or other municipalities. The growth of flexible productive

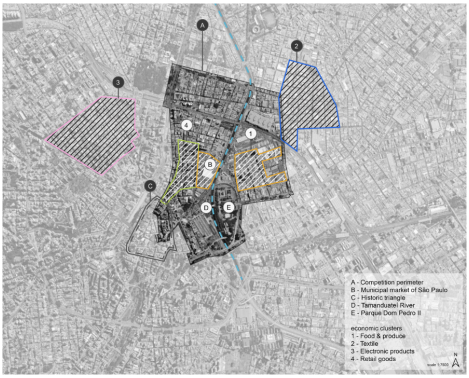


Figure 1: Competition perimeter and surroundings.
Source: Own authorship, satellite image Google Earth

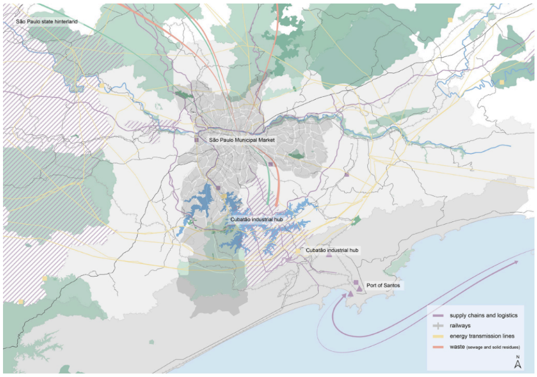


Figure 2: São Paulo's Municipal Market in the regional value chain,
Source: Own authorship

sectors and outsourcing of the means of production created a necessity for a vast network of suppliers and distributors, depicting the precariousness of labor and lack of innovation in the industry.

**Problem Statement**

This has conditioned both the region's urban development and its contemporary occupation, as identified in the radar charts (figure 3). Historically, widespread commercial occupation is linked to two main issues. First, the region's characterization as a place to work, withholding other uses such as leisure and housing. Second, because of its commercial occupation, investments in road and mobility infrastructure are solely directed towards logistics and freight traffic, to cover the long distances between production centers and/or the port. This led to the construction of massive road infrastructures, which made the region significantly more hostile to pedestrians, and precluded investments in public transport. Moreover, the concentration of tertiary sector activities has put the area both as a high energy consumer and a large carbon and waste generator, without adequate energy generation, waste disposal, and management infrastructures.

The effects that arise from this commercial super specialization are still observed nowadays. Current issues include the widespread presence of informal work, both with street vendors and in commercial galleries; fragmented mobility infrastructure; neglected public spaces; and deficient management of waste, which leads to other issues such as floods and public health concerns. However, a critical issue relates to the variation in occupation throughout the hours of the day. While during the day the region receives a significant influx of people (workers, consumers and visitors), overloading public transport infrastructure, once stores close, the area is left empty - which creates security issues. This is further aggravated by the sparse residential occupation and the idle stock of buildings. Thus, our proposal targets this imbalance as the first step to promote regeneration of the area, without evading the region's vocation and importance in the value chain.

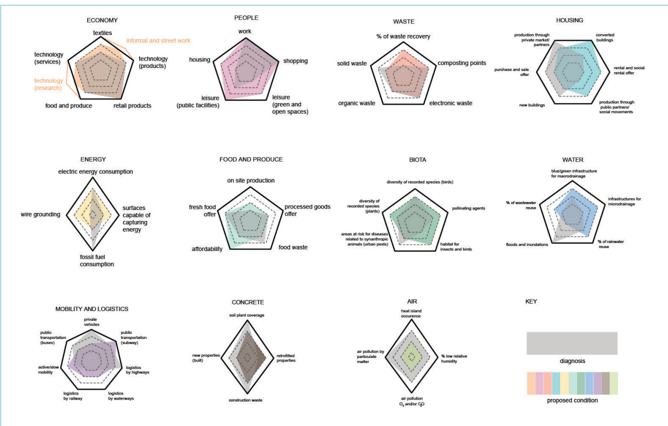


Figure 3: Radar charts – diagnosis. Source: Own authorship

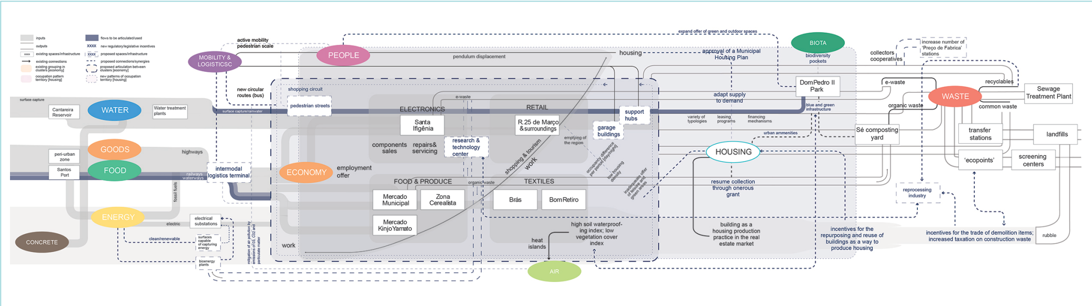


Figure 4: Map of flows. Source: Own authorship

**Theoretical frameworks**

Our understanding of regeneration is supported by systems thinking and the idea of metabolism. Spontaneously occurring regenerative practices in natural landscapes are engendered by the regulation of interconnected cycles that seek to maintain and restore the ecosystem to a state of equilibrium. These practices are sustained and strengthened by the ecosystemic properties which integrate and regulate different chemical, biological, and physical processes through feedback loops. It also supports the idea that relational ontologies (Escobar, 2016) are fundamental when considering regenerative practices. In design, rather than distinguishing subjects, and beyond object-centered approaches, it would allow one to perceive the territory as a network of entities and flows. In terms of value chains, this territory is exemplary in terms of the inputs and outputs which are needed to sustain these forms of economic activity, as seen in the map of flows (figure 4). Examples of inputs are energy, water, people (workforce), and goods. Outputs are energy (in the form of heat and carbon emissions) and waste (organic, electronic, etc.). By accounting, observing, and qualifying these relations, we can more assertively discuss regeneration practices.

In this sense, the proposal introduced the idea of urban metabolism as a framework to analyze and foster these mechanisms of regulation for physical and non-physical dynamics and exchanges that take place in the territory. Focusing on value chains, a metabolic approach begs us to investigate where products and raw materials are sourced from, how and where they are processed and where do they end up. It also allows us to think where these supply chains can be enhanced and optimized to minimize their impacts and externalities and preserve their value. In this case, we argue that these opportunities should be fostered through a synergetic approach between the different commercial sectors found in the area.

Expanding on the notion of metabolic thinking, an important reference during the project development was architect Kiel Moe's work (2014), which investigates the system ecology of buildings and urbanization. Although his work is mainly concerned with the matter of energy, it presents a useful framework to think about the extended implications of construction, from early processes of extraction to flows of waste, without overlooking the social and political relations associated with these processes. Understanding the built environment as a set of as non-isolated systems, Moe argues:

A non-modern, non-equilibrium, non-linear approach to the metabolisms of buildings and urbanization offers a more totalizing perspective on the actual energetics of the world and thus offers better indicators of how designers can best intervene to maximize the ecological and architectural power of design. (Moe, 2014, p. 178)

Often dismissed as externalities by designers, the author highlights why these are matters of concern to built environment disciplines that should be equally integrated into urban development schemes, such as the proposal presented here. In our view, this transparency and accountability of the concealed factors that underpin spatial design and transformation, and consequently, urban development, is a requirement to think of regeneration. While we defend a metabolic approach to the economic, material, and social processes at play in the territory, we reiterate that, as designers, we need to be able to incorporate such methodologies into design and construction processes.
To conduct the metabolic analysis, we looked at the Urban Metabolism publication by the IABR - PROJECT ATELIER ROTTERDAM (Fabrications, n.d.) as a reference. Their understanding of the urbanized territory in sync with natural cycles and as part of other widespread systems provided a practical framework and a set of actions to deal with the area defined by the competition. In the case of the presented project for São Paulo, we were faced with the dispersion and absence of certain data for the defined perimeter, a limitation which researchers of the Global South often contend.

We defend the systems approach as a pathway for regeneration as a counterpoint to the ruling model of spatial development which targets urban territories through isolated and specialized projects. While the area in question presents fragilities on a wide range of topics, previous attempts to deal with these issues in a fragmented manner have failed and, in many cases, led to processes of gentrification, displacement, and economic devaluation. We understand that the potential for regeneration is inherent to the systems that are in place and that it is up to planners and policy makers to catalyze, reorganize, and seek cohesion of the flows and dynamics, preserving their value and character, and acknowledging their externalities. Additionally, the concept of extended urbanization, discussed by Neil Brenner and Nikos Katsikis (2020), points out how city and non-city landscapes are dialectically co-produced under modern capitalism; thus, the field of urban studies should treat them as systematically connected, through tangible and intangible layers.

From this point of view, cities are supported by diverse metabolic inputs (labor, materials, fuel, water, and food) and engender a range of metabolic byproducts (waste, pollution, carbon), the vast majority of which are produced within, and eventually, absorbed back into non-city zones. (Brenner and Katsikis, 2020, p. 25)

This helps us understand the role played by the Market and its commercial surroundings both on a local scale and in regard to regional supply chains, serving as an important warehouse between the hinterland and the port (figure 2). During the research, we understood that many of the spatial issues that were identified can be attributed to this convergence between value chains of different scales. At the same time, a perspective of planetary urbanization portrays the potential of systemic and scalable transformation through what begins as local interventions. One angle to examine this is through agriculture and the relations between consumption, retail, and production. In this sense, the Connecting the Dots project (Ellen Macarthur Foundation, 2021) provides a valuable precedent, connecting the productive rural context to retail and consumption territories within the city, while fostering educational programs around the topic of food.

Ideas in the framework described above are embedded within a larger picture transition from a linear economic paradigm towards a circular economy, which would generate positive economic and spatial impacts for the region. In terms of value chains, we argue that the recovery of resources (ranging from tax incentives to waste byproducts) on site, together with an integration of the different clusters both for retailers and consumers are key factors for the implementation of a circular economy agenda.

**Proposal statement**

There is sufficient evidence that illustrates how productive and economic activities can serve as leverage for regenerating a site to foster other forms of spatial occupation. In the case of the competition's perimeter in downtown São Paulo, where there is both a need and an opportunity to add to the affordable housing stock, we defend that it is crucial to first structure and/or enhance other activities to increase livability, social safety, and connectivity to make the territory more attractive for daily user and residents.

In this sense, the proposal is structured on four guidelines:

1. Recovery of resources.
2. Reorganization of mobility networks.
3. Redesign of blue and green infrastructures as urban amenities.
4. Spatial and regulatory rearrangement for housing production.

We argue that an urban requalification through these guidelines could be achieved by increasing and redirecting value captured with the existing economic activity, increasing cohesion between existing flows. In this sense, the current economic clusters, which are focused on the production and retail stages, should engage with other stages of their value chains, such as research, design, and prototyping, amongst others. The region has plenty of vacant buildings which would be retrofitted as mixed-use buildings to host these new programs. A similar process was observed in the Brussels Canal Zone, as demonstrated by the project Cities of Making (CoM, 2018). At the same time, externalities produced by these economic clusters need to be properly managed - either as inputs for other production


Figure 5: Aerial perspective of proposal. Source: Own authorship

chains or directed towards recycling and composting centers. This became evident through the survey we conducted (see figures 3 and 4), which pointed out feedback gaps and mismanaged flows. For instance, the food business in and around the Municipal Market shows long supply travel distances, produce loss during transit, and tons of solid residues produced due to the lack of large-scale reuse policies. It is crucial to shift towards a shared economy, in a model that fosters synergy between technology and producers, thereby reducing the gap between innovators and manufacturers within the productive city. In this sense, reintroduction strategies (Mcdonough; Braungart, 2010) for solid residues or wasted material originating from retail and wholesale, electronics disposal, and leftover fabrics produced by the consumerist territory does not take place as just a local action but as a complete territorial reorganization.

By rethinking steps of the value chain which take place in the territory, reliance on long-distance vehicle shipping would decrease, allowing a redesign of mobility networks to prioritize pedestrian and slow mobility experiences. The experiential qualities of the area would also be enhanced by a redesign of green and blue infrastructures as urban amenities. Spaces such as Parque Dom Pedro (pictured at the center of figure 5) are requalified as a wetlands park, tackling drainage and biodiversity issues while creating adequate public spaces for leisure. We believe the three guidelines briefly described above would set the conditions for this region to become a safe, pleasant and livable area. However, this would also depend on a rearrangement of the legal and economic framework that governs the area's urban development. While spatial strategies focus on recovering and redirecting material resources, there is also room for improvement on what concerns the urban economic policy. The exemption of the onerous grant, an instrument that legislates construction allowances, in a large part of the perimeter favors the real-estate complex that does not cater to the needs of the territory. At the same time, such exemption does not allow the collection of resources which would enable projects of territorial transformation and especially, the provision of affordable housing in the area.

**Discussion**

The notion of an urban metabolism and systems thinking need to be at the core of urban development and policymaking. Territories such as the surroundings of São Paulo's Municipal Market, in dire need of regeneration strategies, pose both the challenge and opportunity of rethinking the linear paradigm which rules economic and spatial regimes. Additionally, they are exemplary of the coexistence of value chains of local and regional nature, and the spatial conflicts that arise from this condition. In this sense, it suggests new analytical and propositive approaches to sites which observe this dual condition, by preserving local values while optimizing the more extensive networks, to relieve systems which are overloaded, such as infrastructure and mobility.

A challenge faced during the investigation and proposal development was the decentralization and scarcity of data. Access to more robust and quantitative information, specifically regarding the flow of material and goods, would allow us to propose alternatives on a deeper and more assertive level. In fact, methodologies for surveys and quantitative and qualitative data collection in this context could open a new avenue of research on its own. In sum, it strengthens our understanding that exercises such as the one described though this project constitute a refreshed outlook for urban development and city-making. In times where cities need to respond to the effects of the complexification of value chains, on top of crises of climate, politics and social justice, we believe the notion of a metabolism is key for an interdisciplinary and transversal perspective which would reveal paths for regeneration. In this sense, we also interpret this project as a trial, with methodologies and guidelines which could be replicated in other areas.

**Conclusion**

This paper and the development of the project for the competition provided the opportunity to investigate regeneration in highly urbanized and complex territories, such as downtown São Paulo. It provided practical tools, allowed us to delineate clear-cut spatial strategies, and showed how the recapturing and redirection of resources, through a circular economy framework, is a crucial factor for regeneration. But at the same time, we see that this discussion is part of a larger mental shift that needs to take place to achieve a future that is both "ecologically safe and socially just" (Raworth, 2024). Repositioning design and strengthening its agency with practices of mitigation, repair, and regeneration requires a lens of decolonial ecology. As a position, we side with theories of degrowth as a larger shift necessary for regeneration, but we do so by understanding the limitation of a discourse which is still determined by most of the world. While we believe energy and resource reduction is both necessary and possible, and the project advocates for that, it should be done in a way that ensures the livelihoods of those who are part of these relations. As theories of degrowth gain force, we are aware that it creates disproportional implications between the Global North and South, and in the case of this project, between urban and non-urban environments. For this reason, we adopted a systems approach that considers the cross-scale and cross-time reflexes of our proposal, understanding that regeneration cannot be thought of as a singular and isolated set of actions. As we stand at a critical juncture of the Anthropocene, whose symptoms are an escalating climate emergency and unfolding socio-political crises, we believe that design needs to position itself as a part of the "planet's ontological reconstitution" (Escobar, 2014, p. 21). The dualisms that have stated the dominance of humans over nature are no longer affordable or practicable, and this ontological shift will have implications for the way we design, occupy, and live in space.

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# The river and the mosaic: Regenerative strategies for plantation landscapes in the Upper Paraná River Basin

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**Keywords**: Brazil, Paraná River, Drought resilience, Landscape ecology, Plantation

**Introduction**

In case this text has been printed, chances are that cellulose pulp from the Upper Paraná River Basin (UPRB) has been used. Around 14.83% of global wood pulp exports come from Brazil (Harvard Growth Lab, 2024), a significant part from a 1.4-million-hectare Eucalyptus plantation in the UPRB. Once a biodiversity corridor, the basin has been exploited since mapping expedition in 1905. In a few decades, it became a mosaic of intensive commodity production: Eucalyptus plantations, grazing fields for cattle, and cash crops such as sugar cane and soybeans. In 2019, extreme drought disrupted production and heavily impacted local ecosystems and populations. This paper uses on-site research to understand how commodity-oriented land use in the UPRB contributed to a vulnerable hydrologic system, amplifying the drought. A literature review clarifies the spatial model's modus operandi, allowing for regeneration hypotheses that strengthen the hydrologic cycle and leverage local ecosystems and circular economies.

**Understanding the assignment**

The Paraná River Basin stretches along Brazil, Paraguay, and Argentina, is the second largest drainage basin in South America, and an important economic and ecological axis for the continent. Its upper part, the Upper Paraná River Basin, is the most abundant in terms of rainfall and therefore regulates the hydrologic regime of the rest of the system (Metcalfe et al., 2020). During the drought event of 2019, the effects of significantly below-average levels of precipitation in this part of the basin quickly spread, causing unmeasurable social and economic losses. Environmental damage consisted of poor soil moisture, loss of ecosystems and habitat, wildfires, and falling levels in rivers and reservoirs. As to the causes of the drought, the academic community agrees on certain factors – anthropogenic climate change, changes in land use and cover, and wide scale climatic phenomena like the El Niño effect - but not on the share of the role that each played in 2019 (European Commission, 2021). While design disciplines cannot solve all climatological issues, land use and cover sit within their scope and could represent tangible ways to approach such tragedies from a spatial perspective (figure 1).

**Spatial dynamics of commodity production**

The first approach to the assignment consisted of understanding the spatial dynamics of commodity-oriented landscapes, and how such impacts the water cycle. A key step in this process was a research trip to a selected area of the UPRB, which took place in January 2023 and revealed the region's structural vulnerabilities. While a detailed travelogue of all visits and conversations can be found in the full report (Imasaki Affonso, 2023), the spatial homogeneity of commodity-production allows for the large visited area to be briefly described here. In summary, one can drive for hundreds of kilometres and see nothing other than monoculture fields, not meeting one single person. In this monotonous landscape, monoculture crops are widespread and consist primarily of sugar cane, soybeans, Eucalyptus, coffee and orange. Signs of soil erosion can be seen everywhere: soil life is in sharp decline due to the lack of biodiversity in the root system, the litres of fertilizer fed, constant ploughing and the subjugation of ecologic processes to the pace of production, since there is no time for soil to recover after sustaining such demanding

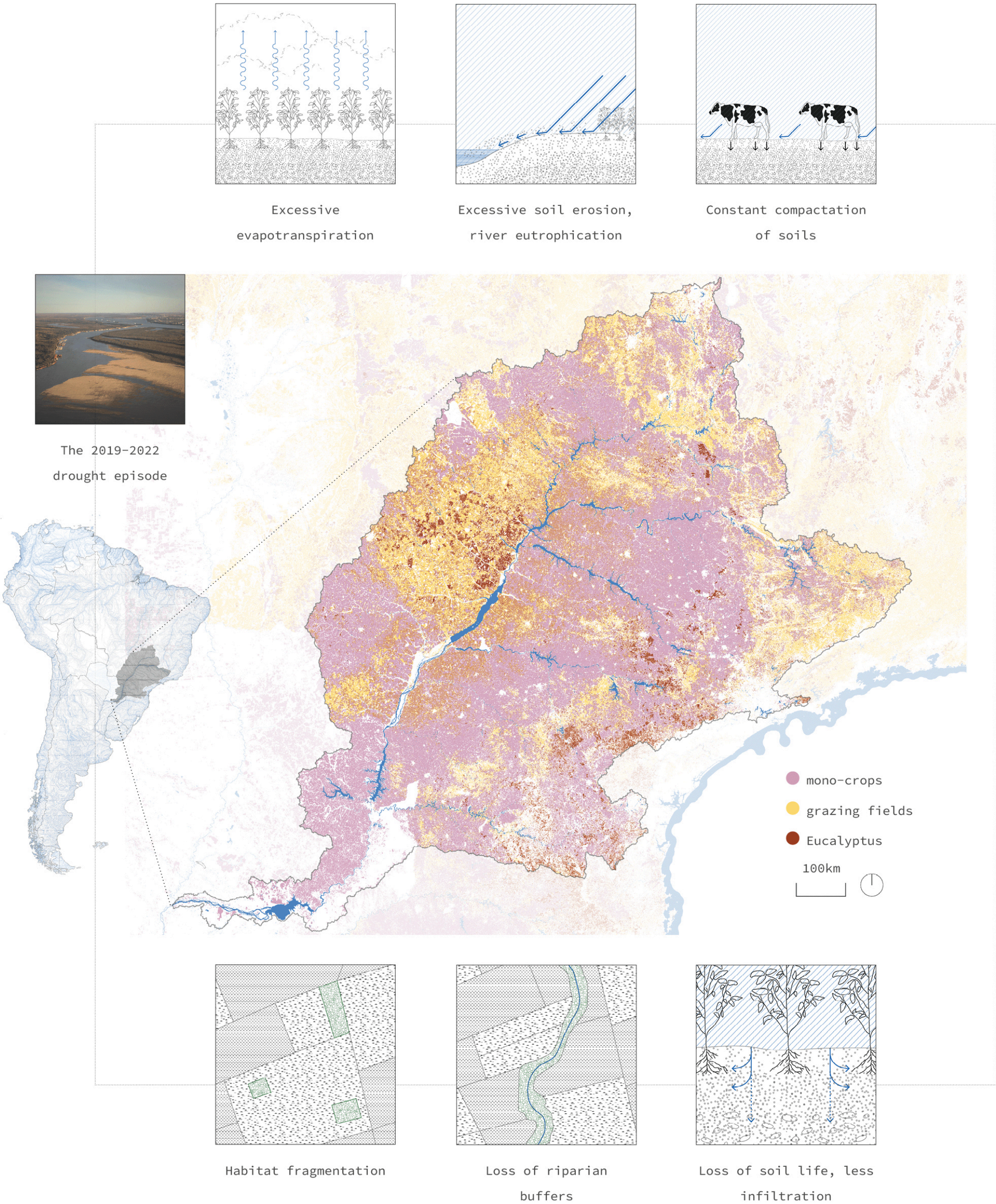


Figure 1: Location of the UPRB, current land use and land cover, and consequences of each land use category for the hydrologic system. Produced by the author; photo of the Paraná River by Sebastián Lopez Brach.

crops. Biologically dead soil is vulnerable to topsoil erosion (here estimated at around 15-25 ton per hectare per year), and deep infiltration and aquifer recharge are hindered. At the same time, the fact that monocultures essentially consist of one single vegetation strata make fields exposed to water evaporation. Such problem is especially present in grazing fields, which can be interpreted as a monoculture as they usually consist of one single grass species. During a visit to the Aguapeí State Park, an institution focused on the preservation and regeneration of local ecosystems, a guide (Adriano, personal communication, January 4, 2023) explained that the Sub-Saharan grass Brachiaria brizantha, introduced by cattle ranchers due to its endurance, was outcompeting native seedlings and hindering the Park's regeneration efforts. The original Atlantic Forest biome has been reduced to isolated fragments and thin riparian remains protected by law (a mandatory 30-meter offset from streams). The research visit clarified how the current land use and practices in the UPRB hinder water retention, allowing all rainwater to be immediately flushed downstream and creating a fragile hydrologic system, thus probably having amplified the effects of the 2019 drought event.

**The origins and modus operandi of the Plantation system**

Most alarmingly, the description above is not specific to the UPRB. The presence of monoculture fields on roughly 6% of the planet's surface (ESRI, 2022) drew scholars to investigate how such model, referred to as the Plantation system, has been historically built and keeps being intentionally reproduced, despite of its environmental damage. Historian Jason W. Moore (2016) challenges traditional narratives by placing the roots of capitalism and the global commodity market in the Plantation system, arguing that its origins go beyond the British Industrial Revolution. During a time when Imperial crowns started expanding their control over a world seen as an infinite assemblage of commodities to be freely exploited, capitalism was an encompassing "new way of organizing nature". In fact, the extremely accelerated pace and broad geographic scope of landscape transformations between 1450 and 1750 under colonial rule placed it as a new form of "world ecology". The author exemplifies how the Brazilian Atlantic Forest ecosystem, which covers the UPRB, was cleared at a pace 5 to 10 times faster than European woods in the Middle Ages.

Streams of thought such as the Cartesian dualism of Humanity versus Nature helped frame all land as "uninhabited", regardless of indigenous and other-than-human presences, and free for exploitation, most often through the use of de-Humanized forced labour. Scholar such as Malcom Ferdinand argue for the importance of understanding the exploitation of environmental and human resources as interdependent, the "double fracture of Colonialism" (Ferdinand, 2021).

Spatially, such ideology operates by the imposing of an abstract Euclidean grid that organizes appropriation and directs valuable flows towards exportation, simplifying complex ecosystems, disrupting cycles of food webs and local interdependencies. Commensurate cyclical ecological exchanges between all actors of the landscape are broken into unidirectional flows, running through newly built roads, railways, ports, and all sorts of infrastructure built exclusively for efficient draining of commodities. The extent of the ecological impact and global landscape transformation caused by the Plantation model, as well as the human inequalities it fuelled, even motivated a group of

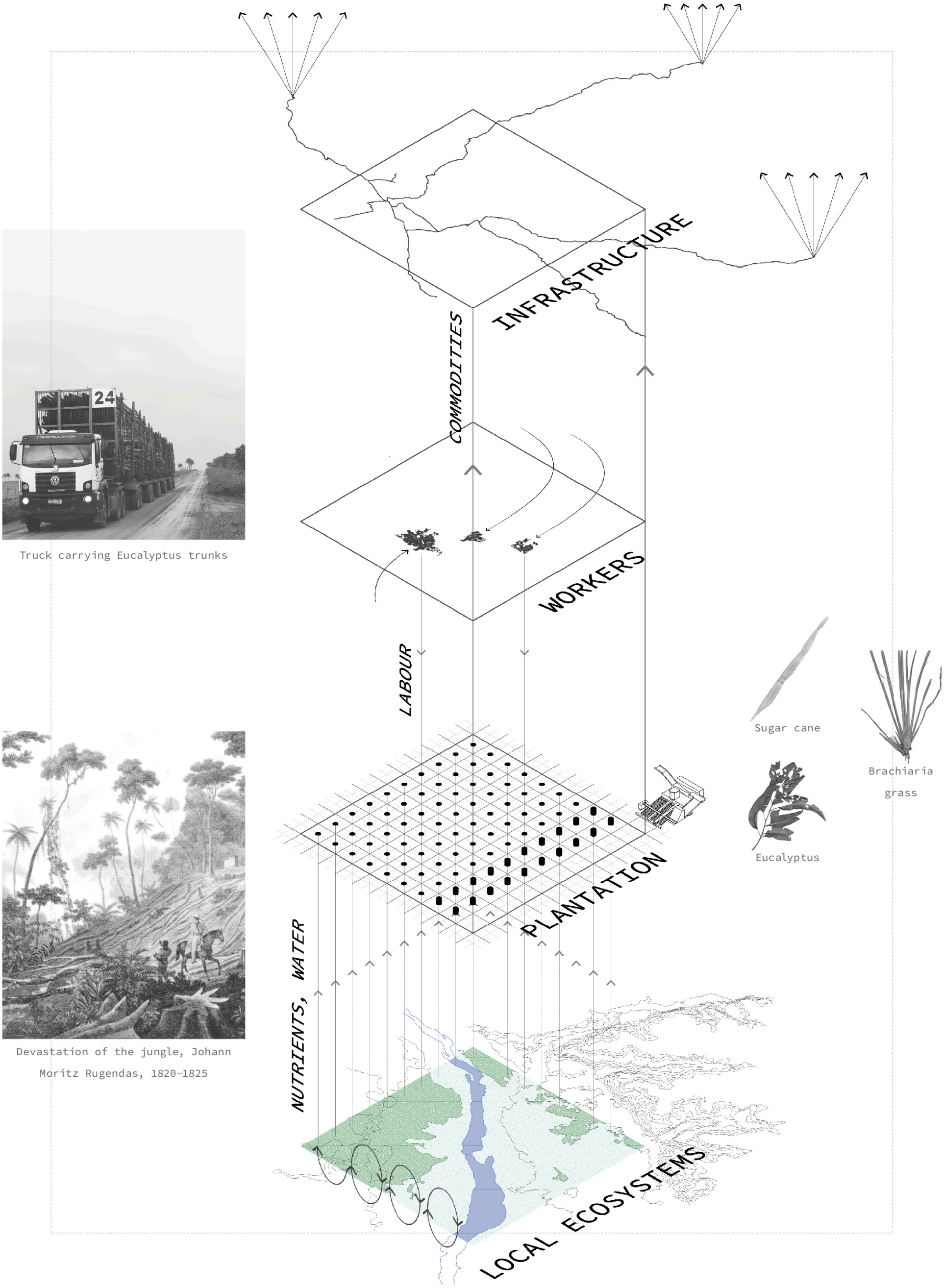


Figure 2: Layers and processes of the plantation model. Produced by the author; painting "Devastation of the jungle" by Johann Moritz Rugendas

environmental scholars to propose the term Plantationocene (Haraway et al., 2015), a nuanced version of the more widely known Anthropocene (Crutzer, 2006). In the context of this research, understanding the modus operandi behind Plantation systems clarified how present vulnerabilities emerged and persisted, and indicated the way towards realistic and context-specific regeneration models (figure 2).

**Setting up the Plantation: the 1905 expedition**

As a product of the Plantation system, the UPRB depicts how its modus operandi perpetuates beyond colonial rule. Brazil was already an independent country in 1905, the year where the government commanded an expedition along the Paraná River with the aim of mapping and assessing its exploitable resources. The so-called Comissão Geographica, whose report is available at the São Paulo State Archive (Comissão Geographica, 1911), described the Paraná River as mighty and meandering, full of waterfalls and rocky formations, with intense sediment flows forming dynamic islands, parallel lagoons of varied depths that appeared or disappeared according to intense seasonal floods. When entering the densely vegetated Atlantic Forest, the expeditioners would also encounter marshland systems amid the high and imponent vegetation. The report also describes brief encounters with the local Chavante indigenous peoples, who were feared even though friendly, as well as controlled fires seen from afar, a common Chavante hunting practice. The previous landscape was dynamic and heterogeneous, with attributes varying spatially and through time, which contributed to its biodiversity and resilience. The logic of the hydrologic system was that rainwater would either infiltrate deeply into the vegetated slopes and reach the aquifer, or get retained for long periods in the marshlands and lagoons – a very different situation from today (figure 3).

The decades following the expedition and the resulting assessment of exploitable resources were marked by extremely fast transformations: the Paraná River became a series of dams, causing marshlands

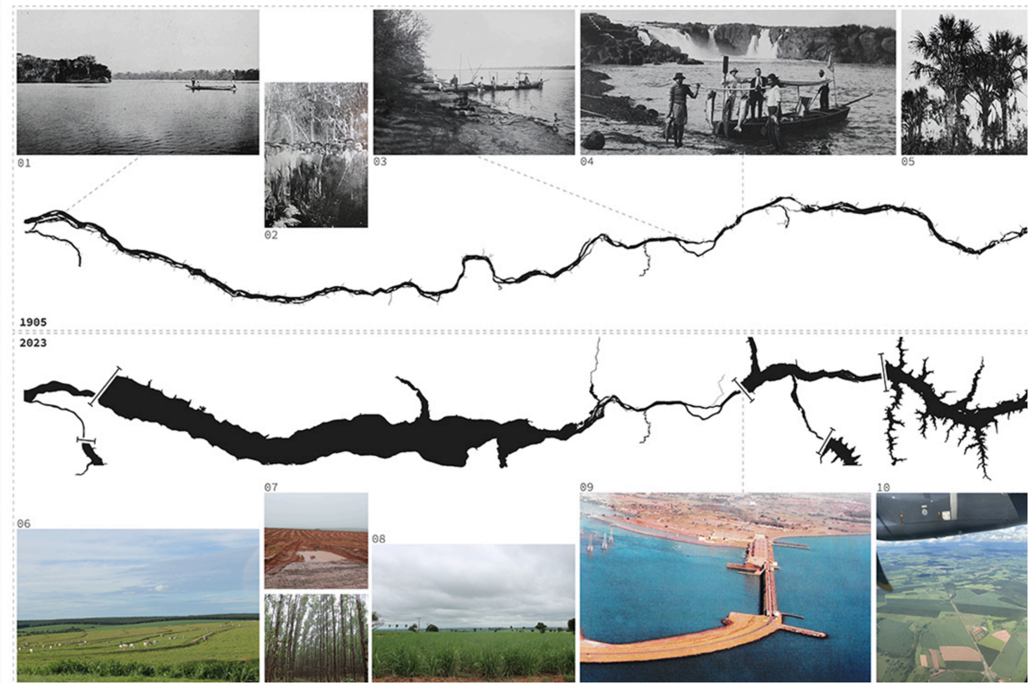


Figure 3: Graphic comparison of the Paraná River in 1905, based on the map produced by the Comissão Geographica e Geologica do Estado de S. Paulo (1911), and in 2023. Adjacent images show: confluence of rivers Paraná and Paranapanema (1), encounter with Chavante population, arrival at the Ilha Grande fluvial island (3), fishing in front of the waterfall Salto do Urubupungá (4), Burity trees at the margins of the river (5), grazing field for meat production (6), Eucalyptus plantation before and after harvest (7), a sugar cane field (8), the Jupiá hydroelectric reservoir, that caused the waterfall shown on figure 04 to disappear (09), the landscape seen from above, with its mosaic of plantation fields and straight lines infrastructure (10). Produced by the author; images 1 to 5 were sourced from Comissão Geographica e Geologica do Estado de S. Paulo (1911).

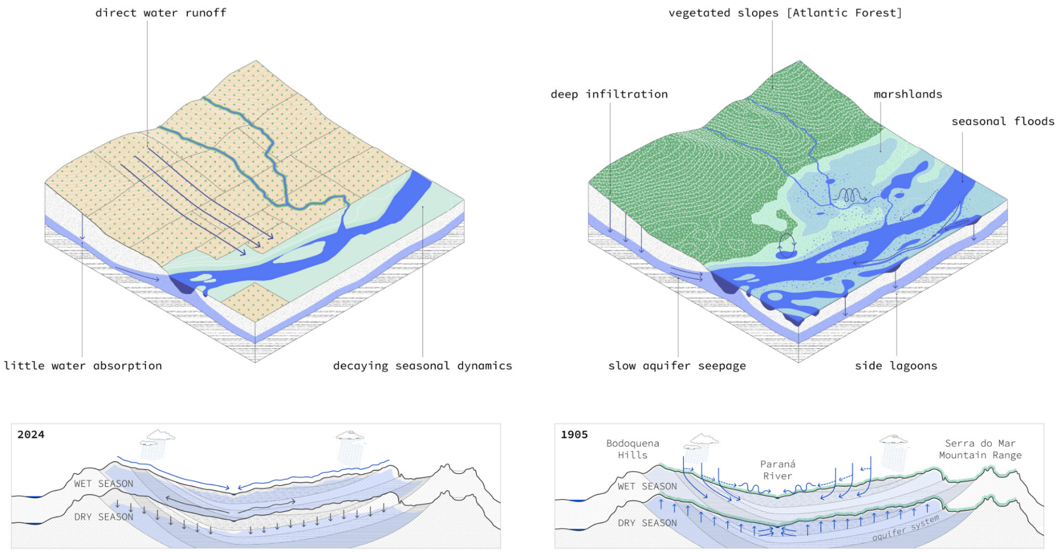

Figure 4: The logic of the landscape in terms of water circulation, in 1905 (hypothetically) and nowadays. Produced by the author.

and riverine ecosystems to dry; railways were quickly built to 'colonise' the land, carrying waves of migrant workers from the coast towards new settlements, and tons of coffee beans (the first economic cycle of the region) from the plantations towards the ports on the coast; deforestation took a very fast pace, as well as the semi-genocide of the indigenous populations due to violent territorial fights. Migrant agricultural labour came significantly from Japan, as part of a contract between the Japanese government, then struggling with an unemployment crisis generated by industrialization, and the statal government of São Paulo, then struggling with occupying and exploiting such a large territory.

**Regeneration in highly modified landscapes**

In the light of the Plantation model and the changes it generated, how can the water system be regenerated in the UPRB? Dilip da Cunha (2018) delves into the historic representations of the Ganges River to emphasize how most of the water cycle is disregarded by human eyes: across a watershed, water is omnipresent in clouds, humidity, soil, mist, materials, and all living beings. A broader understanding of the water cycle acknowledges how all ecological processes in the landscape, even though invisible, constantly play their role in it, expanding the task of hydrologic regeneration and creating opportunities to regenerate other interrelated disrupted processes in the watershed.

But what defines landscape regeneration? The case of the UPRB illustrates how regeneration should not be strictly defined by the return to a pre-disruption state of affairs, for example, to 1905. As it is usually the case with disrupted landscapes, the initial conditions have almost disappeared, and seem unreproducible: the basin currently sustains a significative part of the national and continental economy, and is home to roughly 100 million people. If returning to past baselines is unrealistic, literal understandings of regeneration become as confining as a straitjacket. Resilience theory has been focusing on finding adaptive baselines that enable the landscape to sustain its processes and inhabitants while experiencing disruption, instead of aiming at rigid, idealised past conditions (Ahern, 2011). In this context, regenerative landscapes can be seen as territories where actions, or a system thereof, are strengthening ecological processes and food chains following an external disturbance, but not necessarily re-creating past states. Regeneration departs from the understanding of the logic of the landscape (e.g. infiltration, hydrologic dynamism, heterogeneity) and the modus operandi behind the disruption process (e.g. simplification of complex ecosystems, disrupting of interdependencies and unidirectional flows) to act from within, then providing open-ended favourable conditions for local, ever-changing and dynamic ecosystems to thrive (figure 4).

Reflecting on the original logic of the basin and Plantation modus operandi, regenerating the water retention potential in the UPRB requires supporting and strengthening the remains of the Atlantic Forest ecosystem, fostering ecosystem complexity, local interdependencies, and re-territorializing flows of nutrients, from unidirectional back to cyclical. Regenerating the dynamism and heterogeneity of riverine ecosystems are a more difficult task due to the dams built, even though some solutions can be speculated. Two great examples illustrating why the abovementioned principles could work are the Loess Plateau, in China, and the syntropic agroforestry method (Götsch, 1997).

In the first case, an overexploited agricultural watershed along the Yellow River was regenerated by the community through acts of land forming to restore deep infiltration and, in consequence, soil life. The second is a method that succeeded in recovering many degraded agricultural sites in Brazil, through managing biomass debris to enrich soil life, and choosing species with strong interdependence ties. Both were successful because they reset the increasing of the complexity, interdependencies and energy in declining ecosystems, resuming ecological succession and its compounding effects.

**Tracing the Flow of the Landscape**

How would these regeneration principles work to reset the disrupted water cycle, or landscape logic, of the Paraná River? Regeneration principles work best when thought from within the logic of the landscape. In case of hydrologic systems, such logic derives much from the topography. The landscape of the Upper Paraná River Basin can be abstracted in three main topographic typologies: the headwaters, which receive rainwater and where most of the water springs occur; the slopes, along which streams and rainwater cumulatively flow, albeit formerly significantly retained by the dense vegetation; and the flatlands, a formerly dynamic sponge composition of marshlands, lagoons and the meandering main body of water, the Paraná River itself. Within the framework of regenerating the water cycle through the strengthening of the ecological integrity of the area, which can follow the principles of landscape ecology (Dramstad et al., 1995), actions commensurate to each of the topographic typologies are needed.

The headwaters, as areas where the aquifer is more exposed, need measures for protection and recharge of such, as well as to protect springs from silting up due to surrounding topsoil erosion. The slopes, as areas of intense flows and erosion, can have their previous water retention capacity restored through a contour planting strategy, departing from land forming to facilitate infiltration and re-activate the deep dormant seed bank, starting the process of natural succession. While green corridors in plantation landscapes usually suffer with the edge effect coming from production fields, syntropic agroforestry systems could help buffer it. Using varied species with strong interdependence ties, the system can benefit soil life, pollinators and local fauna, as well as local people and economy, with more varied production enhancing regional food security and local autonomy in relation to global markets. Finally, despite the absence of seasonal variations due to the dams built, biodiversity in the flatlands can be improved by regenerating their original heterogeneity – side lagoons of different sizes and depths, different levels of connectivity – using rainwater flows coming transversally combined with land forming, and proper buffers protecting such new ecosystems (figure 5, 6).

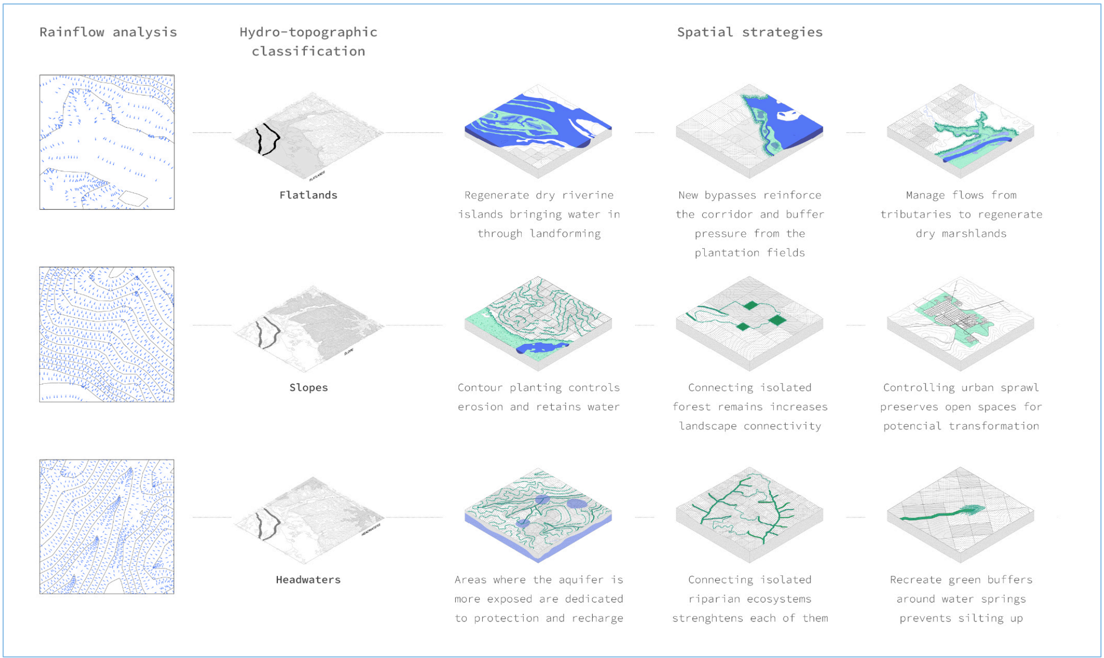


Figure 5: Set of strategies according to topographic category. Produced by the author.

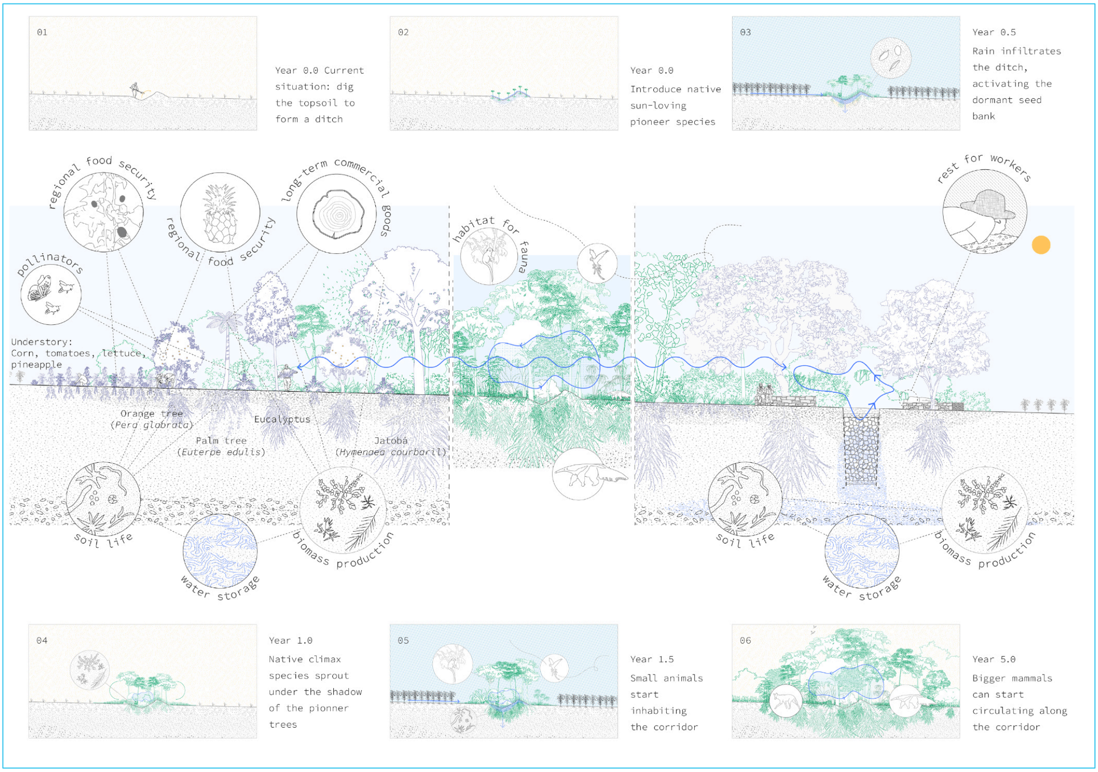


Figure 6: Proposal for reforested corridor, buffered by a syntropic agroforestry system. Produced by the author.

The 2019 drought event in the UPRB depicts how sustaining global chains of commodities can alarmingly exhaust a landscape's resilience and generate expressive environmental disruption. As in many Plantation landscapes around the world, the re-creation of past conditions in a literal manner is impossible in this case, leading to a seemingly unsolvable design assignment. However, this research suggested that the understanding of a landscape's inherent logic, as well as the study of the modus operandi behind the disruption, can offer tools to propose well-grounded regeneration tools. Furthermore, context-specific adaptive baselines can not only fulfil the main assignment identified, which was restoring water retention capacity, but also address associated vulnerabilities, such as ecological integrity and economic autonomy (Figure 7).

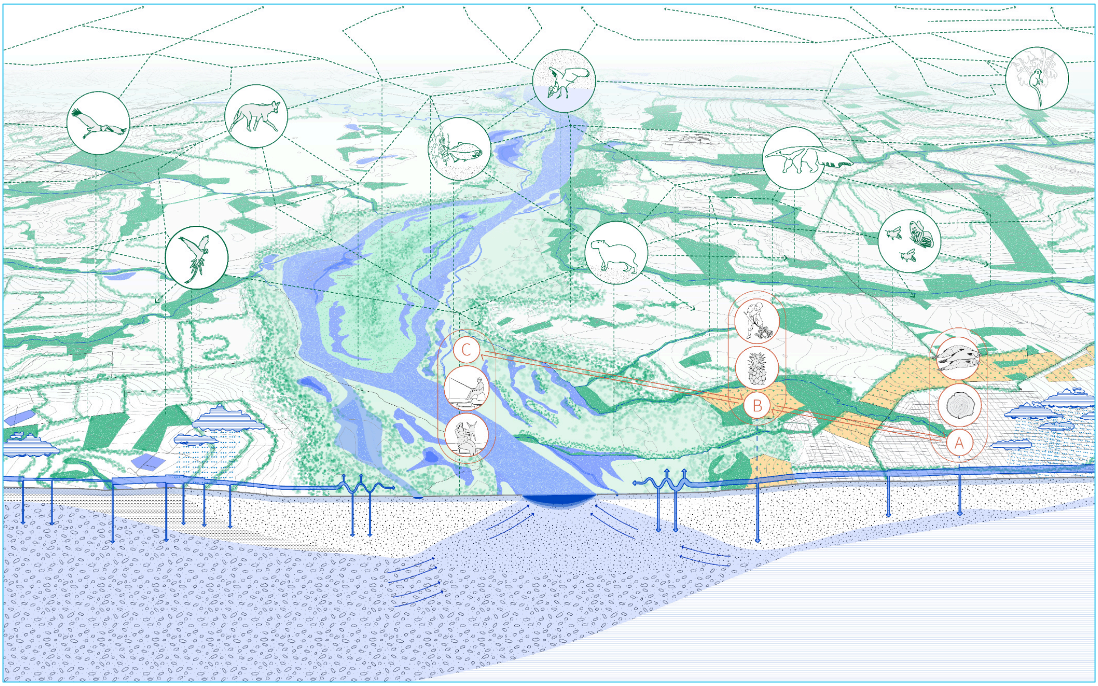


Figure 7: Speculative situation after regeneration measures. Produced by the author.

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# Future Matters: Rethinking material value-chains by drawing out hidden landscapes of extraction

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**Abstract**
This paper outlines a mode of landscape architecture practice that uses landscape drawing processes to prompt the rethinking of material value-chains. As the catastrophic damage reaped on Earth's ecosystems because of human material demands becomes increasingly visible, so to does the need to change current material-use practices. The drawing methods developed in landscape architecture for seeing and working with landscape can play a key role in this change-process, as they have the potential to open new perspectives among material users and support rethinking material value-chains by highlighting the urgent need for change. This approach to landscape practice operates through workshops that lead participants through drawing processes to establish encounters with the environmental destruction caused by hidden processes of material extraction. This work highlights a future role for landscape architects supporting regenerative material practices through cultivating awareness of our distributed landscape impacts.

## Introduction

As the catastrophic environmental impact of our relentless demands for Earth's material resources becomes ever-more apparent, so too does the urgency of rethinking our relationship with material resources. Landscape architecture is a practice well-placed to assist in this rethinking, and in ensuring Earth's future matters. The spatial and social organisation of modern society often hides sites of material extraction, perpetuating consumers' abstraction from the environmental impact of these practices. Having consumers connect to and understand these sites is fundamental to rethinking material value-chains, and it is here that landscape architects can play an instrumental role. The drawing methods developed in landscape architecture for seeing and working with landscapes have the potential to open new perspectives among material users. Outlined in the following paper is an approach to this type of practice, where hosting drawing workshops at design events helps designers encounter the environmental degradation caused by their current material-use practices. This practice offers one way for landscape architects to prompt a revision of material value-chains, and to advocate for a regenerative material future.

## Mechanisms of Abstraction and Encounter

In 2024, the Global Footprint Network identified August 1st as the date in which humanity exhausted the biological resources that Earth can renew during that year. This date, identified as 'Earth Overshoot Day' (EOD), has been steadily moving forward from almost 12 months in 1971 to 7 months today and illuminates an increasing demand on Earth's resources, despite growing awareness of catastrophic environmental degradation and concern for rapidly warming climates (2024). The sustained capacity for resource consumption in the face of such destruction can be attributed to the modern systems and structures that separate consumers from the places and landscapes of material origin, and the destruction these extractive practices cause. While the ecological degradation caused by our relentless demands for Earth's material resources is becoming increasingly apparent through media and scientific studies (Ritchie 2021), we can abstract ourselves from this process. Jane Hutton attributes our ability to abstract ourselves from the impact of material extraction to the social and geographic structures through which modern human society operates, in which the places of production are distanced from the cities as the main economic centres for exchange. This means consumers rarely encounter the communities or landscapes that yield the raw materials we use (Hutton 2019, p.6). In this capitalist structure, material resources are removed from their landscapes of origin, transported and transformed into objects of economic exchange (Tsing 2015, p.121). At the point of consumption, the material has often become so processed that it is nearly impossible to recognise the original material or link it with the environment that produced it. Thus, geographic separation preserves the conceptual separation of material consumption from the landscapes and more-than-human ecologies impacted during processes of extraction and production. Finding ways for material-consumers, such as designers, to encounter the hidden landscapes and environments impacted by material extraction is a fundamental aspect in supporting an urgently needed rethinking of the material value-chain and in making clear to consumers that more regenerative material practices are urgently needed.

Landscape architects are uniquely well-placed to perpetuate this process. The drawing and mapping techniques used in landscape architecture have been developed as approaches for exploring the vast landscape in all its spatial and temporal configurations. As such, these same drawing processes can become vital mechanisms in creating encounters between material users, the hidden landscapes of extraction they are complicit in sustaining, and the destruction this causes. As US-based landscape architect James Corner notes, landscape architects rarely work with the physical stuff of the landscape itself, working instead at a "peculiar distance" through "a completely different medium, an intermediary and translatory medium that we call drawing" (1992, p.145). The practice of drawing landscapes brings the designer into contact with the site and medium itself and is both a way of seeing and exploring the landscape and a generative activity through which new landscapes are envisioned (Corner, 1992; Amoroso, 2022).

While drawings produced by landscape architects are useful for communicating findings and ideas, the act of drawing itself is a powerful mechanism for thinking and seeing landscape from different perspectives. As the artist Bridget Riely notes, when drawing, it is as if "there is an eye in the end of my pencil" which enables discoveries that may be present but have remained unnoticed (Riley cited in Clarke, 2022). It is this process and act of drawing which helps bridge the "peculiar distance" inherent to landscape

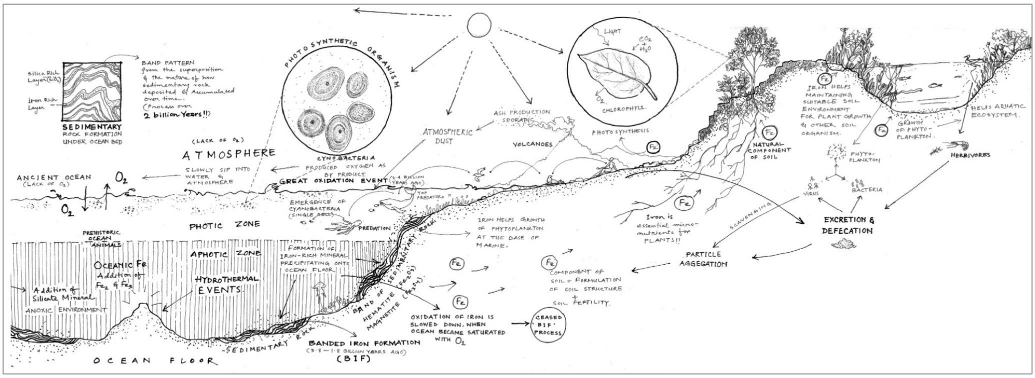


Figure 1: Drawing by landscape architecture student Shuvra Das exploring the regenerative role of iron ore in the natural environment, developed during a course I developed for exploring how landscape architects can be agents in changing material cultures (2024).

architecture practice, and through which landscape architects come to know places they may not physically occupy. This power of drawing is useful for a practice that aims to establish encounters between material-users and hidden landscapes of extraction. However, as an approach to changing landscapes through changing values, it requires carefully leading material-users through actions of drawing in a way that reveals their connections with hidden landscapes of extraction. An example of this approach to practice is outlined in the following, and aims to support a fundamental revision of material value-chains in the fashion design industry.

**Drawing Connections with Hidden Landscapes**

This approach to prompting a rethinking of the material value-chain in the fashion industry using landscape drawing methods was trailed as a workshop developed for Here//To//For Lab; an activation space within the "Fashion Fictions" exhibition at Vancouver Art Gallery (2023). Conceived by Material Matters, a research facility in Emily Carr University of Art and Design in Canada exploring emergent fabrication technologies, Here//To//For Lab invited academics and artists to envision possible futures by exploring how we work with materials in the present (Material Matters, 2023 p.102). As a contribution to the participatory program of Here//To//For Lab, the workshop invited designers from diverse fields to collaborate in drawing maps exposing the hidden landscapes of extraction they contribute to through their material use.

Acknowledging the workshop, and its potential design agency as a landscape architecture practice requires the landscape architect to adopt a "facilitatory" role, impacting landscapes indirectly though prompting material culture change. The English term "facilitation" builds on the Latin facilis, denoting "easy to make", and while facilitation as practice tends to be undermined due to its association with the term "ease" (Preston, 2016), when done successfully, facilitatory events can be instrumental in the sharing and uptake of new perspectives. In the case of this workshop, instead of offering finite solutions, facilitating landscape drawing processes enables designers to explore and encounter their own roles in perpetuating extractive industries and subsequent landscape degradation, and advocates for rethinking of material use practices.

Figure 2: Workshop participants translating web-sourced information on the raw material of aluminium, bauxite, into drawing at Here//To//For Lab. Photo: Alice Lewis (2023)

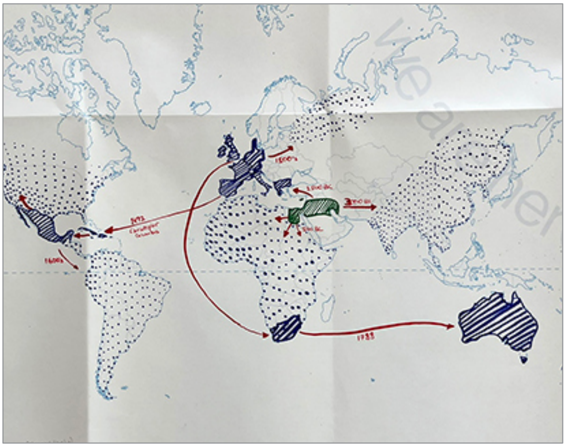

Figure 3: Detail of drawing developed at Here//To//For Lab exploring global distribution of sheep and wool industries over the past 1,000 years, focusing on major actors during this time. Photo: Alice Lewis (2023)

Leveraging the location of Here//To//For Lab within a fashion exhibition, this public workshop, and the iterations which have subsequently followed, targeted designers and design students. Targeting designers who use material is tactical given the role they play in current material-use processes. Not only do designers use materials, but they also perpetuate material demands amongst their consumers and thus support extractive industries. Designers also have a unique agency to change these demands by introducing new products or lifestyles that actively reduce extractive material impacts through the way they are made or used.

During a three-hour session in the Vancouver Art Gallery, 20 participant-designers worked on a collective drawing activity to explore the distributed and drastic impacts of materials commonly used in contemporary design, and which appeared in the Fashion Fictions exhibition. Covering an array of classifications, time scales, extraction methods and colonial histories the group explored plant matter (cotton and natural rubber), animal fibres (wool and silk) and geologic materials (polyester and aluminium). Groups of participants explored each material collectively, approaching it from four directions exploring material life cycles, ecosystem entanglements, material migrations and human production processes that brought together time, space, actors and economics with the aim of identifying their individual roles and scope for action within this complexity.

Responding to written, visual and verbal prompts participants translated sourced web-based information into diagrams drawn onto large-format templates, generating maps exposing spatial and temporal dimensions of how materials (and our extraction of them) transforms landscapes. Corner notes that the agency of this type of mapping lies "in uncovering realities previously unseen or unimagined, even across seemingly exhausted grounds" (2011 p.89). In this case, participants used predetermined questions to guide web-based research and drew their findings onto the page. While the required information is readily available on the internet (arguably "exhausted terrain"), the act of translating this often-textual information into drawing is important in exposing, spatializing and understanding the role of current material-use practices in global patterns of extraction.

In exploring *material migrations*, participant acts of drawing out historical paths of movement across Earth revealed routes of colonisation and the subjugation of lands and labourers at a global scale in quests to dominate places and markets. Plotting the contemporary movement of materials between sites of extraction, production and use reveals a globalised network of trade spanning thousands of kilometres and requiring masses of energy. Drawing the *life cycles* and *ecosystem entanglements* of raw materials showcases the ecological role each material has within Earth's naturally occurring regenerative landscape processes, as well as how our human ingenuity has capitalised on and in some cases, enhanced these systems (though almost always with damaging consequences). This process of enhancement links to the final category documenting *production processes*, which intercept the lifecycles of matter at the opportune moment for our own use with little regard to the impact this has on the more-than-human entities existing in the land, or with this material. As drawings accumulated and expanded on the page, the complexity of these systems are exposed through the multiplicity of sites, resource networks and growth cycles involved in our extraction of individual materials.

The workshop concluded with participant groups giving short, informal presentations of their discoveries to all present, including some causal exhibitiongoers who hovered around the periphery of the workshop zone. While the discoveries varied in extends and scope relative to the material investigated, each group commented on the sheer scale of extractive impact, and began to identify specific places of material production, such as the cotton-growing regions of India, China and the U.S. and the impact of industrialised agriculture in these areas. In short, participants began to encounter and connect to specific landscapes of extraction which had previously been hidden from view and ignored and to locate themselves into these systems of exchange. This demonstrates how landscape drawing can be a vital tool in enabling designers from diverse fields to visualise landscapes and systems that are otherwise unnoticed, and supports rethinking of material relations towards regenerative futures.

**Towards Future Matters**

The value of this indirect approach to aiding regenerative landscapes is in the capacity of landscape drawing approaches to reveal the impact and urgent need to change current material use

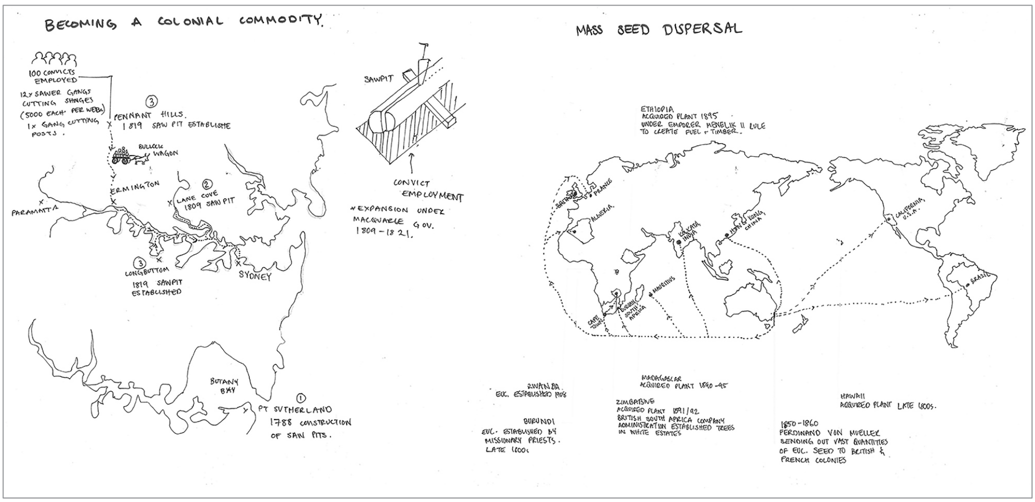


Figure 4: Drawing by landscape architecture student Emma Crocker exploring some of the landscapes and communities impacted in using Eucalyptus Saligna as a building material (2024).

practices. Enabling encounters that disrupt the abstraction of material consumption from the catastrophic impacts of material extraction is a vital step in rethinking material value-chains and redesigning material relations, in fashion and other material-heavy industries. The workshop method discussed here has since been run with groups of students studying fashion design, industrial design and landscape architecture, and included in the book Radical Fashion Exercises: A Workbook of Modes and Methods edited by Laura Gardener and Daphne Mohajer va Pesaran (2023). The ongoing uptake of this method not only demonstrates a mounting desire to understand places of material impact but also highlights the role landscape architects can play in helping designers see hidden landscapes and understand the complexity of our current material exchange networks. This work highlights a future role for landscape architects supporting the redesign of material cultures through enabling awareness of the destruction caused by current practice and questioning our material future.

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# Beyond numbers: Rethinking environmental evaluation through ‘hidden’ landscapes of extraction

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**Keywords**: Ecological evaluation methods, life cycle assessment, ethics of care, extraction landscapes, marine sand and gravel
**Abstract:** Out of sight, out of mind. This is the case for many procedures and global value-added supply chains, and the building industry is no exception. When architects choose materials for buildings, infrastructures, or landscape projects, we simultaneously create holes in seemingly hidden landscapes. These landscapes are hard to imagine as the production and supply chains are both too complex to comprehend and excluded from our everyday workflows. However, a significant 90% of biodiversity loss is attributed to resource extraction and processing, of which 50% is related to the construction industry (Circular economy, 2023). While methods accounting for environmental impacts are already being used, they will most likely be demanded to a higher degree as environmental policies depend on them (European Council, 2024). However, these existing methods lack holistic ethical considerations for evaluating and visualizing the consequences of material choices in architectural practices.

## Method

By analyzing notions of ethics by Danish philosopher Husted and relating them to existing environmental evaluation methods, ontological layers are inquired into in our understanding of landscapes ‘before’ they are impacted by extraction.

## Results

Existing Evaluation Methods: Life cycle assessment (LCA) vs. Environmental Impact Assessment (EIA)
The most commonly used evaluation method for environmental impacts in built projects is the Life Cycle Assessment (LCA), which accounts for the following impact categories:

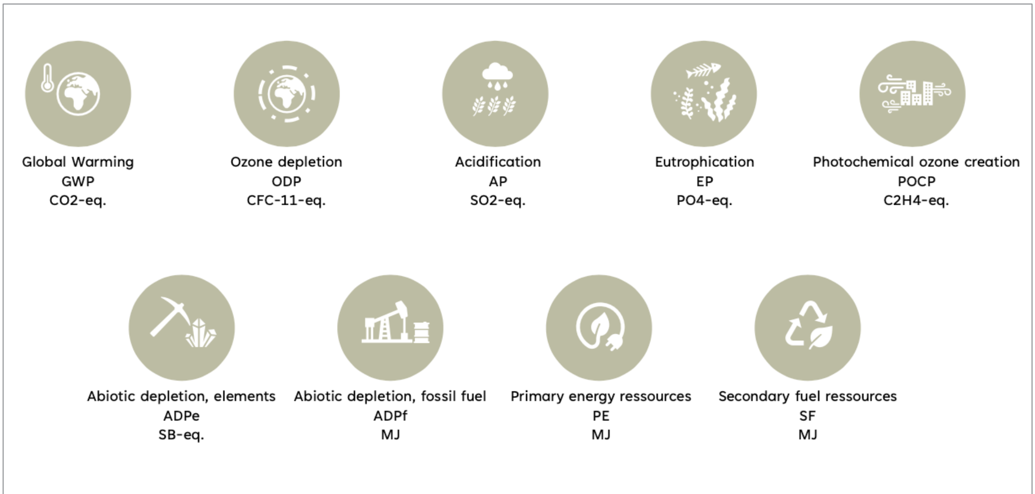


Figure 1: LCA impact categories (Ekolab, 2023)

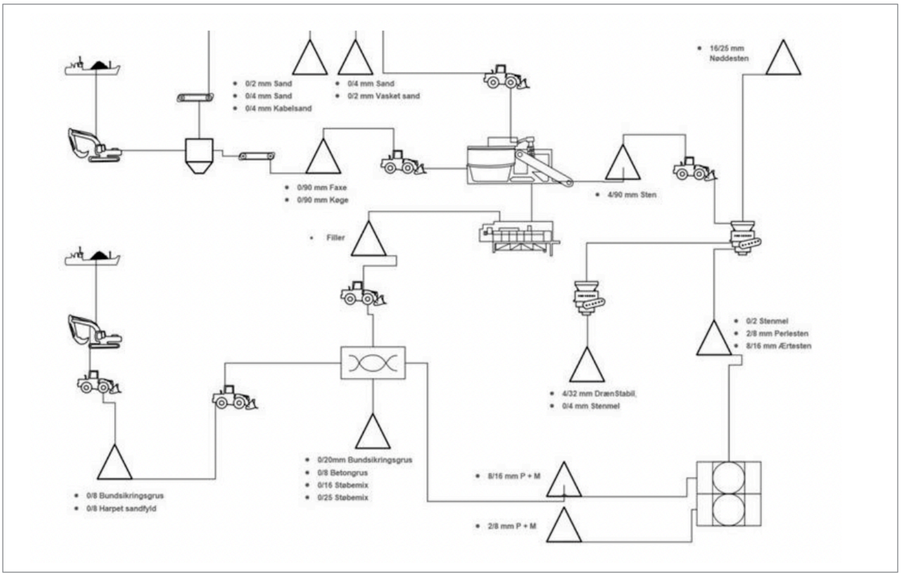

Figure 2: Process diagram from EPD for marine aggregate extraction by (NCC, 2021).

All the data above is found in the Environmental Product Declarations (EPD's), which material manufacturers provide. A general EPD, which is not as accurate as a product-specific one, can be used if a material cannot be found in the EPD databases. These can be found on websites such as Ecoinvent and Ökobaudat (ÖKOBAUDAT, no date; ecoinvent - Data with purpose., no date). Despite the different units, all categories can be converted into carbon dioxide equivalents [CO2-eq], allowing the method to provide one numerical value for a project as a whole. When making LCAs for buildings, the value is calculated as carbon dioxide equivalents pr. square meter pr. year [CO2-eq/m2/year], making it possible to compare the footprint of buildings with different sizes. Many aspects of this method can be criticized, but as of today, the LCA is the most commonly used method for calculating the construction's CO2 impact.

The LCA is divided into the following phases: A1-A3: Product, A4-A5: Building process, B1-B7: Use, C1-C4: End of life, and D: Outside of project (reuse). In modules A1-A3, the landscapes outside of the building site can be considered. The embodied carbon is also accumulated in the early A-phases. Even though A1 (raw materials) should include the impacts on the extraction landscapes, we simply lack tools to identify hotspots of biodiversity impacts in building projects and mitigate them through design and material choices (Francart et al., 2024). The hidden landscapes of extraction are rarely considered in the EPDs used for the LCA. This is visible in the diagram below, as the landscape of extraction is left out.

In this EPD for marine aggregate by the Nordic Construction Company (NCC), the process of aggregate production starts with the machine and not the landscape: "The process of extracting natural sand & gravel at sea starts with an empty ship that leaves the harbour and travels to a dredging area out at sea." Leaving out the landscape is the case for most EPDs, revealing that the landscapes of extractions are generally out of concern, purposely positioning them as 'hidden'.

Addressing landscapes before the A-phases of an LCA can be done through an Environmental Impact Assessment (EIA). However, an EIA is not normally considered a part of a material's EPD. An EIA is required for major building or development projects in the EU, and they can also be made concerning the allowance of new extraction sites. In Denmark, the extraction license is granted on the basis of a completed environmental assessment.

The EIA is more nuanced and specific to a landscape than an LCA. According to its regulations, it "assesses the direct and indirect significant impact of a project based on a wide range of environmental factors, including: population and human health, biodiversity, land, soil, water, air, climate, landscape, material assets, cultural heritage." Moreover, the EIA is assumed to "guarantee environmental protection and transparency with regard to the decision-making process for several public and private projects" (Environmental Impact Assessment - European Commission, 2024). The nuanced assessment of an EIA considers environmental consequences rather than stating a numerical impact value. However, the validity of such assessments can be questioned, as they are financed by contractors with clear interests in erecting a given project[1.]

**Environmental assessments and ethics**

Different assessment methods embed different ethical theories. For example, if not stated otherwise, the LCA refers to the attributional LCA (ALCA), which is based on deontological ethics. Deontological ethics is characterized by normative choices within a predefined system boundary at a specific point in time. In his book Ethical Theories, Husted explains a situation where you would return a book to the library because you promised to do so. Generalizing deontologically from this example, anyone should keep their promise (Husted, 2014, p. 226).
The handling of EPDs in the ALCA – especially the general EPDs – can be compared to that of deontological ethics, as the goal is to be able to compare the impacts of buildings. Hence, generalization is needed. Sand as a construction material can be found in many different EPDs, sourced by land, rivers, and sea. The ALCA only shows the specific share of environmental impacts a given project has at a specific point in time. The EPD for sand states specific values for all the impact categories, and these are the only aspects considered in an ALCA.

In contrast to the ALCA, consequential LCA (CLCA) is a more complex methodology. CLCA captures changes in environmental systems within global value-added chains as consequences of the addition or removal of an activity. CLCA is concerned with a product's impact on the surrounding systems and how a product or system fits into value chains and different markets (Ekvall, 2019). The CLCA is based on consequentialism, which is an ethical dimension more occupied with the outcome of an action. Sometimes, acting in a seemingly "bad" way can be okay if the outcome is "good". An example could be returning a book to the library even though you are not allowed to go into the library after closing time. The fact that the book is returned on time is more important than how it was returned, prioritizing the goal over the means.

Using the case of CLCA from the building industry means that the consequences of the material choice are assessed. If you choose a seemingly sustainable and local sand type for your project, how will it affect the sand market in the area? Will someone else need to source it farther away? The CLCA is thereby more complex to conduct but gives a more accurate picture of the consequences of material choices on the global market.

As shown in the diagram below, the ALCA and CLCA can be described as either a share of the global environmental burdens (ALCA) or the impacts on the global environmental burdens (CLCA). Hence, the CLCA describes a system's dependencies on supply and demand, whereas the ALCA merely describes the general preassigned burdens of a specific material.

*1 The process of the planned artificial island, Lynetteholmen is an example of the EIA not being reliable as "the negative environmental effects are downplayed" and the "legally binding process is only based on a single party contribution from the developer". Translated from (Markager, 2023, p. 10*

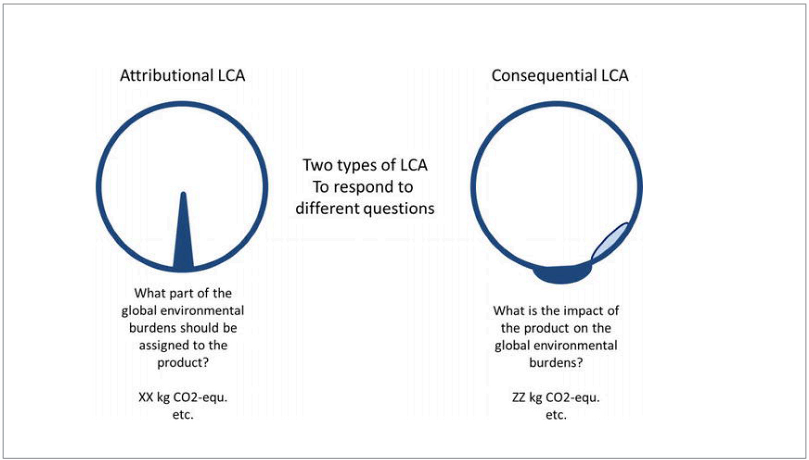


Figure 3: The conceptual difference between attributional and consequential LCA (Weidema, 2003).

It is already established that the ALCA can be associated with deontological ethics, whereas the CLCA is associated with consequentialism (Schaubroeck, 2023). The two methods thereby have different purposes and complement each other. The ALCA can be used to define an initial scope of responsibility, whereas the CLCA cannot. The CLCA is aimed at reducing environmental impacts by investigating the consequences of an action.

*Ethics and time intervals*

"It is the mere encounter (in its broadest sense) with another human being that gives us responsibility and obligations towards them, establishing the slightest caring relationship" (Husted, 2014, p. 235).

The different ethical approaches are connected to different time intervals. Deontological ethics and consequentialism are not limited to but associated with the time intervals of 'now 'and 'after'. While the former deals with the act itself (the 'now'), the latter does so with the consequences of the act (the 'after').

However, in other fields like social work[2], the 'before' is considered more important. Often, it is associated with ethics of care based on the encounters and interdependency among beings. Employing the book example again, one would return the book because one had spoken to another person who needed it. In this way, ethics of care appear when other people's needs are treated with empathy, compassion, and understanding through communication. This requires explicating the situation rather than generalizing (Husted, 2014, p. 227).

Ethics of care can also be performed in relation to more than humans. Bellacasa has rewritten Tronto's description of care in the following way: "Care is everything that is done (rather than everything that "we" do) to maintain, continue, and repair "the world" so that all (rather than "we") can live in it as well as possible. That world includes . . . all that we seek to interweave in a complex, life-sustaining web" (Bellacasa, 2017, p. 161). This is relevant in relation to evaluations of building materials and their complex web of supply chains interweaved with extraction landscapes. What happens before raw materials become building materials? Who and what is affected? And what are their needs?

*2 The field of social work is concerned with the basic needs of individuals, families, groups, communities, and society as a whole.*

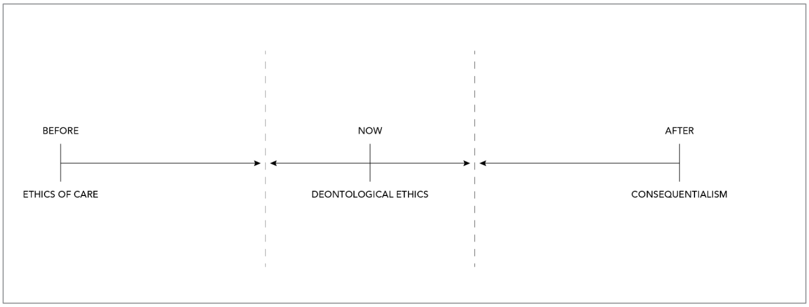


Figure 4: Based on the diagrams that appear in (Hemme, 2019, pp. 23, 26, 29)

(Hemme, 2019) links the three ethical approaches with the time intervals of 'before', 'now', and 'after' through the figure presented above.

A central finding of this paper is, that the building industry's assessment methods lack an approach concerning the 'before', which might be connected with ethics of care. The figure below is a combination of Hemme and Weidema's diagrams, showing a missing focus on ethics of care when using the LCA methods.

While EIA methodology could be framed under ethics of care, its deficiency lies in being connected to a specific site but not to a specific material, thus disregarding the impacts on landscapes. Similarly, a few other attempts have been made to expand the LCA to include the time interval of 'before', but each of them has its inadequacies3.

**Discussion**

*The case of marine sand extraction*

Marine ecologist Stiig Markager is profoundly worried about the life on the seabed and how sand extraction affects it. Sand is the most extracted solid substance on earth, counting 50 billion tonnes annually, but it is treated as an insignificant material (Beiser, 2018; Environment, 2022). Around a third of Danish sand is extracted from the sea (Miljø- og Fødevareudvalget, 2020), and as the 'battle for areas' on land continues, the extraction might be pushed towards the sea. Coming from two dissimilar fields, natural science and architecture, we can demonstrate several externalities unaccounted for in the existing LCA

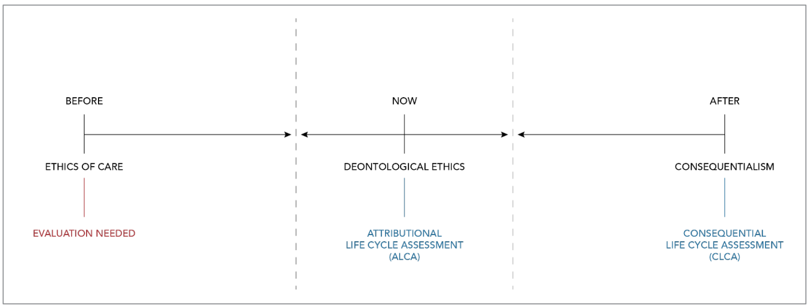


Figure 5: Missing ethics in environmental evaluation by author. Combination of the two former diagrams by (Weidema, 2003) and (Hemme, 2019).

methods. Besides removing habitats, gasses are emitted as sand is dredged from the seabed, dispersing the unwanted plume back into the water, releasing greenhouse gasses that are toxic to fish and contribute to global warming. See figure 6. Thanks to transdisciplinary collaborations, it is evident that architects are largely uninformed about these processes due to the absence of direct confrontation with them, which cannot be gained through numerical values.

Architects can play a central role in understanding the connection between building materials and their extraction landscapes, fostering ethics of care in the building industry. Visualizing the case of slow violence imposed on the seabed today might push extraction practices back to land, where we, as humans, are able to see and be held accountable for the landscapes we are affecting (Nixon, 2011). Externalities might still appear, but methods to regenerate open gravel pits into new biotopes already exist (Association Biodivers, 2022). Establishing the connection between building materials and extraction landscapes is key to achieving a regenerative practice, as architects could suggest positive outcomes through methodologies, including ethics of care.

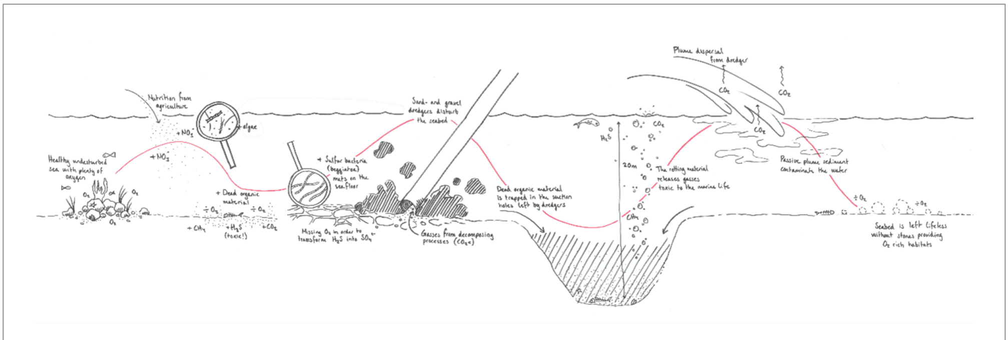


Figure 6: The process of extracting marine aggregate from the seabed before its arrival on the dredging ship.

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# The *natural* Icelandic landscape: Examining devegetation of the Icelandic landscape as a function of historic trade, and modern economic solutions to support ecological restoration in Iceland

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**Introduction**

Popular representations of Iceland show the country as ruggedly independent, with self-sufficient farmers eking out a living in the northernmost arable part of Europe, a green-energy paradise where sustainability is paramount in an untouched wilderness ecosystem.

These are wrong.

Estimates vary, but at the time of settlement the Icelandic landscape would have been rather different to how it appears in the modern era, with about 70% plant cover and between 25% and 60% of the land being covered by forests, primarily birch stands but with other types of trees, such as rowan and poplar, interspersed among them (Júlíusson et al., 1989). Within a few generations of the settlement of Iceland, these forests were largely cleared (Skógræktin, N.D., Aradottir & Eysteinsson, 2005). The materials were used for boatbuilding, home construction, and, most commonly, a fuel source. However, much of the deforestation occurred because in early Iceland wealth existed mostly in the form of livestock (Zori et al., 2013), and as recounted by Andriði in Kjalnesinga saga, "bæinn er of skógi vaxinn til að vera nýttur (Guðni Jónsson, 1947)" (the farm was too thickly covered in forest to be grazed).

Apart from forest ecosystems, wetlands played a major role in pre-settlement era Icelandic ecology. The wetlands covered much of the island, and were important as breeding grounds for the wild fowl, which were a major staple of early Icelanders' diets. They characterized by highly organic soils that performed similar roles to forests in that they prevented desertification and aeolian removal of organic soils (Arnalds et al., 2016).

Iceland was never self-sufficient, and the necessity of paying for cereal and timber imports led to overproduction of wool goods and other animal husbandry products for export into international value added chains. Overgrazing ensued (Guðni Jónsson, 1947, Skógræktin, N.D.).

The resulting devegetation of Iceland led to a grim situation in the early modern era. Until the 1970s, animal production remained massively unsustainable as a prerequisite for economic survival and food security. While many interventions have been made in the last century, the scale of necessary restoration operations is beyond the financial capacity of the Icelandic government. This lack of vegetative cover has negative implications for multiple UN and Icelandic governmental initiatives, regarding both ecosystem restoration, food security and native biodiversity (Raworth, 2017, United Nations Environment Programme, 2020, Matvælaráðuneytið, 2022, UN Environment programme, 2022, Sandin et al, 2022, FAO 2023).

With the advent of the cap and trade system in the EEA for carbon emissions, the massive deserts and unvegetated areas of Iceland have become a valuable commodity (United Nations, 1998, MCC Policy Brief, n.d., European Commission Climate Action, 2016, European Commission Climate Action, 2022, Legal Information Institute, 2022). Sale of carbon sequestration credits can finance novel afforestation of areas that have been devoid of vegetation for centuries, and provide farmers an income that does not depend on the export of materials from land use. The ecosystem services provided by these afforestation efforts have effects on everyone, not just farmers, and can serve to stabilize local

The *natural* Icelandic landscape, Hfrafn Óskarsson

microclimates, improve soil resource quality, reduce property damage and health issues caused by dust storms and mudslides (Nilson et al., 2018, Tang et al., 2018, Palsson, 2019, Guðmundsson et al., 2019, Wolosin & Gray, 2022).

While policy and planning are beginning to follow the market trends, there remains a great deal to be done in order to maximize the local stakeholder benefits from carbon sequestration interventions, and undo the damage done by years of overexploitation to meet the needs of international value added chains.

**Discussion**

At the beginning of the settlement period, food production in Iceland was largely foraging, fishing, and dairy production. Cereal cultivation, and sheep, for wool production, were mostly kept for domestic use. With the onset of the little ice age, cereals were not possible to cultivate in Iceland any longer, and increasing dependence on foreign trade to get staples such as these lead to a heavily export based economy (Júlíusson et al., 1989, Lucas & McGovern, 2007). Due to deforestation, over time even wetland soils became important as a building material and fuel source, wherein sod was cut both for the purposes of building turf houses and to dry and burn to heat them. This removal of material was perhaps not as significant and instantly hazardous as the decimation of the forests (today around 2% of Iceland's surface (Skógræktin, N.D.)), but it certainly interrupted natural cover and allowed for the further degradation of soil resource quality.

As centuries passed, various products were more in demand in Europe, such as dried stockfish, wool cloth, vellum, but the net effect was that Icelanders either exported more agricultural products and ate more fish or exported more fish and ate more agricultural products. The trend over time favored sheep farming over dairy cows, and the demands placed on it exceeded the regenerative capacity of the land (Sveinbjörnsdottir, 2007, Lucas & McGovern, 2008, Byock et al., 2013, Erlendsson et al., 2018).

These trends continued until the early modern era, with severe ecosystem degradation and functional poverty characterizing the period from the 1600s until the mid-1900s when modern agricultural practices and aerial seeding had managed to increase farm productivity and revegetate some of the most critically degraded parts of the island (Petursson, 1962). The onset of afforestation efforts to control erosion, especially dust storms also helped. While progress is being made in cereal production and greenhouse horticultural products, animal husbandry remains the main onshore food production paradigm in Iceland to this day (Magnússon & Vídalín, 1913, Erla Sturludóttir et al, 2021, Garðarsdóttir et al., 2021). Early revegetation efforts included Alaskan lupines and other imported species, which are considered by some scientists to be invasive, and by others effective. Due to the exorbitant costs of maintaining aircraft fleets for aerial seeding and the debate over whether it is acceptable to use imported species, such interventions have not been carried out in a number of years and the revegetation projects are now operating at a much smaller scale. This does not mean that the costs of revegetation per unit land area are lower now, simply that the budget is not as high proportional to the areas in desperate need of revegetation. Uncertainty over how to proceed in the scientific community has bled over into policy formation, and has created a situation where the government is funding initiatives which are effectively at loggerheads, and less inclined to commit funding to large scale projects until some sort of consensus is reached (Bigas et al, 2007, Péturdóttir, 2020).

**Conclusion**

The emergence of the carbon credit market in recent years has been of great utility in carbon-sequestration forestry, which allows land use and afforestation that is not timber, fuel or fiber production to yield profits. Afforestation has been shown in international and Icelandic research to convey multiple benefits to neighboring areas and beyond (Kragt et al, 2016). It can help with erosion, dust storms, protect infrastructure and settlements from extreme hydrological events, and ameliorates microclimates (Orradottir et al., 2008, Agustsdottir, 2015, Nilsson et al., 2018, Pálsson, 2019). In short, revegetation would help with many domestic and UN initiatives, indeed research has shown that food security would be increased due to the beneficial effects of local afforestation on cereal and fodder production (Hilmarsson and Hardarsson, 2022, Gautason et al., 2023).

While fast growing species which accrue biomass are preferred for such interventions, recent innovations in seeding technology and increasing understanding of sustainable, succession-based planting schemes mean that costs of afforestation may be decreased in the near future such that native forest plants such as downy birch may be seeded en masse at a low enough cost that sale of their carbon credits can finance operations.

These developments create a solution to the policy quagmire over native vs imported plants, and a synergy of carbon sequestration initiatives, ecosystem remediation initiatives, and sustainability goals (using the framework of Nature Based Solutions), interventions that everyone can agree are both effective and acceptable, can be implemented using non-governmental funds, on a large scale (Kragt et al, 2016, United Nations Environment Programme, 2020, Sandin et al, 2022).

This restores ecosystem health and services in Iceland using the same international value added chains that historically denuded the land of the forests and wetlands which gave it the biodiversity and productivity so attractive to the first Icelandic settlers of old.

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# The hidden landscapes of the global value-added chains

Workshop & reflections

Authored by moderators Karolina Krośnicka, Samaneh Nickayin, and Kelly Shannon with review by Dirk Funck, this chapter incorporates contributions from all workshop participants in the form of images and quotes. The named authors assume responsibility for the final text, which reflects a collective yet authored narrative.

A final morning workshop highlighted several themes in the *Hidden Landscapes of the Global Value-Added Chains* session. Global value-added chains profoundly shape contemporary landscapes through extraction, production, and consumption processes that often remain invisible to end users. These processes leave behind degraded territories - so-called sacrifice zones - while concealing the spatial and ecological costs of global economic systems. As a result, landscapes are transformed in ways that challenge traditional approaches to analysis, design, and responsibility. The workshop *Hidden Landscapes of the Global Value-Added Chains* brought together multiple perspectives to explore how landscape architecture can engage with these hidden geographies. Drawing on theoretical frameworks, case studies, and visual strategies, the workshop examined how extractivism, material flows, and regenerative design intersect. You will find a synthesis of the workshop discussions across four themes: extractivism and wastelands; entanglements and responsibility; visibility and invisibility; and the transformative potential of design. It offers critical insights into how spatial disciplines might expose and reconfigure the landscapes of global production. The moderators and participants presented one image and an extended caption to initiate a discussion. Four major themes came up in the discussion and are reframed below in relation to larger concepts and the growing body of discourse on the subject.

**Extractivism & Wastelands**

Extractivism alludes precise definition and is a contentious concept. For several scholars, it is part-and-parcel of the expanding global value-added chains and in leaves in its wake extremely deleterious landscapes (Barbier 2011; Bélanger 2018; Arboleda 2020; Escobar 2018). Resource-rich landscapes are brutally transformed for both export-led economies and for more localized urban extractivism (Struele 2022). Extractivism is premised on capital accumulation and centralization of power and involves resource and wealth flows across spatial scales (local to global). The notion of wastelands is associated with such extractivist sites, particularly in relation to their spatial aspects. Brownfields (Alker et al. 2000), terrain vague (de Solà-Morales 1995) and drosscapes (Berger 2006) are part of the contemporary lexicon in relation to such extreme landscape manipulation.

Nonetheless, the notion of wastelands itself is not exclusively tied to the 20th and 21st centuries. As Di Palma has revealed, they have a long economic, social and historical significance across various cultures and geographies (Di Palma 2014). For her, it is as much a cultural category as a spatial one. The conceptualization of wastelands is rooted in colonial history and continues to shape contemporary global material flows and economic relations.

Social and environmental injustices are inseparable from both extractivisim and wastelands.

"There is a short-term wasting of objects, and a long-term wasting of place." Lynch, K. (1990). The Waste of Place. Places, 6(2). Urban soils, redefined as construction waste and public fill, were consigned to the Tseung Kwan O Area 137 Fill Bank, Hong Kong. (Photo: Ceci Wong, 2021), **Susanne Trumpf**

Environmental activist and academic Naomi Klein has forcefully written about such areas as sacrifice zones (Klein 2014). Klein defines extractivism as 'condemned places' and 'disposable peripheries' which have 'a nonreciprocal, dominance-based relationship with the earth, one purely of taking' (Klein: 2014: 169). They are directly connected to sacrifice zones which are premised on the notion that one area can be expended for the benefit of another. Although the term predates Klein and was used in ranching, forestry and mining (Miller 2023), she explicitly links them to settler-colonialism, imperialism, land expropriation and the displacement of indigenous peoples.

Amongst the workshop participants, Susanne Trumpf made an explicit focus on urban extractivism and its consequences through her research revolving around clay mines and traditional bricks in Hong Kong. Her case study focused on unravelling the inter-dependencies between objects and places and the redefining of practices of material specification, production, and distribution. The traditional bricks case is part of a larger research frame focusing on the environmental challenges of contemporary material use to restore knowledges about landscape materials through strategic indexing and experimentation. Her work meticulously records the layered alterations of physical compositions over time and tracked material flows, extractions and accumulations that accompany development. She suggests limiting extractivism by the reuse of construction materials derived from demolished urban structures. As a pilot study in Hong Kong, on a 104-hectare rubble dump, different types of post-construction materials were identified in terms of their physical properties, then separated, crushed and reprocessed into new bricks. The newly formulated building material was then subjected to rigorous testing to ascertain its structural integrity and was subsequently employed in the landscaping of public parks and spaces. Trumpf has asserted that the concept of nature should no longer be regarded in isolation, and that anthropogenic materials made from natural materials (such as bricks, concrete, rubble) should also be considered part of nature resources. She referred to the canonical text 'The Waste of Place' by Kevin Lynch (Lynch 1990) to delve into the context-specific case of the short-term wasting of objects and long-term wasting of place. The issue of extractivism was also taken up by Emma Rishøj Holm, who looked specifically at the North

Extraction site in Tyttenhanger, St Albands, UK

Landfill

Put'n'take fishing

Regeneration

"Care is everything that is done (rather than everything that "we" do) to maintain, continue, and repair "the world" so that all (rather than "we") can live in it as well as possible. That world includes . . . all that we seek to interweave in a complex, life-sustaining web" (Bellacasa, 2017, p. 161; rewritten from Tronto, 2020, pp. 131–32)., **Emma Rishøj Holm**

London Tyttenhanger Quarry, which supplies building sand and aggregate. She critically questioned how the landscape of disused quarries has been rewilded as a series of lakes and nature reserves. According to her, the measuring the possibility or success of environmental recovery after sand extraction is increasingly pressing. Through the case study, Holm proposed an alternative responsibility of humankind's activities. She suggested the raising of awareness of hidden landscapes by extending life cycle assessment (LCA) tools to encompass the period prior to the transformation of the landscape. She suggested a new ethics of care, whereby the extended LCA of landscapes could prevent the wrong planning decisions being made in relation to landscapes, and it could make it possible to go beyond the reduction of side effects (such as the creation of wastelands, or even beyond a circular economy).

**Entanglements, Responsibility and Shifting Values**

Global value-added chains are inextricably tied to global wealth chains. Both are increasing entangled and hidden, with tangible and intangible aspects, through the production (and labor), trade, finance, and laws of the globalized, liberal market economy. Notions of value and wealth are evermore blurred. At the same time, the notion of entanglement is more expansive, particularly following the posits of Donna Haraway, amongst others. Haraway asserts that everything is fundamentally connected, challenging boundaries between humans, animals, machines, and other entities. She emphasizes processes of 'becoming-with' others, both human and non-human, organic and inorganic and the importance of making affective relationality visible and integral deepened understandings of the world (Haraway 2016). Haraway also gives significance to kinship, inheritance and "wordings" as affective relations of connection, mixing, and interdependency. Haraway's concept of entanglement offers a provocative and nuanced way of understanding humankind's relationships with the world, challenging traditional boundaries and encouraging a more interconnected and responsible approach to existence and knowledge production. In the workshop, Viviana Comito extended the notion of entanglements to human consumption patterns and the way they put great pressure on environmental and social systems and create concealed but continuous ties between sites. Materials flow through what she calls an "endless landscape", referring to the altered geography of 19th century myriorama cards, which combine no matter what they contain.

”The architect can act as an ambassador in between different worlds, a mediator between interconnected beings. Through awareness of material flows, building becomes a conscious process linking people, places and different life-forms.” **Viviana Comito**

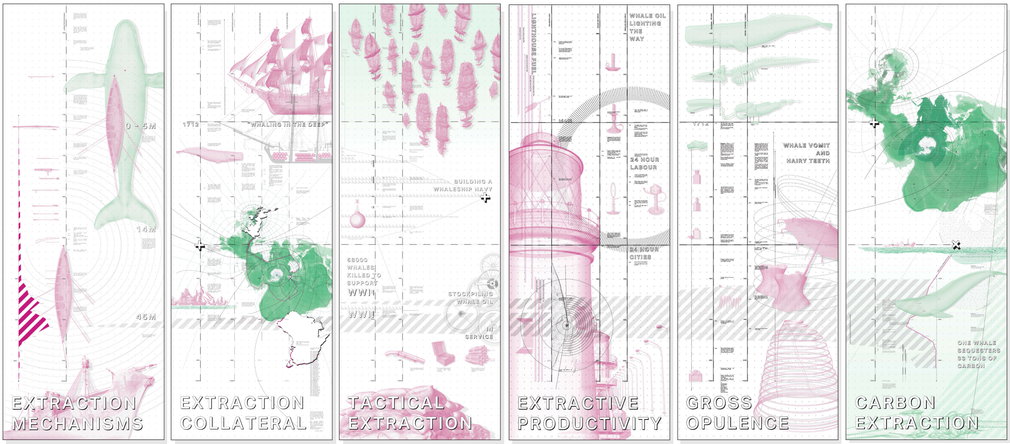
In society, the process of becoming aware of the consequences of the value chain of the hidden landscapes occurs by moving beyond the distinction of 'them' (who are responsible for the problems) and 'us' (who are abstracted from the process). In the workshop discussion, Alice Lewis suggested that only by understanding these relationships and taking responsibility for 'our' choices, in terms of what materials or products we buy and use, humankind can reduce the impact of the value chain on distant landscapes. To do this, Lewis suggests translating information on the subject into visualized data associated with hidden landscapes (drawings, diagrams, etc.). She also suggests learning from the local landscape, following the different patterns of life and incorporating ideas from nature into everyday life to change human behavior.

**Invisibility / Visibility**

Landscapes are palimpsests of a delicate balance between what is seen and what remains Nichturpräsentierbar—one cannot see it there and every effort to see it there makes it disappear, but it is in the line of the visible, it is its virtual focus, it is inscribed within it (in filigree) (Merleau-Ponty & Lefort, 1964; Corboz 1983). The dichotomy of invisibility and visibility informs the aesthetic and functional aspects of human-modified lands, as well as the socio-ecological narratives embedded within them. By examining the interplay of forces, landscape architecture can embrace its potential as a medium for subtlety and revelation, creating spaces that resonate on multiple levels.

In relation to the hidden landscapes of the global value-added chains, regenerative landscape frameworks could harness the dynamics of market-driven commodities to improve the strength, resilience, and diversity of landscapes beyond their original condition (Gabel, 2015). But what does it mean to define a regenerative landscape? Regeneration should not be viewed as a return to pre-disturbance conditions, as these states have often been lost or are no longer feasible. Instead, resilience theory advocates for the establishment of adaptive baselines, which enable landscapes to sustain their functions and support their inhabitants amidst disruptions rather than aiming to recreate an idealized version of the past (Ahern, 2011). In this sense, regenerative landscapes are those where actions or systems enhance ecological processes in response to disturbances without the need to restore past conditions.

In the workshop discussion, there was broad consensus that global supply chains, market-oriented




“Drawing becomes a way to understand how our relationship with material shapes Earth.”
This visual series explores how drawing can serve as a critical method to trace the material and geopolitical histories of whale extraction. Through layers of cartography, anatomy, and data visualization, the project maps the transformation of whales from living beings into commodified resources—fuel, military assets, and carbon units—highlighting the evolving human-nature relationship shaped by technological, economic, and colonial forces.
We Have Come So Far?” — digital drawings by Alice Lewis and Caitlyn Parry (Atlas of Matters), 2024., **Alice Lewis**

commodities generate ‘new’ landscapes. While invisibility provides subtlety and depth, making hidden systems visible can foster awareness, education, and connection. Sabina Müller and Miguel Hernández Quintanilla related a logistics park in the hinterlands of metropolitan Oslo to paradoxes of short-term efficiency and long-term environmental processes. They made a specific link to the creation of a new topography and pled for employing design techniques to reveal the unseen, such as ‘exposing processes’ and interdependence of natural and human systems of landscape transformation.

The landscapes behind the product are usually not visible to the consumer, as another participant, Victoria Imasaki Alfonso, noted. Her work on the mosaic of monoculture plantations in the Upper Paraná River Basin (Victoria Imasaki Affonso) sought to utilize ‘narrative design’ to reveal the colonial and exploitative nature of extraction. Therefore, visualizing hidden landscapes could become a tool for a fair discussion with supply chain managers by making hidden landscapes visible.

**Importance of Design**
Spatial disciplines, including landscape architecture, focus on the specific local territory of a region, city or town. This territory is the main reference for analysis, goal setting and strategy development. The context of landscapes along the global value chain, invisible from a local perspective, requires one to rethink our already classical approaches to landscape design (Hansen 2010; Beck 2013; Holden & Liversedge 2014). The material flows and supply chains that move in and out of contemporary urban landscape systems and consumption patterns should evidently be part of the landscape architecture design process. This requires thinking across disciplines and supporting systemic change towards more sustainable and responsive global value chains.

During the workshop discussion, Bruno Futema explained that the flow charts for the urban market in Sao Paulo could be understood in relation to urban metabolism and the approach of material flow analysis (Wolman 1965). He advocated a focus on production and consumption patterns in order to redesign its architecture. Futema quoted the Brazilian poet Ailton Kernak (2024), who noted that ‘life is wild and also hatches in cities’. To design regenerative landscapes, Viviana Comito proposed an eco-centric ethic (Leopold 1949), stating that architects and

Eucalyptus leaves

Eucalyptus bark

Sugarcane

Brachiaria grass

"The landscapes sustaining our global commodity chains are usually invisible to the people that consume the final products made of its raw materials. The act of collecting parts of this landscape - soils, stones, plants, local products - and bringing them to other places, as a traveling collection, helped turn it visible." **Victoria Imasaki Affonso**

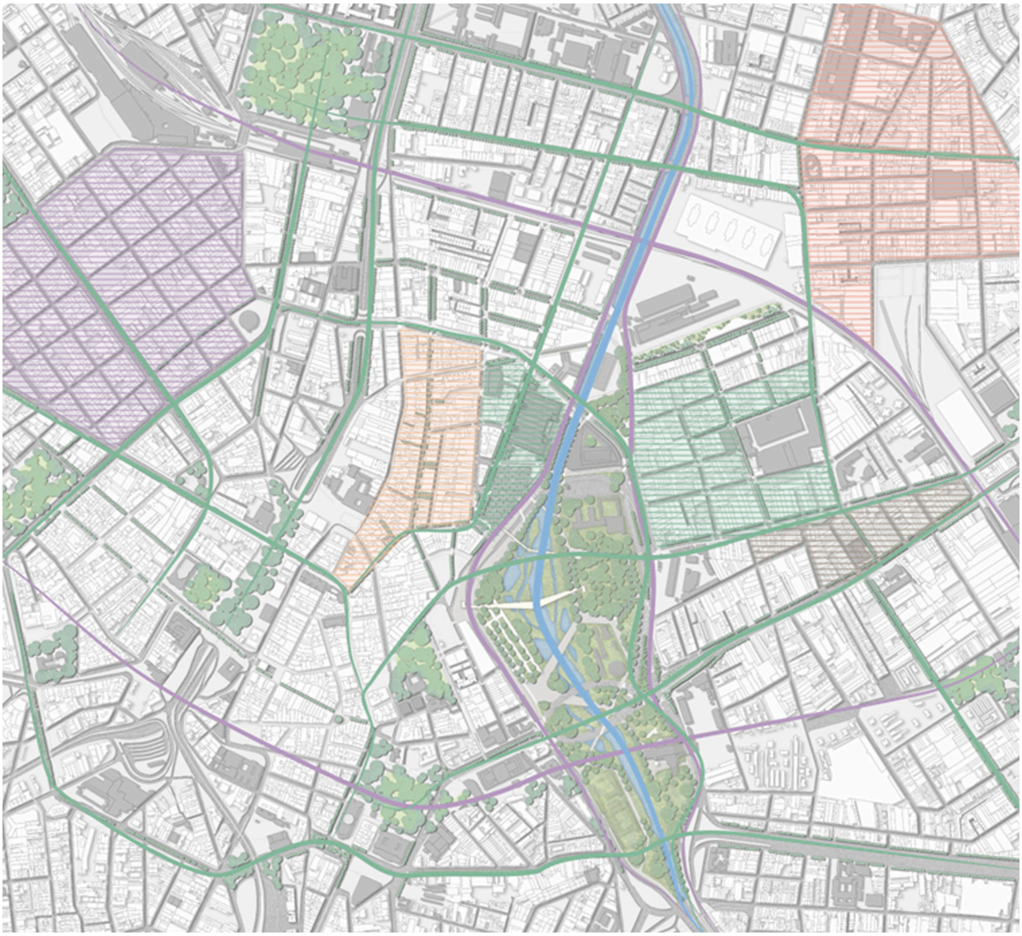
landscape architects – by adopting a less anthropocentric vision- could act as mediators between different realms.

Eugenia Morpurgo suggested that it is possible to create regenerative landscapes by redesigning the production chain and using biomaterials. This type of activity could be called ecological landscape management (e.g. grazing the grasses under vineyards to produce wool, preserving wetlands to produce natural building materials). Morpurgo noted that the inspiration for redesigning production chains could come from historical local knowledge and experience. By studying the structural characteristics of different plants, she realized that their use as materials could be certain or uncertain, intentional or unintentional.

Finally Holm noticed, that currently almost all landscapes in the world have been transformed by humans, so perhaps we should not be afraid of transforming them, but rather work to gather the best knowledge on how to make them regenerative. This would require going beyond diagnosis and developing new scenarios that push solutions towards the projective. However, as Morpurgo mentioned, this approach requires caution, as there is a high risk of initiating the transition without paying attention to the final outcome.

All you can store! Could this logistic park be designed as an "interception net, (...) a compound web of life and technologies (.. .) designed to catch and store as much energy as possible (....) providing 'niches as opportunities in space', and 'cycles as opportunities in time', "to give harbour to many events and species" ? (Mollision 1988, p.13 and p.23).,
Photo of Vestby Logistic park, Norway. Student work at Oslo School of Architecture and Design, Spring 2022.
**Sabine Müller, Miguel Hernández Quintanilla**

"New habits that can shape new habitants" (Cooking Sections, 2024) **Eugenia Morpurgo**



"...the so-called progress commands us, and we continue on autopilot, devouring the planet with fury. (...) We have to reforest our imagination and, thus, who knows, we may be able to reapproach a poetics of urbanity that gives back the power of life (.. .). After all, life is wild and also hatches in cities." (Ailton Krenak, 2024) **Bruno Futema**

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# Heritage and Identities

# Activating Cultural Capital

# Heritage and Identities
# Activating Cultural Capital

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The thematic track 'Heritage and identities: Activating Cultural Capital' approaches heritage from a landscape perspective, exploring various opportunities for creating synergies and added values at the interface of tourism, recreation, nature protection, agriculture, education, and health and well-being. Selected papers in this track offer insights into the role of historical plants, the continuity and regeneration of historical landscapes, (de)finding identity in urban planning, and the use of archival materials in regenerative approaches.

Historical plants and species are unique components of landscape heritage, requiring a better understanding of their roles in both cultural and natural settings. Soares et al. examine the development of Lisbon's street trees between 1929 and 2021. They describe changes in abundance, composition, and biodiversity, reflecting on individual species' contributions to climate resilience and ecosystem services. Laidet explores the vineyards in Val de Loire, France, emphasizing the need to adapt to climate change by preserving the winegrowing landscape and reintroducing associated plants that support the vines.

Several papers use case studies to exhibit the continuity and regeneration of historical landscapes in both rural and urban settings. Sofer examines a historic neighborhood in Tel Aviv, Israel, analyzing landscape heritage elements in open spaces to enhance urban ecosystem services. She emphasizes the importance of integrating historical urban landscapes components in sustainable urban renewal, promoting a balance between natural and human systems while preserving the distinctive spirit of place. Kotliarchuk and Parkhuts present an in-depth analysis of the historical transformation and contemporary revitalization of Tustan's agricultural cultural landscape in Ukraine. Their study highlights the spiritual, cultural and economic growth during the re-naturalization of the landscape. Doğan et al. focus on the regeneration of functional and cultural roles at Atatürk Orman Çiftliği in Turkey, emphasizing the interconnectedness of social and ecological systems. The study highlights the importance of community involvement and participatory models in promoting social equity and cohesion. Staniewska's paper focuses on regenerative therapeutic and sensory gardens at historical mental hospital sites in Europe. She argues that involving users in maintenance activities as green therapies can improve historical healing gardens and create new sensory therapeutic gardens, advocating for social engagement and patient involvement.

In terms of identity in urban planning, two papers present case studies from Vác town in Budapest and Lørenskog in Oslo. Valánszki et al. examine the green space development needs of Vác town in the

Budapest agglomeration. Their study highlights local people's attachment to green spaces at the riverbank and historical values in the town center, contrasting the needs for social and recreational activities in the center with natural relaxation outside the center. The authors argue that the current urban development plan lacks a deep understanding of local needs and interconnections, suggesting future research to improve urban green infrastructure planning. Helgason explores the findings from a mapping process in Lørenskog, Norway, through the lens of place theory. His paper addresses the loss of identity due to rapid urbanization and emphasizes the need to involve citizens in planning, management, and development of cultural landscapes. He highlights the importance of incorporating heritage experiences to maintain a sense of place.

The use of archival materials in regenerative approaches is showcased in two papers. Gao et al. present a workshop organized by NELA (Network of European Landscape Archietcture Archives), demonstrating the role of archival material in developing concepts for urban park revitalization. The workshop resulted in five project groups formulating different design approaches based on the same archival materials. Csepely-Knorr et al. uncover a hidden history of the International Federation of Landscape Architects (IFLA) by exploring landscape architecture archives in various European countries. Their demonstration emphasizes the need for close international collaboration between academic researchers, archives, and professional organizations, and how this may enrich the understanding of landscape architecture profession.

What's common in the papers at the Heritage and Identity track is the importance of participatory approaches and historical analysis in regenerative landscapes. Well-organised participatory approaches help builds identity, connects people with their place, integrates the past with the present and future, and creates added values. A thorough understanding of historical information provides a foundation and inspiration for future scenarios. Together they contribute to a more meaningful landscape regeneration.

# Regeneration through collaboration. A case study of collaborative landscape history research

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**Keywords**: Landscape architecture history, archives, historiography, interdisciplinary collaboration
**Abstract:** This paper presents findings of the international research project 'IFLA 75: Uncovering hidden histories in landscape architecture' and demonstrates how collaboration between academic researchers, archives and professional organisations can lead to more nuanced histories of landscape architecture. To show how such an international networked approach can expand expertise in landscape architecture, the project's thematic focus is on the history of the International Federation of Landscape Architects (IFLA), as it celebrated its 75thanniversary in 2023. Established in Cambridge in 1948, IFLA remains a crucial network for knowledge transfer, progress and professionalization of landscape architecture and has dealt with prevailing challenges to our built environment. While the CIVA foundation in Brussels is the official archivist for IFLA Europe, documents relating to particular activities of the Federation, its national organisations and key members are scattered in several European archives. Therefore, a thematic focus on IFLA underpins the need for close international collaboration in enriching our understanding of the history and the international impact of professional bodies and landscape architects in both historical and contemporary contexts.

**Introduction: Regenerating history through collaborative archival research**

The international research project 'IFLA 75: Uncovering hidden histories in landscape architecture' [1] was initiated and delivered by members of the Network of European Landscape Architecture Archives (NELA). From November 2022 to November 2024, archivists, researchers and educators from several countries in Europe and beyond cooperated to research and understand the legacy of the key professional landscape architecture organisation, the International Federation of Landscape Architects (IFLA), and to uncover histories hidden in archives.

Since its establishment in Britain in 1948, IFLA has been a crucial network for knowledge transfer, progress and professionalization of landscape architecture (Figure 1). In 2023, it celebrated the 75th anniversary of its foundation, which makes it timely to reassess its history and legacy and at the same time draw attention to the importance of landscape architecture archives. Documents relating to particular activities of the Federation, its national organisations and key members are scattered in several European archives due to its multi-national nature. Therefore, a thematic focus on IFLA underpins the need for close international collaboration in enriching our understanding of the history and the international impact of professional bodies and landscape architects in historical and contemporary contexts. This paper presents some exemplary findings of the project's investigations and discussions. By exploring the case study of IFLA, we have asked: How can we cooperate as an interdisciplinary, international network of academic researchers, archives and professional organisations and generate more nuanced histories of landscape architecture through collaborative archival research? And how can we advance and communicate knowledge and understanding about the profession of landscape architecture and its history?

**Project Structure**

The project used collaborative workshops as a main vehicle to initiate conversations and cooperation. The project funding allowed us to have two in person and two online workshops, the topic of which was defined by mirroring the first four IFLA committees established in 1974 (Anagnostopoulos, 2000).

The first workshop at CIVA in Brussels in February 2023 focused on "Preservation and Restoration of

1 This project was funded by the Arts and Humanities Research Council (UK). Grant reference: AH/W011344/1.

Figure 1: Programme and photos of the International Exhibition and Conference of Landscape Architecture in London in 1948, exhibited during the workshop at the Museum of English Rural Life (image source: project team)

Historic Landscapes" as IFLA has been working very closely with ICOMOS International Scientific Committee on Cultural Landscapes. In 1982, this cooperation successfully set up the Florence Charter on Historic Gardens. One of the driving forces was the Belgian landscape architect René Pechère, IFLA president 1956–58. Within the project, the rich collection of CIVA was used to reflect on the history and policies of landscape architecture conservation as well as on the evolving methodology of preservation, restoration and reconstruction. The participants consulted the IFLA archives and discussed its history as a network and its impact on policies and methods of conservation, as well as the role of archives in conservation, restoration and reconstruction projects in past, present and future (Figure 2).

The Museum of English Rural Life (MERL) at the University of Reading hosted the second workshop in June 2023, titled "Legislation and Administration". The Special Collections at MERL hold the archive of the Institute of Landscape Architects (today's Landscape Institute). Founded in 1929, the ILA worked tirelessly throughout the War to establish itself, and part of these efforts was to start a network with other professional organisations, that led to the 1948 Conference and the creation of the Federation. The papers of these efforts are held in the archive, and the workshop interrogated a number of collections to gain a better understanding of the issues around the legislation and administration of the profession. The comparative research of each participating countries revealed the trends and differences in nomenclature and organisational structures in different countries. During the workshop we held a hybrid roundtable in collaboration with IFLA, as part of their official 75th anniversary celebrations. The roundtable asked how we can use history, and what can we learn from the history of the federation to inform our future goals (Figure 3)[2].

2 The recording of the roundtable is available to watch online on the IFLA World youtube channel: https://www.youtube.com/watch?v=b7sn27Jr7VM

Figure 2: Participants of the workshop at CIVA in Brussels, discussing documents from the archive (image source: Marlies Brinkhuijsen)

Figure 3: Participants of the workshop at the Museum of English Rural Life studying documents on the history of IFLA (image source: project team )

The Norwegian University of Life Sciences NMBU in Ås was the third to organise a workshop titled "Landscape Planning in Urban Areas: the (changing) profession of landscape architecture in the 1960s–70s". This online workshop focused on a period when urbanisation and environmental concerns greatly shaped the profession of landscape architecture. Landscape architects increasingly expanded their work to larger-scale, industrial and urban projects. At the same time, they saw their role to safeguard the environment, as reflected by the 13th IFLA Congress held in Brussels in 1972, entitled 'the gardener of the Earth is the environment's healer'.

Based on the archival material of key figures and projects, workshop participants exchanged knowledge and explored how the shift of the profession happened in various parts of Europe, how designers influenced each other and what were the driving forces. An online public symposium offered lectures and a discussion on the fight of landscape architects to tackle the environmental crisis over the past half century and how researchers, designers, archivists and educators can cooperate to answering this still current question by linking archives.

In spring 2024, BOKU university Vienna and MATE University in Budapest held the fourth workshop: "The Social Value of Landscape". Through archival material and on-site analysis, masters students in landscape architecture and urban planning investigated one housing landscape in Vienna (designed in 1973–77) and one in Budapest (designed late 1980s). Between the 1960s and 1980s, cities faced massive housing construction activities on their outskirts. The design of the outdoor spaces followed the ideas of the functionalist city. At the same time, experts and politicians emphasized the social importance of these open spaces. In the on-site design workshops, students discussed the social, functional, planning and design significance then and now and elaborated design scenarios for these open spaces. This strengthened the students' understanding of consulting archival material as well as in site analysis and assessment.

In the course of the four workshops, working as a team allowed us to translate and compare materials, build a large, shared knowledge base and communicate our project to a broad range of audiences through articles, presentations and a webpage.

**IFLA's early years: building an international network**

The findings presented here are part of the outcome of the first two workshops, highlighting the

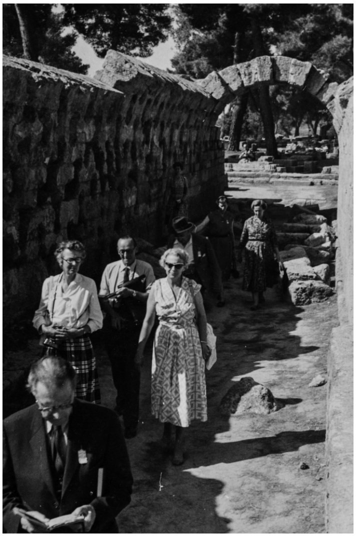


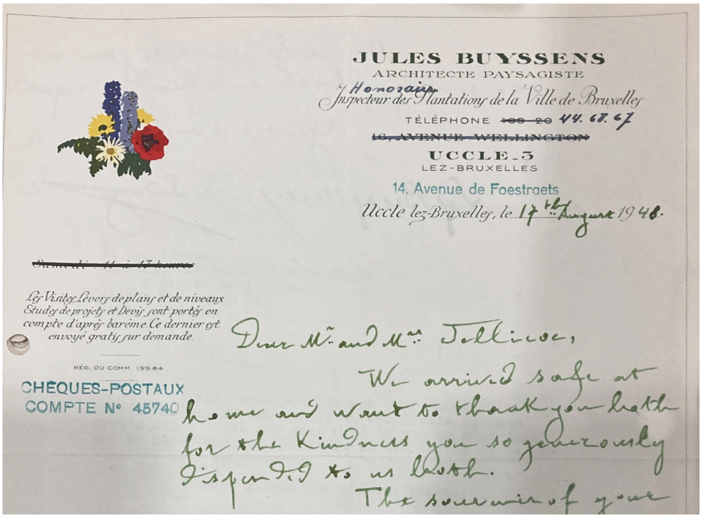
Figure 4: Brenda Colvin (left), possibly at an IFLA visit in Greece, date unknown (image source: The Museum of English Rural Life / Brenda Colvin Collection)

contributions of different countries. They exemplify the delicate and nuanced histories that can be uncovered through collaboration.

According to founding members of IFLA, Brenda Colvin, Sylvia Crowe and Geoffrey Jellicoe, the Federation was established 'to promote understanding and knowledge throughout a war-shattered world through the common language of landscape; […] to raise universally the prestige of landscape in the public mind; and […] to enable member countries to keep abreast of world ideas' (Gibson, 2011, p. 125), none of which is achievable without collaboration and networking. However, founding an international association in 1948 raised the issue of how to deal with the war-triggering countries Austria and Germany (Imbert, 2007, p. 19). Austria was considered less responsible for the war than Germany and thus representatives were invited to the international congress in London, August 9–12 1948. However, only a close examination of documents kept in the Archive of Austrian Landscape Architecture at BOKU University revealed why Austria was not one of the founding members. Back then, the Austrian landscape architects received the invitation late, were thus unable to postpone a previously agreed meeting with the municipality of Rotterdam and had to leave England immediately after the conference in London. Only architect Hanns Kunath travelled on to Cambridge, but he did not feel responsible for landscape architecture matters. Four years later, Austria was thrilled to become a member of IFLA at the Stockholm congress and to host the 4th IFLA congress in 1954, because it "will […] bring to Vienna the leading figures in the field of garden and landscape architecture, which is so important today" (Ihm, 1953). The Austrian delegation consisted exclusively of men. National Socialism had caused a radical cut in Austria, as all female landscape architects practicing in the interwar period were Jewish and had to emigrate in 1938/39.

**The role of women**

IFLA has benefitted from the contributions of many women, although their roles have not been mentioned that often. According to the memories of Geoffrey Jellicoe, the idea to create the Federation originated from a woman, Lady Allen of Hurtwood (Harvey, 1987, p. 11). The Committee responsible for the work was led by Sylvia Crowe, who became the Federation's Honorary Secretary upon its foundation. The first representative of the British Institute of Landscape Architects was Brenda Colvin, key ally and collaborator of both Allen and Crowe. Colvin was later elected first female president of the British Institute in 1951 (Figure 4).



JULES BUYSSENS
ARCHITECTE PAYSAGISTE
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Inspecteur des Plantations de la Ville de Bruxelles
TÉLÉPHONE ~~109-20~~ 44.68.67
~~16, AVENUE WELLINGTON~~
UCCLE-3
LEZ-BRUXELLES
14, Avenue de Foestraets
Uccle lez-Bruxelles, le 17th August 1948.

~~Samedi : 11 à 17 heures~~

Les Visites, Levers de plans et de niveaux Etudes de projets et Devis sont portés en compte d'après barème. Ce dernier est envoyé gratis sur demande.

RÉG. DU COMM. 139.84

CHÈQUES-POSTAUX
COMPTE N° 45740

Dear Mr and Mrs Jellicoe,

We arrived safe at home and want to thank you both for the kindness you so generously dispended to us both.

The souvenir of your

Figure 5: Letter of Jules and Louise Buyssens to Mr and Mrs Jellicoe-Pares (image source: The Museum of English Rural Life. Copyright permission by Brigitte Buyssens)

For the Netherlands, Catharina Polak Daniels participated in the 1948 conference in London, but she was unable to attend the founding meeting in Cambridge. Nevertheless, in several documents from the IFLA archives it is stressed that she should be included in the list of founding members (Notes of Informal Meeting held at Jesus College). Polak Daniels attached great importance to collaboration and international exchange, also in education (Polak Daniels, 1948a). She put this drive into practice as Dutch delegate for IFLA until 1961 and as secretary of the BNT (Dutch Union of Landscape Architects) foreign exchange assessment committee and as a member of BNT's 'IFLA committee'. In 1948 she praised the international character of the IFLA events: 'It was gratifying that there was such an atmosphere of convergence between the various professions and that the subjects were illuminated by professionals from very different fields. Garden and landscape architects, civil engineers and architects, industrialists and town planners and those in charge of education tried to solve problems, which are the same in many countries, in the greatest harmony. And there was no one who disputed the other's primacy' (Polak Daniels, 1948b).

The informal roles of women should not be underestimated either. Though being mentioned as 'Mrs' - and thus as 'wife of'- in the IFLA attendance lists, many practised landscape architecture or attendant fields, and had a design office with their husbands. For example, a letter from Jules Buyssens – representative of Belgium – is addressed to both Mr and Mrs Jellicoe, thanking their hospitality and praising the conference that both Buyssens and his wife attended, and that was of interest to both of them (Figure 5). Recent research at CIVA uncovered that Louise Buyssens (née Gibert) indeed played a key role in managing her husband's nursery (Pépinières de Fort-Jaco) at least during the whole design and construction period of the Brussels World's fair of 1935[3], while Susan Jellicoe (née Pares) was described by her husband Geoffrey as the person who 'did all my planting' (Harvey, 1987, p. 11). According to Buyssens' letter, Susan and Geoffrey Jellicoe invited delegates into their own home during their stay in England. Informal events like these have contributed to the building of international networks. In her obituary to Susan Jellicoe, Sylvia Crowe wrote: 'When IFLA was launched at Cambridge in 1948, it had no resources except the enthusiasm of its members; there was no

2 Information by Brigitte Buyssens, with thanks to Ursula Wieser Benedetti (CIVA).

secretariat and no interpreter. The President [Geoffrey Jellicoe] was no linguist and the Hon Sec [Sylvia Crowe] had only rudimentary French. It was Susan who could talk freely with other nationals. Her linguistic abilities and her out-going personality were vital factors in creating friendship and understanding between nations who had been separated by five years of war. She was an ambassador for peace as well as for landscape' (Crowe, 1986, p. 12).

**Conclusions**

Writing about landscape architecture, Sylvia Crowe, IFLA's first Honorary Secretary and woman president, famously said in 1945: 'team-work is the only possible solution in a profession that covers such a wide range of subjects, many of them requiring not only a different training but a separate set of capabilities, and a different type of mentality' (Crowe, 1945). While anyone familiar with the complex nature of the landscape architectural profession would agree with her comments, historical accounts of both landscape architecture and its institutions – like IFLA – tend to focus on successful individuals, lead designers, or presidents, while many collaborators are – as architectural historian Elizabeth Darling phrased – rendered 'not seen' (Darling, 2020).Archival materials reveal many intimate details about personalities, formal and informal networks and friendships that made IFLA a success. Uncovering these stories and highlighting people who have not previously been mentioned in the official histories of the Federation is crucial if we want to understand the complexities of our history in a more nuanced way. As IFLA was and is collaboration, understanding its history equally needs team-work.

Collaborative research highlights the ways to understand landscapes from a cross-cultural and international angle. This can help us use landscape history and historic landscapes in a more nuanced and inclusive way to support the regeneration of our shared heritage. Understanding networks and actors in shaping multidisciplinary discourses and the contextual biographies of institutions instead of individual designers or landscapes can lead to a more thorough understanding of processes and influences that shape the profession of landscape architecture as well as the landscapes themselves.75 years ago, IFLA was envisioned as a 'vehicle for peace' and as a major network for knowledge transfer to enhance and emphasise the role of landscapes in post-war regeneration. To reconstruct the history of this institution and its networks and gain insight in its heritage and impact from a historic point of view, collaboration between archives, practical institutions and researchers is fundamental.

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# Regenerate functional and cultural roles of historic farm: Atatürk Orman Çiftliği

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**Keywords**: Regeneration, historic farm, agricultural product, Atatürk Orman Çiftliği, Ankara

**Understanding regeneration**

Regeneration can be viewed as a transformative process that seeks to enhance the quality of life for individuals and communities (Gibbons et al., 2018). It involves recognizing the interconnectedness of social and ecological systems, where individual actions and collective efforts contribute to broader sustainability goals (Buckton et al., 2023). This perspective aligns with contemporary theories that emphasize the importance of relational dynamics in addressing environmental challenges. By fostering cooperation and inclusion, regeneration initiatives can develop opportunities for marginalized groups, thereby promoting social equity and cohesion (Zhao et al., 2024; Zhou et al., 2024).

**The role of community engagement**

Central to this regenerative approach is the active involvement of local communities. Engaging stakeholders in decision-making processes ensures that diverse needs and interests are represented, particularly those of disadvantaged populations. This participatory model not only empowers individuals but also cultivates a sense of ownership over local resources, enhancing the overall resilience of the community (Sacchetti et al., 2018).

**Preventing loss of function**

As we explore regeneration, it is crucial to focus on maintaining existing functions and services. This requires a comprehensive understanding of the current state of assets - be they natural, social, or economic—and identifying strategies that leverage these assets for future sustainability. By integrating various factors into the regeneration framework, we can create pathways that not only restore but also enhance the ecological and social fabric of the farm (Tàbara, 2023).

This study focuses on regenerating the functional and cultural roles of a historic farm, Atatürk Forest Farm (AOÇ), one of Turkey's most important heritage places places. Before Ankara was declared the new capital city in 1923, it was a small settlement in the middle of the steppe area. However, Mustafa Kemal Atatürk wanted to make a model capital that is aesthetic, green, and most importantly self-sufficient. In pursuit of this goal in 1925 the farm was established first as a private property of Atatürk and then as a public forest farm. However, over time, the area has moved away from its founding purposes and land uses appropriate to these purposes. This essay provides information about the farm's historical process and examines the concept of regeneration and how it can be framed for the historic farm.

**Atatürk Forest Farm**

Beginning from its establishment period, the AOÇ became the icon of modernization of agriculture, education, social life as well as industrialization. Accordingly, the objectives of the farm are given below determined (Atak and Şahin, 2004):

- To convert the marshland in the centre of Ankara into a forest
- To increase afforestation work around Ankara
- To increase the variety of agricultural activities
- To educate people on the use of machinery in agriculture
- To provide students with opportunities topractise their agricultural knowledge

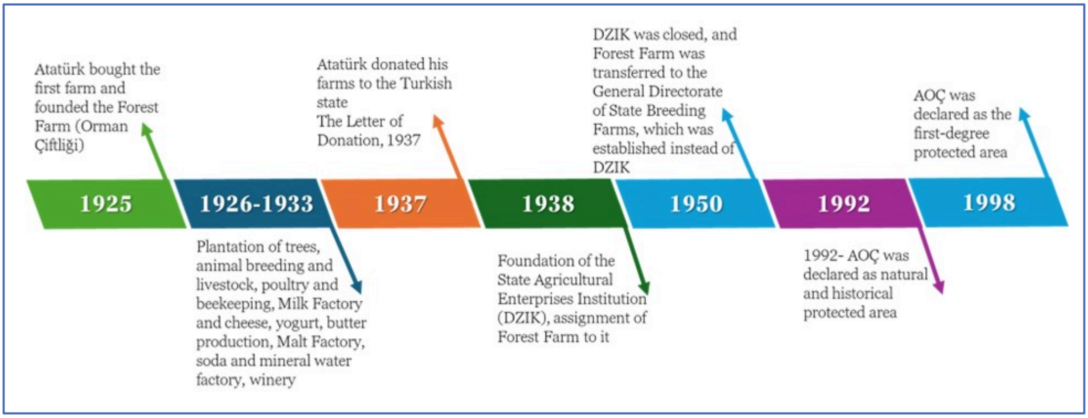


Figure 1: Timeline of the farm (source: authors)

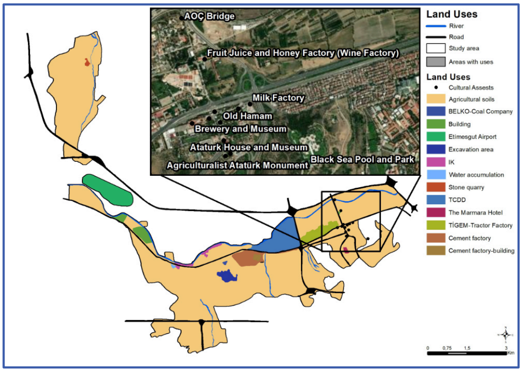


Figure 2: Land uses and cutural assets, source: authors

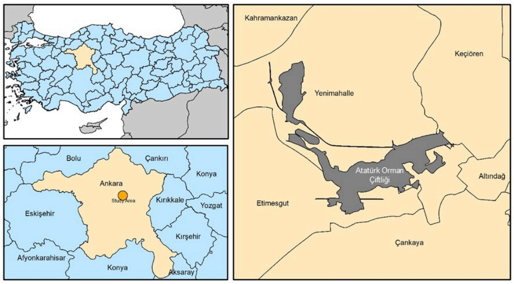


Figure 3: Location of the farm

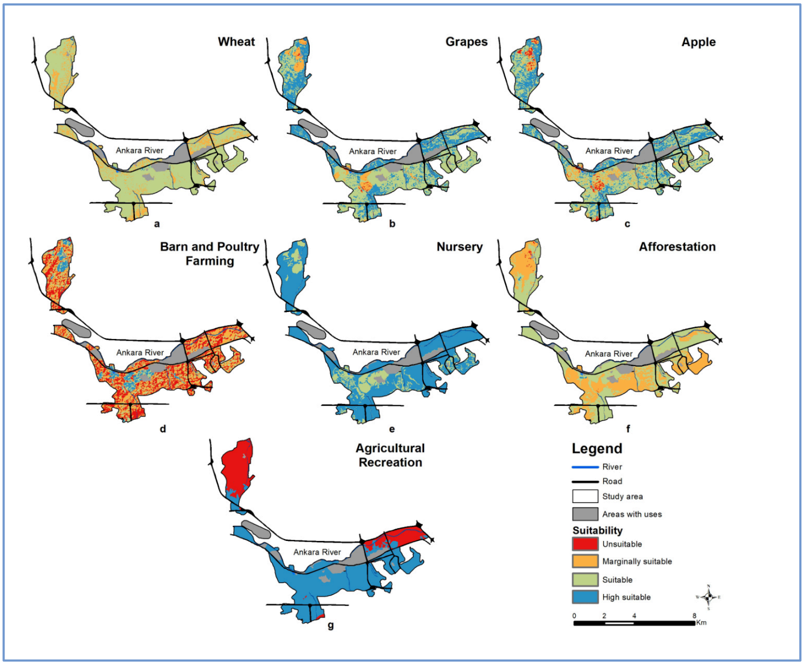


Figure 4: Suitability analysis (a) Wheat, (b)Apple, (c) Grapes, (d) Barn and Poultry Farming, (e) Nursery, (f) Afforestation, (g) Agricultural recreation, source: authors

- To raise breeding animals
- To ensure cooperative organization by providing clean and affordable food
- To play a regulatory role in the market
- To create socio-cultural and recreational areas for public visitation

The land area of the farm, which started at 20,000 decares, is stated to have incrased to 102,000 decares during the period when Atatürk donated it to the Treasury (1937) (Anonymous, 2003). However, due to rapidly increasing urbanisation, the land area has begun to decrease significantly, particularly after the 1950s, when many lands were lost from the ownership of the AOÇ through sales and rentals, 33000 decares (Gürkan 2019) (Figure 1). Established as a symbol of the Republic and the modern capital, the farm is used by state institutions and private organisations for factories, stone quarries, and foundry sites (Figure 2). On the other hand, the integrity of the land has been disrupted due to the railway and road crossings of the city of Ankara through the Atatürk Forest Farm. Today, most of the farmlands are in Yenimahalle, but there are also lands in Etimesgut and Keçiören neighborhoods (Figure 3).

The AOÇ is classified as a first-degree natural and historical site, as declared by the Ankara Cultural Heritage Conservation Board of the Turkish Ministry of Culture. It is stated in the conservation and usage conditions that "agricultural activities and viticulture can continue, and it shall not be used for any other purpose." This statement is one of the most important legal bases for cultural heritage. However, despite this, the farm has quickly deviated from its founding purposes (Yıldız Yılmaz and Akpınar, 2017).

Within the Atatürk Forest Farm area, there were the Republic of Turkey State Railways (RTSR), RTSR Gazi Station Building, RTSR Station Lodging Buildings, Atatürk House Museum, State Cemetery, Train Station, Turkish Post and Telegraph Organisation Building, AOÇ Directorate Building, a hamam (Turkish bath), historical residences, and remnants of a historical windmill, as well as a hotel, a swimming pool, factories producing beer, wine, milk, ayran (a traditional yogurt drink), ice cream, and various other products, a zoo, picnic areas, and other recreational and entertainment facilities (Açıksöz and Memlük, 2004). Today only architectural structures related to transportation, along with Gazi Farm Park, picnic areas, a museum, an exhibition hall, and Atatürk's house continue to exist. Production of honey, fruit juices, dairy products, and some ornamental plants is still ongoing. However, the majority of the raw materials are sourced from agricultural production cooperatives and are marketed under the AOÇ brand (Figure 2).

AOÇ is related to the layers of meaning associated with the social, cultural, and spatial objectives of the Republic Revolution, the principles and methods of becoming a self-sufficient contemporary society, and the story of the urban development of the capital, Ankara. It also hosts tangible cultural assets and natural systems that transcend the boundaries of the area.

Since its inception, the AOÇ has been perceived differently by various segments of society; for some, it is a place to access organic and fresh products, while for others, it has served as a retreat from the chaos of urban life (Atak et al., 2004). Despite the different perceptions and associations it creates, AOÇ holds significant value both locally and nationally. Historically, this area is a testament to the determination and resolve of the founding of the Republic of Türkiye, demonstrating the claim of the newly established capital to be exemplary and pioneering in the fields of agriculture and animal husbandry. (Atak et al., 2004).

According to the Council of Europe Landscape Convention, our country is obligated to identify its own landscapes, analyse their typical characteristics and the forces and pressures that transform them, record changes, and thus evaluate the identified landscapes by considering the special values attributed to them by stakeholders and the relevant population. In this context, AOÇ constitutes one of the most significant historical and cultural heritage values in the modernisation efforts of the Republic of Türkiye. Both the European Landscape Convention and the natural necessity of landscape protection and management concepts necessitate the establishment of a vision regarding the future of AOÇ, based on the mission determined during the founding years of the Republic. AOÇ is a symbol of modernisation, a shift towards technology, social understanding, and ultimately the creation of a miracle for the Republic of Türkiye.

**Returning to founding objectives**

In order to regenerate the spirit of this area, which is the symbol of the Republic and the modern capital city and one of the stepping stones of the history of the Republic, it is important to return to its founding purposes and to select the uses in accordance with these purposes. For this purpose, development strategies have been determined in the field (Table 1).

In this context, suitability analyses were made for cereal agriculture, husbandry, nursery, orchards, afforestation areas, production areas and recreation areas in line with the establishment purposes of AOÇ. Wheat for cereal agriculture, apple and grape for orchards, and agricultural recreation areas for recreation areas were taken into consideration.
Soil data prepared by the Central Research Institute of Soil Fertilizer and Water Resources and ASTERGDEM data with 30 m resolution were used in the study (https://search.earthdata.nasa.gov/search/, 2024).

The study was conducted in three stages. In the first stage, uses and products were determined in line with the founding purposes of AOÇ, and in the second stage, suitability analyses were conducted to

| Strategies | | Detailed Strategies |
|---|---|---|
| (1) Identification of areas for production activities included in the objectives of the organisation | 1.1 | Determination of crop pattern-based cultivation areas to return the farm to agricultural production activities |
| | 1.2 | Identification of suitable areas for afforestation activities and establishment of forests and nurseries |
| | 1.3 | Identification of suitable areas for the development of animal husbandry and research |
| | 1.4 | Identification of agricultural recreation areas to create socio-cultural and recreational areas |
| (2) Processing of agricultural products and offering them to the public | 2.1 | Marketing of already existing products |
| | 2.2 | Processing and marketing of new products to be produced |
| | 2.3 | Ensuring that disadvantaged groups benefit primarily from the products to be produced |
| (3) Production of agricultural technologies | 3.1 | Establishment of a techno city to follow and produce technologies related to agriculture and animal husbandry |
| (4) Providing Training | 4.1 | Organising courses and internships related to agricultural education |
| (5) Organising recreational activities and transferring the history of AOÇ to the public | 5.1 | Organising cultural tours |
| | 5.2 | Ensuring public participation in production in areas suitable for agricultural recreation |
| | 5.3 | Planned AOÇ Museum visits |

Table 1: Proposed development strategies and detailed strategies

| ***Product –– Parameters*** | **Elevation (m)** | **Slope (%)** | **Aspect** | **Soil depth** | **Soil texture** | **Land use capability classes** | **Distance to road** |
|---|---|---|---|---|---|---|---|
| **Wheat** | ≤1600 | ≤8,75 | S, SE, SW | deep, moderately deep | sandy clay loam, loam, silt loam | • | • |
| **Apple** | ≤1600 | 0-6 | S, SE, SW | ≥ 50 cm | • | I. to V., with priority for classes I, II, III. | • |
| **Grapes** | ≤ 1500 - 2000 | 3-10 | S, SE, | ≥ 90 cm | • | I.-II-III. | • |
| **Barn and Poultry Farming** | • | 0-10 | S, SE, E | • | • | areas not suitable for agriculture | • |
| **Nursery** | 600-1200 | 0-5 | • | ≥50 cm | • | to IV. | < 5000 |
| **Afforestation** | 0-1400 | • | N | ≥ 90 cm | • | VI., VII., with priority for classes VI, | 0-100 |
| **Agricultural recreation** | 0-885 | 0-20 | All aspects | • | • | • | • |

Table 2: Product and parameters used for the analysis (Compiled from Akpınar et al., 2004; Peşkircioğlu et al. 2009; Tıknazoğlu 2010; Yıldız, 2013; Alsancak Sırlı, 2015; Yazıcı and Aslan 2018; Sönmez et al. 2019; Güzel and Doğan, 2020; Muğla and Türk, 2020; Kılıç et. al. 2022.)

| Manifesting Potential | Shifting worldviews | Creating mutually beneficial, co-evolving relationships | Adding value across scales | Growing regenerative capacity in whole systems |
|---|---|---|---|---|
| • Production and spirit of the farm returning to AOÇ<br>• Promoting Agricultural tourism | • Collaborative, reciprocal relationships<br>- Farmer trainings and products<br>- Socio-cultural and recreational areas for the public to visit<br>• Circular energy, waste transformation, renewable energy | • Reciprocal economic relationships-corporatization, agricultural recreation<br>• Reciprocal humanitarian relationships-educational initiatives | • Sponsoring agricultural, educational and economical initiatives and support locally and regionally<br>• Enhancing green space network | • Beneficial initiatives continue to emerge and grow<br>• Scaling up good agricultural practices in the country through farmer training<br>• Local and international markets for farming products,<br>• Creating agricultural tourism network |

Table 3: Regenerative development of the Atatürk Forest Farm

determine where the determined uses and products were located within the area. While determining the products at this stage, the products grown in Ankara were identified from the products discussed in the scope of the Project for Determining Potential Suitability Areas of Agroecological Zones and Products in Turkey (Peşkircioğlu et al. 2009) and their suitability in the study area was analyzed. In the last stage, planning and design recommendations were developed for suitable areas determined in line with the analysis.

The parameters and suitability classes used in the analysis vary according to species and uses (Table 2). The results of the analysis were evaluated in four levels as unsuitable, marginally suitable, suitable and highly suitable (Figure 4). Climate was not considered for the species used in the study. The reason for this is that micro-scale measurements cannot be made with existing climate stations. In terms of the selected crops, the data obtained from the existing climate stations show that rainfall and temperature data are sufficient in terms of plant ecological requirements.

**Regenerative development of the Atatürk Forest Farm**

The necessity of transmitting AOÇ, which has become a symbol of Ankara since the establishment years of the Republic of Türkiye, to future generations in accordance with its founding purposes is paramount (Açıksöz and Memlük, 2004).

Re-identification of the farm will revive its spirit and reveal its potential. This production process will encourage mutually beneficial, mutually valued relationships. It will also change the community's perspective on the farm, thus adding more value and ultimately increasing its regenerative capacity (Table 3). However, with the trainings to be given and internship opportunities to be provided, public awareness will be raised and opportunities will be created especially for disadvantaged groups. The products and technologies to be produced in the farm will contribute to the local and national economy. Thanks to all these, the farm will be passed on to future generations in accordance with its founding purposes.

In conclusion, regeneration is a multifaceted process that requires a holistic approach to understand and develop interdependencies within social-ecological systems. This model not only supports nature in an ecological sense, but also increases the overall resilience of society by developing a sense of ownership over local resources. These interactions play an important role especially in the transfer of areas that serve as historical stepping stones for countries (such as AOÇ) to future generations.

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# Engaging with citizens' heritage knowledge in urban research and planning: The case of Lørenskog, Norway

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**Keywords:** Citizens' Heritage Knowledge, Transdisciplinary Research, Spatial mapping, Qualitative interviews

Figure 1 : The aerial photo shows the limits of Lørenskog municipality, which is adjacent to Oslo on the left. Lørenskog has traditionally been characterised by agricultural and forest landscapes

In response to a new municipal plan (Lørenskog kommune 2023), citizens of Lørenskog, a municipality near Oslo (see Fig. 1), called for a development halt, reflecting a shared sense of loss due to the rapid transformation from a predominantly agricultural to an increasingly urbanised landscape. This transdisciplinary research engaged residents in exploring experiences related to heritage and place identity amid development. In collaboration between researchers, educators, students, and the municipality, qualitative interviews with an integrated spatial mapping part were conducted with inhabitants. The paper examines the findings from the mapping process through the lens of place theory. To address the loss of identity, the paper highlights the need to involve citizens and incorporate their heritage experiences in the planning, management and development of cultural landscapes such as Lørenskog.

**Addressing Loss of Place Identity by Exploring Heritage Through Citizens' Perspectives**

Loss of local and regional identities and qualities has become a growing concern across European heritage and planning fields, as voiced by European Ministers in the *Davos Declaration 2018* (European Ministers of Culture, 2018). *The Council of Europe Landscape Convention*, first introduced in 2000, recognises landscapes as "an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity". (Council of Europe, 2000) The convention, alongside the recent declaration, problematises the accelerated transformation of landscapes due to rapid development. As a response, it emphasises the importance of acknowledging landscapes' natural and cultural heritage for individuals' sense of identity and quality of life.

The philosopher Jeff Malpas (2018) theorises that place is fundamental to human experience, arguing that landscapes are not merely physical settings but are deeply entwined with identity and collective memory. His theory of place suggests that landscapes play a formative role in shaping how communities perceive themselves and their heritage, connecting these processes to individual and collective identity. Similarly, heritage scholar Gregory John Ashworth and human geographer Brian Graham (2005) view heritage as a dynamic, selective process by which societies negotiate what elements of their past are preserved, reshaped, or forgotten. Adding to this discourse, critical heritage theorist Gustav Wollentz (2020) examines the connections between place identity, cultural heritage, and urban transformation. In *Landscapes of Difficult Heritage*, Wollentz (2020) argues that memories are intrinsically linked to physical spaces and that transforming these spaces profoundly impacts spatial remembrance and collective memory. Together, these scholars highlight that landscapes and heritage are not static concepts but evolve as communities continually redefine the values and memories they wish to protect. Their combined perspectives offer a critical lens and framework for exploring identity and heritage in the ongoing transformation of landscapes.

Building upon the foundational understanding presented in the landscape convention, UNESCO introduced the Historic Urban Landscape approach (HUL) in 2011, marking a shift from managing heritage as isolated objects or within conservation zones to viewing heritage as a process where entire cities can be understood as cultural landscapes (Taylor 2015, 179–202). UNESCO defines cultural landscapes as "combined works of nature and of man", reflecting the interaction between the natural environment and the development of human settlements over time (UNESCO 2012, 13–14). This framework defines urban areas as evolving processes shaped by the dynamic relationship between tangible physical elements and intangible cultural dimensions. The HUL approach opens for an inclusive approach to heritage and has called for updated practices and knowledge of how heritage relates to planning (Bandarin and Oers, 2015).

Informed by critical heritage and place theory, this paper addresses how collective identity and heritage are experienced and shaped amid the rapid development of Lørenskog municipality in Norway. Responding to the identity issue raised by residents, it explores the question: What can critical engagement with citizens' heritage knowledge bring to urban planning? The aim is to investigate how community-based heritage perspectives can inform planning practices.

**Integrating Qualitative Interviews and Spatial Mapping in a Transdisciplinary Research Approach**

Through a collaborative experiment using qualitative interviewing and spatial mapping approaches, this paper explores inhabitants' understanding of heritage

Figure 2: A view from the historical farm of Skårer gård towards the new development on the plains of Skårersletta, which obstructs the experience of the surrounding forest landscape from which Lørenskog's name derives, photo by: Vignir Freyr Helgason 2023.

and their evolving relationships with the landscape. Drawing on place theory, it later discusses findings to assess how cultural heritage and local identity are impacted by rapid urbanisation. Lørenskog was selected as a case study due to how the densification affects cultural heritage and the residents' experiences related to their place identity. The municipality's landscape is of a mixed character, combining its agricultural features, the surrounding forest, residential housing and the densely built urban centre of Skårersletta (figures 1 and 2).

This transdisciplinary research engaged teachers, researchers, and 74 architecture and landscape architecture students at the Oslo School of Architecture and Design (AHO) alongside the municipality and 30 residents of Lørenskog. Combining exploratory mapping and interview techniques provided access to residents' lived experiences of cultural heritage amid new developments within the case study. The in-depth interviews offered insights into how residents perceive and interact with local places, reflecting evolving heritage perspectives. The spatial data, which this paper focuses on, was drawn during the interviews on aerial photos with assistance from the students and then digitised to visually represent locations of interest, residents' movements, and everyday activities (see figures 3 and 5 for method examples). The method enabled inhabitants to engage with and explore the topic spatially.

Following the interviews, students conducted photographic surveys to interpret inhabitants' experiences visually. Some created collages juxtaposing photos with interview quotes (figure 4). These visualisations help interpret residents' interactions with Lørenskog's changing landscape.

**How Interviewing and Spatial Mapping Influenced Participants' Relationship with Heritage**

The combination of interviews and experimental mapping provided rich data on spatial patterns and personal experiences, revealing how inhabitants navigate the municipality and where they gather (see figures. 3, 4, and 5 for examples). A key finding is that citizens' understanding of heritage was primarily shaped by what they have been told is valuable. Many

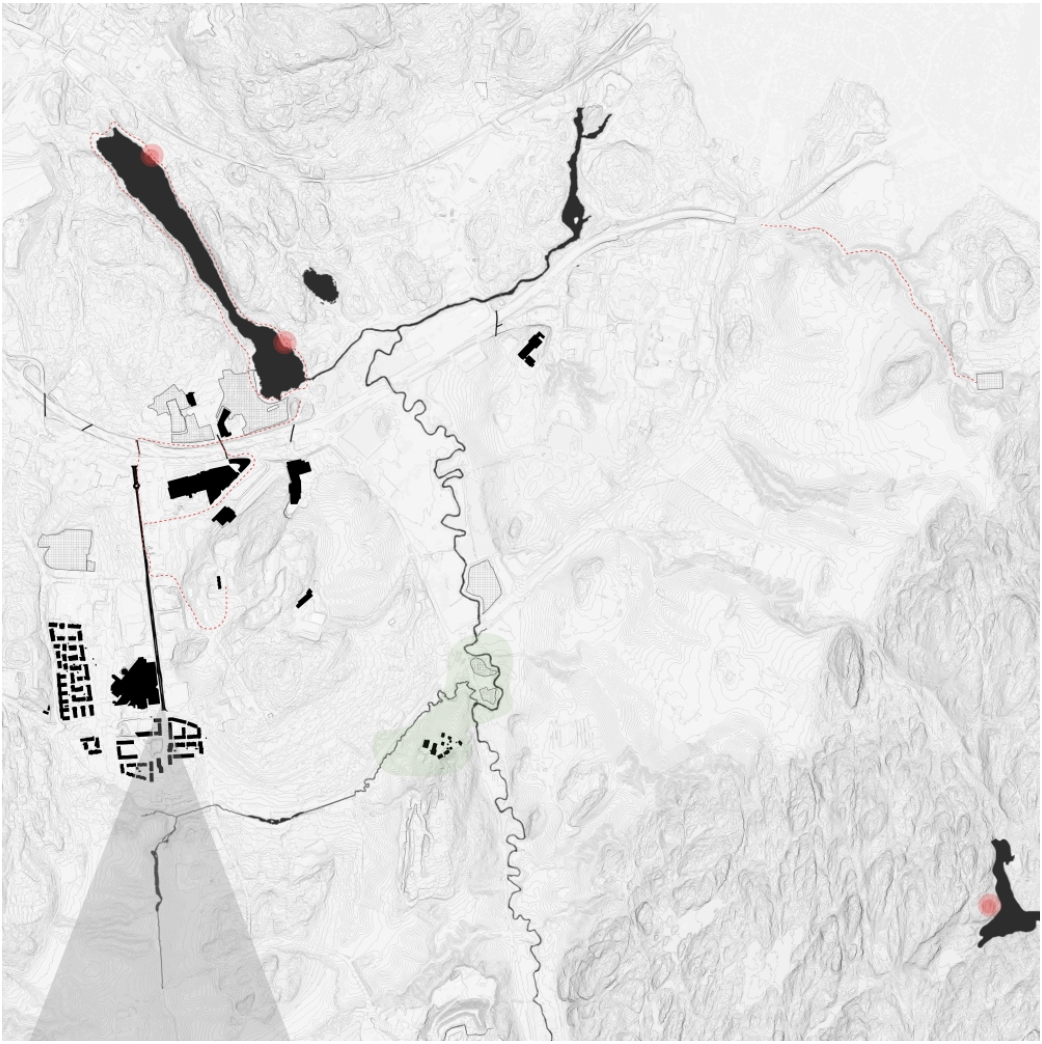

Figure 3: An example of a map created by the students to spatialise the information from the interviews, which was also used to inform their semester projects. authors: Jo Westgaard and Hedda Birgitte Lie Gullestad 2023

Figure 4: Example of a photographic survey and fieldwork conducted by the students after interviewing participants. The included interview quotes informed the understanding of the inhabitant's relationship to their places, authors: Christophe Benjamin Gilles Francois Marie Calm and Amalie Johansen Thoresen 2023.


Figure 5: This figure illustrates how spatial data was gathered during the interviews. The red markings indicate places of importance and the daily movements of the interview participants, authors: Kristoffer Gjestland Brun and Erle Strøm-Johansen 2023.

participants referred to monuments and heritage zones listed in the local heritage plan (Lørenskog kommune, 2021), part of the broader municipal plan (Lørenskog kommune, 2023). However, most inhabitants were unaware that they could actively participate in defining and creating heritage. Thus, through questioning, discussing, and mapping, the experiment became a process for identifying cultural heritage beyond officially designated heritage.

For many participants, the interview and mapping process also became a search for identity, as the guided questions linked the concepts of heritage and identity. Explorative questions like "How would you define Lørenskog's identity?", "Is Lørenskog a part of your identity?" and "What do you consider important cultural heritage in Lørenskog?" were posed. Follow-up questions invited them to identify specific places of importance: "Are there places you consider particularly meaningful? Where are these? Are they used for social activities?" Participants were then encouraged to draw these socio-spatial relationships on a map (see figures 3 and 4 as examples). Initially, some noted that they had not been asked such questions before. However, their thoughtful responses revealed deep connections with built and natural landscapes, providing insights into past, current and alternative landscape narratives and uses.

Through the interviews, a shift became apparent in participants' perception of heritage: from seeing it as object-centric, such as individual buildings, towards an understanding of heritage as a lived experience. This new perspective connected heritage with their

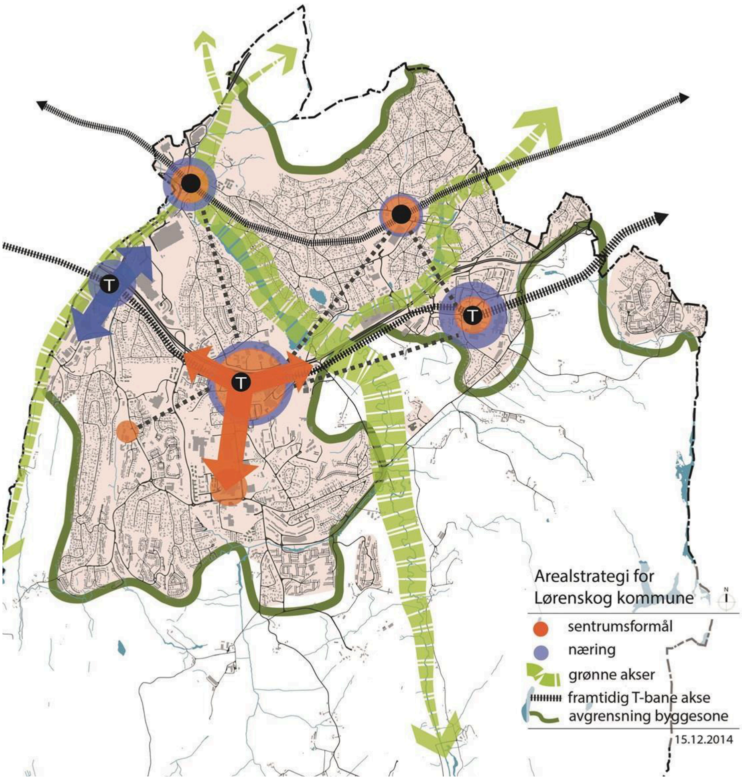


Figure 6 : The diagram shows an abstract planning concept used as a strategy in Lørenskog's municipal plan to guide development (Lørenskog kommune 2023, 6). The concept illustrates green corridors across the municipality but leaves out many green spaces within the urbanised areas that the residents speak of and draw during the interviews, source: Lørenskog kommune 2014.

actions and routines, like walking in agricultural landscapes surrounding the historic estate of Losby gods, which many participants felt strongly connected to. Additionally, many highlighted the significance of green spaces near their homes and the surrounding forests (from which Lørenskog's name originates) as central to their identity. The loss and lack of visual access to these places (Fig. 2) appear to contribute to local opposition to development, as these changes affect the community's identity tied to the green spaces within and surrounding Lørenskog.

**Engaging with Citizens' Heritage Knowledge in Urban Research and Planning: Opening for Citizens' Agency**

An essential finding from the interviews is that citizens highly value their "nærnatur", the in-between green spaces in their neighbourhoods, characterised by their wild, undesigned nature. However, the municipal plan (Lørenskog kommune, 2023) does not fully recognise the quality of these spaces, emphasising densification and prioritising only a few green corridors across the urban core (as shown in Fig. 6). The new municipal plan defines clear borders between built and natural environments, instead of promoting a more integrated experience where these are interwoven.

Ashworth and Graham (2005) argue that a sense of place comes from the creative imagination of individuals and societies rather than being an ingrained quality of landscapes. They emphasise the dynamic relationship between time, people and heritage, critiquing static notions of identity. The interview and mapping process in Lørenskog shifted participants' understanding from an object-oriented perspective to recognising heritage as a part of their identity, which relates simultaneously to intangible and tangible sides of the cultural landscape. These findings align with Ashworth and Graham's assertion that a sense of place must be related to time due to the constant regeneration of heritage and narratives, a process closely tied to lived experiences. They differentiate between a static understanding of heritage - anchored at a specific historical moment - and a dynamic interpretation, where heritage evolves alongside contemporary development. Creating a shared understanding of heritage values is a long-term process built upon layers of historical context and social contingencies. In Lørenskog, the rapid transformation disrupts this long-term negotiation, contributing to many residents' shared sense of loss of identity. The newly constructed buildings of Skårersletta starkly contrast with historical structures (as shown in Fig. 2, depicting Skårer gård), obscuring views of the surrounding forest from which the municipality derives its name. Participants' spatial engagements reveal a stronger connection to the natural landscape than the built environment. Losing visual or physical access to these spaces disrupts this connection by removing the possibility of experience and attachment.

The mapping process revealed growing concerns over socio-spatial divisions: those with resources reside in homes with gardens outside the city centre, while those within it lose access to green spaces and natural open areas near their homes. Malpas emphasises that people's experiences are inherently tied to place (2018). He proposes an integrative understanding of place identity across disciplines encompassing natural landscapes, built structures, and individual and collective narratives. Wollentz (2020) emphasises that heritage is continually produced and never conclusively determined. Malpas views place as a structure that fosters action, thought, and experience, where time manifests as a space for identity formation. He posits that an "open" place facilitates engagement and agency. Both Wollentz and Malpas highlight the relationship between embodiment and spatiality. Applying their theories to Lørenskog prompts reflection on the narratives being created and the values they embody. Embracing more profound and broader heritage perspectives can encourage reflection and negotiation surrounding the green and open heritage spaces the inhabitants' treasure and potentially impact further inclusion of them in planning and development.

### What Can Critical Engagement with Citizens' Heritage Knowledge Bring to Urban Planning?

This paper's interview and mapping methods reveal that heritage can be understood in a broader context than typically presented in a municipal heritage plan, which often focuses on a list of objects and designated heritage zones. The findings indicate that the relationships between Lørenskog's inhabitants and their landscape are far more affluent, showcasing a diverse heritage shaped by citizens' narratives and deep connections with the natural environment, as illustrated through their movements and uses of spaces within the municipality.

Additionally, the interviews serve as both a search for identity and a journey of discovering Lørenskog's heritage. By integrating mapping into the interview process, participants initially recalling heritage objects from the municipal plan were encouraged to reflect on their personal experiences and the impacts of changes within their local environment. This approach prompted them to reconsider their connections to heritage and how they would define it. For effective heritage regeneration in Lørenskog, there must be space for citizen agency, which, as Malpas, Ashworth, and Graham argue, is essential for creating heritage. The interview and mapping processes have seemingly enhanced citizens' sense of agency, allowing heritage to evolve from a concept defined by others towards recognising that it is something they can actively shape and define through their daily practices and visions for the future.

This research demonstrates that local heritage knowledge can be accessed and produced by actively engaging citizens through explorative interviewing and mapping. The paper illustrates a lack of recognition of heritage experiences within current planning practices by critically engaging with citizens' heritage knowledge. Most importantly, the findings underscore the need for further exploration and discussion on better incorporating citizens' heritage experiences in the planning, management, and development of cultural landscapes like Lørenskog.

**Acknowledgements**

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# A NELA workshop: Speed design with landscape architecture archives

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**Keywords:** Landscape architecture, Archives, Speed design, Mont des Arts, René Pechère

**Keywords**: Landscape architecture history, archives, historiography, interdisciplinary collaboration
**Abstract:** This paper presents an overview of the workshop organised by the Network of European Landscape Architecture Archives (NELA) at the ECLAS 2024 Conference. Centred on the theme "Speed Design with Landscape Architecture Archives: the Mont des Arts, Brussels," the workshop explored the creative potential of landscape architecture archives in design practice. The theme of this year's conference, "Regenerative Landscapes," is embedded in the workshop's objective: to investigate how archival resources can inform, inspire, and regenerate landscape design. Thirty participants, including landscape architects, educators, archivists, and researchers, engaged in the speed design exercise using archival materials of René Pechère's design proposal from the 1950s. Through this exercise, participants explored how ideas from the past can be integrated in a new proposal, and how historical sites can be regenerated to fit in a new context.

**Introduction**

Founded in September 2019 at the ECLAS Conference in Ås, Norway, the Network of European Landscape architecture Archives (NELA) is now in its fifth year (Lička and Krippner 2020; Csepely-Knorr 2021). Since 2021, NELA has organised a workshop at each ECLAS conference to address issues related to landscape architecture archives, including: Archives of Landscape Architecture in the Digital Era (2021), Landscape Architecture Archives Collection Strategies (2022), and Points of interest: Connecting Landscape Architecture Archives in Europe (2023). At this year's ECLAS conference in Brussels, NELA organised its fourth workshop, Speed design with landscape architecture archives: the Mont des Arts, Brussels, focusing on the use of archives in landscape architecture design. In alignment with this year's theme 'Regenerative landscapes', the workshop aims to demonstrate how the meaning of landscape architecture archives can be regenerated through their use by landscape architectural practitioners and educators, and how such use can (re)generate better landscape architecture projects. This is also an attempt to create bridges between landscape architecture archives, researchers, educators and practitioners. The goal of this speed design workshop is to experience and explore the creative use of archival materials, and to test the potentials that archival materials can bring to a new design. By creating a space and opportunity to work with landscape architecture archives, we hope to bring a 'learning by doing' experience to all participants. Scheduled for 2.5 hours, the workshop ran as a parallel session during the conference and attracted around 30 participants. Among them, two thirds are non-NELA members. Participants, from in and outside Europe, included landscape architects, educators, archivists, historians, plant scientists, researchers and PhD students.

The workshop contains three parts: Workshop organisers presenting landscape architecture archives and the site for speed design (40 minutes); speed design (70 minutes); participants presenting their design results, then discussion and reflections (40 minutes). Based on this order, the following sections provide an insight into the process, outcomes and reflections of the workshop.

**Landscape architecture archives: What are they? Why are they important?**

The workshop started with a short presentation by Sophie von Schwerin (Archiv für Schweizer Landschaftsarchitektur ASLA) on landscape architecture archives to show their meaning and importance in professional work. The base informations to the collections, the connected institutions and the use by landscape architecture practitioners and educators were given:
Landscape architecture archives collect the written and graphic records and data produced by Landscape Architects or offices. The content depends on the collection strategy and can be focussed on specific timeframes, geographic or cultural areas. Currently, landscape architecture archives are mostly connected to universities, which means an easier access to such archives by university educators. There have been examples of using landscape architecture archives in teaching activities, such as lectures of garden history, cultural heritage, plant use, design studios and drawing classes (Krippner et al. 2020; Lička et al. 2023).

Besides, landscape architecture archives are an important source for research, practice, and exhibitions. They show the development of the profession and demonstrate the implementation of styles. They are used for cultural heritage conservation as well as inspiring new design projects. Finally landscape architecture archives are the memory of the profession, they must be seen as cultural institutions and used as knowledge centres.
Site for speed design: The Mont des Arts in Brussels f
Following the general introduction on landscape architecture archives, the audience was introduced to the Mont des Arts in Brussels, the site for the speed design. Landscape architect, landscape architectural historian and curator Ursula Wieser Benedetti from CIVA —the largest archive centre for landscape architecture and architecture in Belgium (https://civa.brussels/en) gave a resourceful presentation of the site, illustrated with rich archival materials from their collections. These archival materials served as a starting point and source of inspiration.

The project was designed in 1958 by landscape architect René Pechère (1908-2002), as part of a major series of urban transformations undertaken to reorganise the city along modernist planning principles. The site is situated at the heart of Brussels, on a sloping site connecting the upper and the lower part of the city - the historic city centre. Situated next to the National Library of Belgium (also built in 1958) the site acts as a connecting public space, a belvedere onto the lower city and its iconic town hall spire. The design consists of a formal main axis with a very open character, and a lateral, more intimate space. This 'intimate garden' (no longer extant today), was created by Pechère to provide users with a series of informal spaces for relaxation, children's play, leisurely observation... It was destroyed in the 1980s to give way to an underground convention centre.

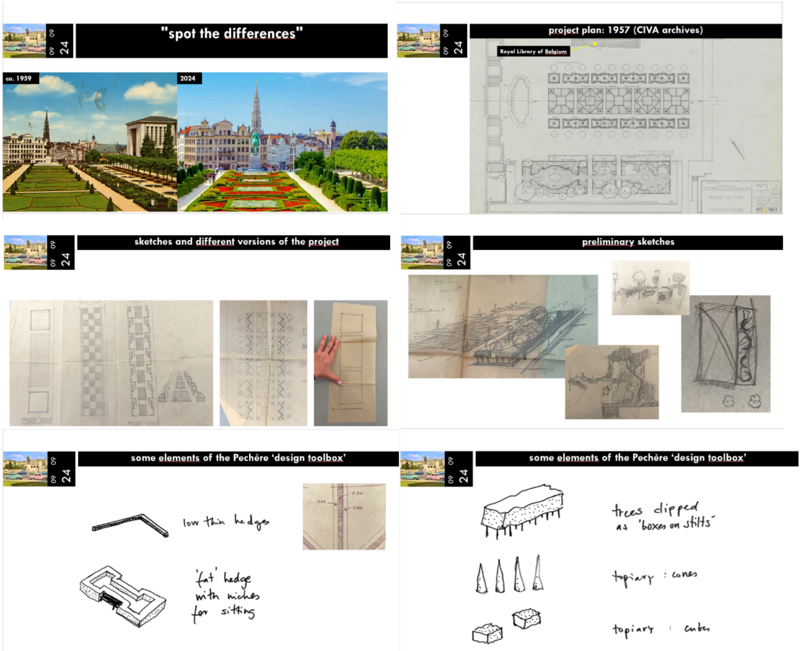


Figure 1: Different archival records were shown to the participants, ranging from sketch design options to final detailing plans.

This fundamentally denatured the designer's original concept, whose overall balance was based on these two strongly contrasting entities.

The site for the speed design was chosen for the multiple challenges it poses: destruction of an important part of the original project in the 1980s, strong alterations of plantings,street furniture and detailing in the still existing parts...
The challenge proposed to the participants of the workshop was to develop strategies on how to go about tackling a historic site strongly modified over the decades.

Several tracks were suggested:

- Recreate the original design meticulously, on the basis of Pechère's archival plans?
- Completely redesign the site with a contemporary approach?
- Take inspiration from Pechère's 'design toolbox' to redesign the site and cater for contemporary needs, thereby catching the spirit of the 1950s whilst also adopting a contemporary approach?
- Draw inspiration from some archival sketches showing design options that were never chosen, so as to create a design by René Pechère that never saw the light?
- Adopt a hybrid strategy between conservation and redesign, keeping some historic parts whilst creating new ones ?

Speed design with landscape architecture archives
After the introductory presentations, participants, divided into five groups, began a 70-minute speed design. Before the workshop started, we had arranged the room with five large square tables, each surrounded by six chairs. On each table, we provided one sheet of A1-sized paper with the original plan printed at a 1:200 scale, one sheet of A1-sized blank paper, several sheets of blank A3 and A4 paper, tracing paper, a set of coloured pens and pencils, pencils, erasers, scale rulers, scissors, and glue. We intentionally excluded digital materials in order to evoke a historical atmosphere of landscape design. Although all groups worked with the same site and archival materials, they were encouraged to choose their own design focus. To initiate this, we provided a design brief to guide their design thinking (Table 1).

**A Design Brief**
**Site**: Mont des Arts, Brussels
Originally designed by René Pechère (1908-2002)
Date of creation: 1958 (created for the opening of the 1958 World Expo - with the Atomium as its symbol).
Pechère was also the Landscape architect in chief of the Atomium site.

**Typology:** Roof Garden (over a car park)
The site has been altered over the decades (site amputated by about 1/3 of its original surface in the 1980s for the creation of an underground congress centre; planting severely altered ; lighting replaced, etc.…)

**Project Goal**: The aim of this design project is to create an attractive public space. 'Attractive' can mean different things, such as being socially inclusive, rich in culture and history, aesthetically appealing, and so on. Please define your own interpretation of 'attractive' for this speed design project.

**Tasks:** As a group, you are to specify the goal of your design project and identify the focus and scale of your design. This can be a conceptual design or a master plan of the park, a detailed design of one section of the site, a planting design, a pavement design, park furniture designs etc. Please be as creative as possible.

Ensure that your design incorporates inspiration from the provided archival materials. The extent to which you use these references is at your discretion. You may choose to restore an original parterre or planting design, make a bold alteration while capturing the essence of Pechère's vision, or even deconstruct the original plan to create something entirely new.

Present your results on A1 paper (max. 2 sheets per group)

All participants were actively engaged. Almost all groups spent a long time studying the site and discussing their chosen direction or focus, with the actual drawing taking place in the last thirty minutes. However, the results were impressive and each group developed its own complete and unique design project. Although we mentioned that participants could take a break during the design process, no one left the room or even took a coffee during the 70 minutes – they were deeply immersed in the tasks. This demonstrated that the workshop design was successful.

**Speed design results and reflections**

After an intense time of speed design, we came to the exhibition and reflection section, where the outcomes from each group, presented on one or two sheets of A1 paper, were posted on the wall of the workshop room. Each group made a 3-minute presentation, followed by a discussion with workshop organisers and all participants. This created a nice moment of reflection: what was on their mind? what they have learned from the archives, what worked and what did not work during the speed design process? What benefits did they see? What obstacles did they have? Here is a brief summary of the five groups' design projects and their reflections:

Group 1 focused on the contrast between the informal woodland and the formal parterres (Figure 2). They took a conservative approach, combining historical design with a new touch. They found valuable information in historical images from various periods presented in the introduction, while acknowledging that history is selective; thus, decisions must be made about what to preserve and what to change. In reflection, they realised that their entire focus had been dominated by forms, which were strong and characteristic, while they had paid less attention to the people who use the site. It would be desirable to know more about the surroundings in order to understand how the park is used.

Reinterpretation and reconstruction as methods of a conservative approach, creating a contrast in forms
Group 2 had a lot of discussion in the beginning about what to keep, what not to keep, and why. They eventually identified their primary goal as making the

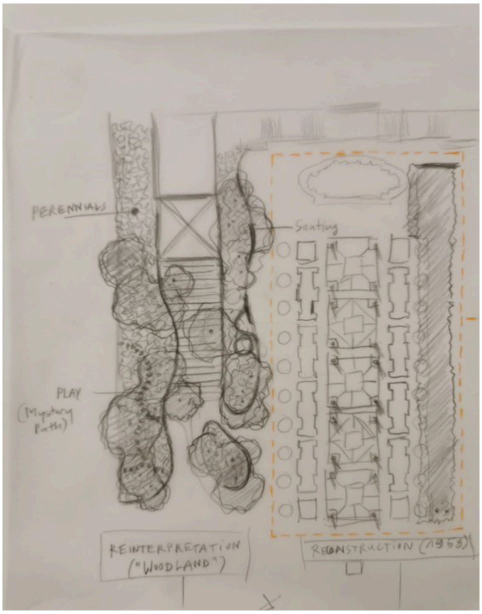


Figure 2: Part of the proposal by Group 1.

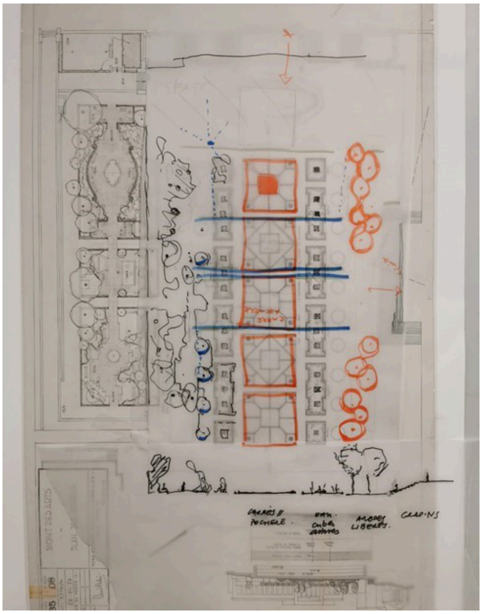

Figure 3: Part of the proposal by Group 2. The design intention was to strengthen the connection between the east and west sides of the site.

place more attractive and accessible. Based on historical images, they found that the groves should be preserved as an appealing feature, and that the east-west connection between the library and the convention centre should be strengthened (Figure 3). Although the recently added convention centre does not contribute to the site's sense of place, they opted to work with the existing structure rather than remove it. They also noted that two rows of trees obstruct the view and proposed to have them removed by, not cutting them down, but waiting for them to die naturally. Besides, people's feelings and uses of the place was also their focus. They found archival materials useful and wished to gain more information on the site's historical and geographical contexts to support more informed decisions.

Group 3 approached the project from a heritage perspective, beginning with an analysis of what is important or valuable. They identified the central axis and topiaries as key features. Based on this, they proposed a design that preserves the main character of the site while introducing new planting for biodiversity and low maintenance. They also considered user experiences, transforming the central axis into a 'social parterre' — a green open space for picnicking, lounging, and other activities (Figure 4). The group made a good use of archival materials, respecting the 1950s design. Meanwhile, they also expressed the desire for additional information about the broader context to better assess the historical value and function of the site.

Group 4 played with the meanings and forms. Using 'strips' as the central theme, as seen in the sectional plan (Figure 5), they divided the park into different zones: strips for recreation and leisure, wild prairie strips paired with strict boxes for biodiversity (demonstrating biodiversity in different shapes and forms), an open strip of neat lawn offering views of the town hall, and a promenade. Besides, by turning the statue of King Albert I to a slightly different angle, they aimed to orient it toward the town hall, symbolising a gesture of decolonization.

Group 5 presented a more strategic plan, beginning

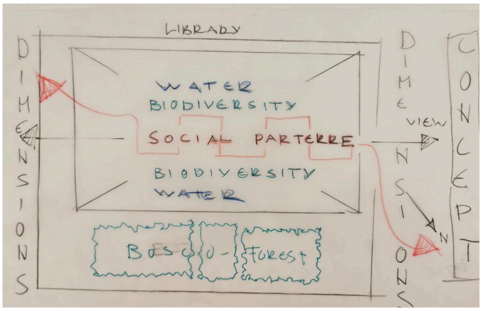


Figure 4: Part of the proposal by Group 3. A concept plan that explains the main consideration of the proposal

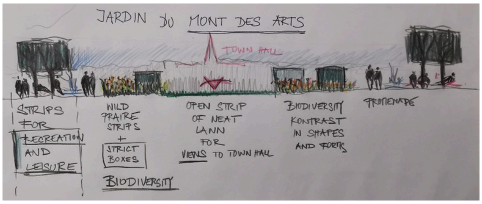


Figure 5: Part of the proposal by Group 4. A sectional plan that illustrates different 'strips'.

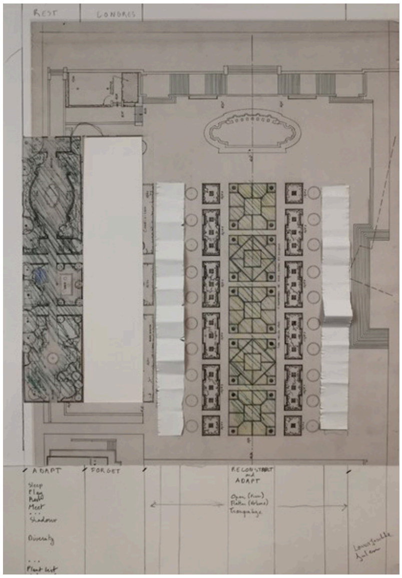


Figure 6: Part of the proposal by Group 5. The site was analysed and a new scenario without cars was proposed

with questions such as "what are current challenges? How is the place currently used? What is the wider context?" They spent considerable time with understanding the area and felt hindered by the lack of a current plan of the site. Therefore, they consulted google maps to study the site's current situation before diving into a new design. Central to their proposal was analysing past changes and anticipating future changes, leading to a scenario in which cars would disappear and the road would be re-purposed for rest or re-creation (Figure 6). As a result, the group proposed new functions in selected areas, while keeping the rest of the site preserved or restored.

Landscape architecture archives and regenerative landscapes: reflection and conclusion

With the workshop results in mind, we can now reflect upon the conference theme 'Regenerative landscapes'. How do landscape architecture archives relate to this topic? The dictionary definition of 'Regenerate' is 1) (of a living organism) grow (new tissue) after loss or damage.2) bring new and more vigorous life to (an area, industry, institution, etc.); revive, especially in economic terms. 3) reformed or reborn, especially in a spiritual or moral sense (Oxford Languages, n.d.). Interpreted through this lens, a 'regenerative landscape' can be understood as a landscape transformed from an undesirable state, or one that demonstrates an ability to adapt to and thrive in a new context. Compared with architecture, landscapes are more likely in constant flux, shaped by natural forces, management or maintenance priorities over time (Tusch et al., 2024, 3). Archival materials record such processes, providing a deeper understanding of how and why these changes occur. By digging into landscape architecture archives, we gain insights into the layered histories of sites, allowing us to learn from the past and guide future transformations toward regenerative, rather than degenerative, landscapes.

The results of the design projects generated in the workshop exemplify how and why transformations – and in some cases, regeneration – happen in the design stage. For example, timely calls for biodiversity and social equity shaped the focus of some groups' projects, leading to designs that align more closely with contemporary needs. Meanwhile, the results also showed that the ideas from the past (either realised in reality or merely existing on paper) were regenerated in new designs, such as Pechère's design thinking on contrasting forms being picked up and reinterpreted by some groups, leading to a strong sense of continuity between the new and the old projects. These findings suggest new meanings to regenerative landscapes: a historical landscape adapted with a new focus to meet present society's needs, or a new landscape that reintroduces valuable ideas from the past.

In this way, regeneration in the context of using archives in landscape design projects is about reusing and re-evaluating historical information, knowledge and wisdom to meet contemporary needs and challenges.

Through the immersive experience of this workshop, participants gained a deeper appreciation for the value of landscape architecture archives. The next step is to bring this approach into future projects, including the recently granted EU-COST Action 'Connecting landscape architecture archives to enhance European landscape practice, research and education' (COST, n.d.), Moving forward, more questions arise: how to make landscape architecture archives more visible and accessible? How to further promote the use of archives by practitioners, researchers and educators? What obstacles currently hinder their integration? Addressing these questions will help us maximise the role of landscape architecture archives in the profession, fostering richer, historically informed design solutions.

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# The art of the 'winegrower – gardener' in Val de Loire in France

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Figure 1: The September grape harvest in the close surroundings of the château de Saumur, Illumination in : Les Très riches heures du Duc Jean 1er de Berry, The Limbourg brothers 1410-1411, open access via Gallica.bnf.fr

**Introduction**

In Val de Loire (France), the art of the vine is combined with the art of gardening. The expression *Jardin de la France* (Florio,1477) refers to the opulence of a kingdom whose king is the gardener. Vine was used on fodder trees or fruit trees as a support in an agriculture organised into associated crops. The late 19th century phylloxera and mildew crises and the 20th century rise of mechanised, standardised terroir winegrowing under the *Appellation d'Origine protégée (AOP)* have led to the almost all disappearance of this landscape.

The need to adapt to climate change is once again changing the way things are done. The *winegrower-turned-gardener* advocates cultivation based on listening to nature, maintaining living soils, rehabilitating old grape varieties and designing the vinescape with its environment. In what way and how, is the landscape heritage of the garden contributing to this renewal of winegrowing in the Val de Loire?

**The 'vinescape' heritage of the Jardin de la France**

*The print of garden viticulture*

The 'cultural, evolving and living landscape' of the Val de Loire was inscribed on the World Heritage list in 2000. This recognition celebrates in particular the cultural value of vineyards set up by the abbeys, the châteaux and the cities de Loire. One of the illuminations of the '*Très riches heures du Duc de Berry'* is dedicated to the September grape harvest. This image of the close surroundings of the Château of Saumur (Maine-et-Loire) gives us an idea of a 15th century vinescape: a vineyard protected by woven fences and non-aligned plants trained on stakes.

Until 16th century, prestigious vineyards contributed to the reputation of the lord owner. Vines planted in arbours, cradles or trellises were also one of the ornamental motifs in the pleasure gardens of Renaissance princes (Salamagne, 2024). At the same time, a vinescape of peasant origin was developing: the vine used on the living support of the tree as a

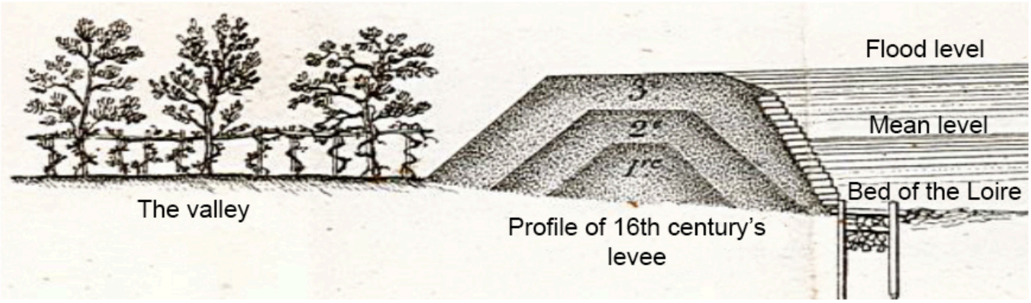


Figure 2: The profile of a Loire's levee and a drawing of the trellising of a vine with a treestand, 16th century. Bodin,1821

stake (Fig.2) in a process similar to the antique mediterranean model of *vite maritata* (married vine) and thrived in an agricultural environment of *coltura promiscua* (associated crops). Some 18th century farming contracts mention orchards planted with cereals between the tree rows and vines running alongside the fruit or fodder trees at heights of 2 to 3 metres (Brouard, 2021). This ancient system of cultivation based on plant companionship was described by a traveller in 1752: '*On arriving from Touraine to Anjou, at the bottom of the Loire's levees you see vines growing on top of fruit trees as in Italy*' .

**UNESCO recognition of a territorial cultural value**

The UNESCO recognition of the Val de Loire concerns the whole of its fluvial, agricultural and garden art landscape, as well as its outstanding monuments and remarkable urban landscapes. The exceptional value of this cultural landscape cannot be reduced to the quality of its vinescape. However, it opens up a particularly rich field of investigation into the spatial and intangible interrelationships between the vine and the other territorial components of the cultural landscape of Val de Loire.

The UNESCO Cultural Landscape category was adopted by the UNESCO World Heritage Committee in 1992. It is the result of the progression of international expertise, starting from the garden art as a heritage object defined by the Florence Charter on the protection of historic parks and gardens in 1982 to the large scale of the territory and its diverse landscapes. The similarity of uses and forms between the vinescape and the concept of garden is one of the keys to my doctoral research: the vineyard analysed as '*a mosaic of vine gardens*' and, conversely, the garden as the right size of plot for growing vine and experimenting with new practices such as acclimatising new grape varieties.

**The coming-back of the winegrower-gardener**

*The winegrowing ecological practice*

The need to adapt to climate change and the collapse of biodiversity are leading to new agricultural practices. Organic farming certification has been booming since the beginning of the 21th century, especially in Val de Loire: 29% of estates (+50% between 2019 and 2022) and 23% of the surface area (+44% between 2019 and 2022) are certified. This result is higher than the French average, which is 17% of estates and 20% of the surface area (Gautier, 2022). Unlike other agricultural sectors, organic conversion winegrowing estates are still increasing. It reflects the coming-back to a chemical-free viticulture, based on the respect for ecosystems as well as animal and human well-being. It also marks the rediscovery of the key role played by companion plants in the ecosystemic development of the vine (Darricau,2019).

Despite this success, the INAO's 2022 activity report points out that only a third of wine-producing AOP have adopted three of the agroecological measures supported by the French government since 2014:

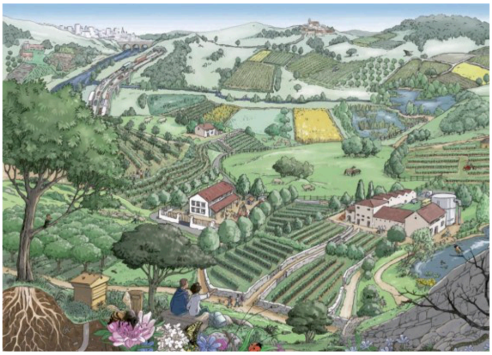

Figure 3: Simulation of an eco-climatic transition vineyard landscape, retrieved from: https://www.vignevin.com/outils/outil-pedagogique

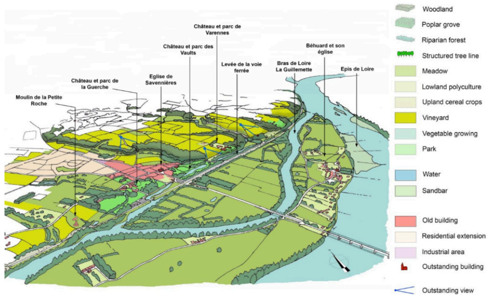


Figure 4: The cultural vineyard landscape of Savennières: perspective view from the river Loire, source: Curvale, 2017

grass cover on plots, banning the use of herbicides and improving the efficiency of spraying equipment. This situation can be explained by the diversity of the socio-economic situations of winegrowing farms: the CLIMENVI research programme in the Centre-Val de Loire region emphasises the importance of establishing specific climate change adaptation trajectories taking the different locations into account (Bertrand et al., 2020).

**The need for territorial landscape coherence**

The 'Agroecological transition and climate change' guide in viticulture produced in 2018 by the French Institute of Vine (IFV) confirms the importance of an overall territorial approach to complement the individual commitment of vineyards. An agroeco-logical strategy cannot be envisaged without taking into account the landscape coherence of ecosystems on a territorial scale, (Lempereur, Herbin, 2022). To support its argument, the IFV offers an educational landscape simulation on its website (Fig. 3) . Although this is a fictitious landscape, it sets out the development of the vine in close relation to the agricultural and forestry mosaic with respect for all living beings, including those of the soil and subsoil. The winegrower and the inhabitant are both the artisans and the observers of a landscape whose coherence is presented as synonymous with harmony and well-being.

How can the agricultural landscape heritage of the Jardin de la France guide an ecological and climatic transition? By way of example, here are some of the conclusions of a study carried out in one of the most remarkable Val de Loire's vineyards for its density of gardens and parks: the vineyard of Savennières (Maine-et-Loire).

**The example of the 'vineyard - garden' of Savennières**

*The landscape heritage of wine châteaux*

This vineyard is located on a promontory downstream from the Loire-Maine confluence, 15 km south-west of Angers, on the right bank of the Loire. Planted on a steeply sloping hillside, it flourishes on shallow schist soils and outcropping volcanic beds. Small valleys, the coulées , from erosion of the hillside, allow the vineyards to benefit from the river's climatical regulation and the valley's biodiversity (Fig.4).

There are 17 châteaux, all of which have (or have had) wine-growing estates, and 15 of which are within the AOP perimeter. The surroundings of all of them are consist of regularly laid-out gardens, some of which have retained their 17th and 18th century features).11 of them are extended by 19th century landscaped parks. They reflect an unified landscape composition articulating plots of land thanks to the design of paths and views including an essentially decorative purpose, the landscape park and plots of land with a purely productive purpose, the agricultural park (Hamon, De La Celle, Pinon, 1995).

*A regulating landscape ecosystem*

Today, the vineyards are framed by the anthropic environment of the coulées listed as remarkable areas in the planification document of the Angers metropolitan area . These include gardens and landscaped parks as well as overgrown meadows and

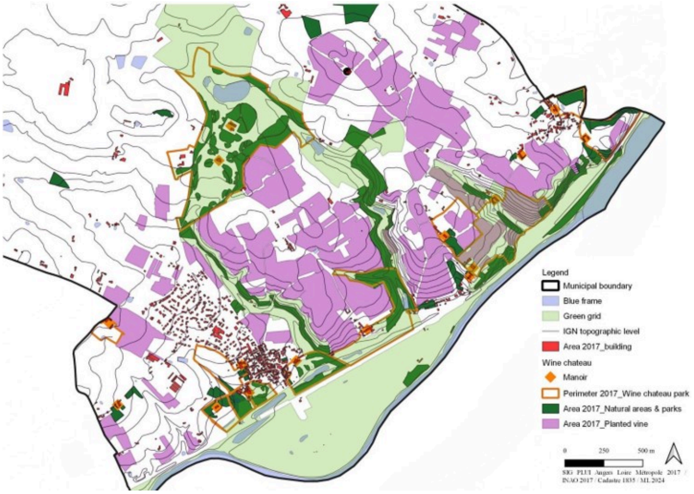


Figure 5: The vineyard landscape composition of Savennières, source: author

woods remarkable for their biodiversity. In total, they account for 10% of the surface area of the local green grid, which is twice as large as the planted vineyard area (270 ha of green grid for 140 ha of vineyard, Fig 5). This green grid is also that of the vineyard ecosystem that gave rise to its development. It has been magnified by the monumental compositions of landscape parks. But does this mean that we can talk about regenerating landscapes able to face the challenge of climate change?

Following the UNESCO listing, the entire vinescape of Savennières was granted protection for its landscaped components in 2010, and for its built, garden and parks heritage in 2017. These two regulatory tools were drawn up at an inter-municipal scale, in line with the landscape unit defined in the regional landscape atlas. This protection has proven to be essential for controling urban sprawl. Howevrer, there are no specific actions to guarantee the conservation of vineyards. But how about the winegrowers-gardeners?

**The winegrowers-gardeners' experiences**

*The 'vineyard-garden' of Château des Vaults*

One of the Savennières wine châteaux, Château des Vaults, has reinvented the combination of landscape, park and wine estate. A footpath offers a landscape wine walk encompassing the park and vineyard (Fig.6): the landscape composition showcases the alliance between the useful and the pleasurable, the vineyard and the anthropic environment of the coulée and the landscaped parks.The vine becomes a component of the aesthetic design of the landscaped park.

The priorities of this winegrowing estate, organic certified, are to encourage the conservation of living soil and subsoil (through the regenerative action of invertebrates and mycorrhizae) and the planting of viticultural hedges, used as a landmark by the bats that predate the European grape worm (Lobesia botrana), as well as to feed the bees thanks to native melliferous species. The vine is no longer trellised but tied to a stake and pruned 'en gobelet'. It provides a naturally ventilation of the vine  to better withstand the high temperatures and excess humidity that cause fungal diseases.

**The idea of a 'vinescape park' on the scale of the appellation zone**

The idea of a 'vinescape park' on the scale of Savennières AOP was tested in Spring 2023, within the framework of a public consultation with local residents and winegrowers.  It was set up in collaboration with the Institute Agro Angers - Rennes, the local government and the viticultural organisation of

Fig.6: The landscape story of a production ethic, the example of a wine tourism trail in the vineyard park, source: Château des Vaults, 2020

Savennières. The guidelines considered in the wake of the project concern the restoration of heritage landscape, the creation of leisure trails between vineyards, coulées and parks, and an inventory of the remarkable trees in the parks as landmarks in the wider landscape. The winegrowers agreed on three priorities to be implemented with the local authorities: maintaining the plant cover of the coulées, restoring ponds to combat drought, and reserving land for the future migration of vines from the hillside to the plateau. Indeed, deeper soils provide better water reserves and allows a better adaptation to the climate change The idea of a viticultural landscape park is now in the process of being defined.

**Conclusion**

The preservation of the winegrowing landscape and the reintroduction of associated plants that help the vines could be set up thanks to the network of gardens, parks and natural areas inherited from the past. A landscape vineyard on the scale of the territory might be an adapted strategy to tackle the ecologic and climate transition. The aim is to propose the terms of a cultural ecology for climate transition based on the art of the winegrower who has become a gardener once again.

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# Tustan’s cultural landscape: Research, conservation and use experience

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**Keywords:** cultural landscape, re-naturalization, landmark preservation documentation

In order to satisfy their needs, humans use the resources coming from the natural environment in which they live. It is known that the full satisfaction of people’s needs is possible only when natural resources are used to an extent that does not prevent their sustainable use (Petlin 2021, p. 139). Such are the cultural landscapes in which the natural and anthropogenic components are balanced. They are formed as a result of long-term effects of the human factor on the natural landscape. As a result, material forms are formed, which, together with the natural landscape, constitute the cultural landscape (Sauer 1969, p. 343). Since cultural landscapes are open and dynamic, they constantly undergo oppositely directed processes aimed at the enculturation of natural landscapes and anthropization of cultural ones, and the degradation or re-naturalization of cultural landscapes can take place (Myga-Piątek 2012, p. 60). The cultural landscape can be considered regenerative when the changing processes taking place in it are aimed at restoring the lost qualities of the landscape.

Regenerative landscapes, despite all the transformations that take place in them as a result of economic, political or social changes, remain a medium of information about the culture of people who lived in them and changed them. Landscapes preserve the layer of these cultures in the form of material forms or minor transformations of the natural base. It is up to us to read this information correctly and use it wisely. The cultural landscape of Tustan has been formed for hundreds of years and has gone through several stages of its historical development. The first stage encompassed the formation of wooden fortifications on the rocks of the Yamnensky Sandstone, which were improved at least five times over a long period of time. In the 14th century, Tustan had the status of a parish centre and a border fortress of the Galician Principality.

The incorporation of the Galician lands into the Polish Kingdom led to the decline of the fortress and its transformation into a feudal castle, and then a customs post. The village of Urych, its settlement and agricultural landscape was formed near it along with the decline of the defensive functions of the fortress in the late 15th century and in the early 16th century, marking the beginning of the second stage. The second stage ended in the late 19th century.

At the third stage, the industrial use of the local natural resources intensified. In the late 19th century and in the first third of the 20th century, the local forests were intensively cut down, the area of agricultural territories was expanded, and the oil-extracting operations began: first manual, then mechanized ones. At this stage, the natural resources were a driver of economic growth not only for the village of Urych, but also for the oil community and other entrepreneurs. At that time, the active development of the village and its agricultural landscape could be observed. In 1935, the number of residents of Urych reached its historical maximum (Parkhuts 2009, p.515).

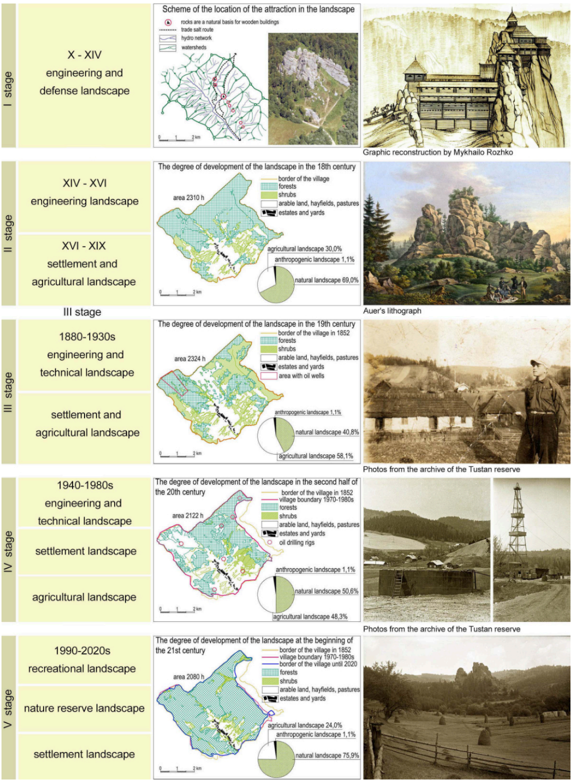


Figure 1: Stages of changes in the cultural landscape of Tustan (author)

Subsequent political and economic changes that occurred after the Second World War contributed to the cultural and economic decline of Urych. At this fourth stage (1940 – 1980), there were changes in the system of forest and agricultural land use, oil extraction with the help of drilling equipment became more active, and a significant number of peasants migrated to urban areas. These processes contributed, on the one hand, to a partial return of the agrarian landscape to its natural state, and on the other hand, to a change in the landscape: small parcels of former private properties were replaced by large areas of collective farm land.

As Ukraine regained its independence, the fifth stage of the cultural landscape of Urych began. In 1994, the Tustan State Historical and Cultural Reserve was created; and in 1999 the Skolivski Beskydy National Nature Park was established. When the Reserve was established, the Lviv Historical Museum was assigned the function of its management. On the lands of Urych, oil extraction was stopped and the collective farm was liquidated. At this stage, the decline of the agricultural sector was compensated by the development of recreation and tourism (Figure 1).

The modern stage is characterized by the activation of cultural potential, which is hidden in the landscape under various temporal layers. The first steps of activation began inconspicuously back in 1960, when the rocks with the remains of the castle walls were recognized as a natural landmark of regional importance. Starting from 1971, regular historical, archaeological, and then architectural studies began, which were supplemented by prospecting works in geodesy and geology. In 1982, research of the landmark began to be carried out comprehensively by the Carpathian architectural and archaeological expedition, which was led by Mykhailo Rozhko. The results of archaeological excavations and architectural-geodesic measurements made it possible to reveal a unique organization of the space of the fortress, where architecture and landscape constituted an organic unity. Based on the results of research, Mykhailo Rozhko recreated the graphic model of the wooden fortress with a high percentage of reliability and published a monograph in 1996.

The leadership of the Carpathian architectural and archaeological expedition has introduced the practice of annually involving student youth of the

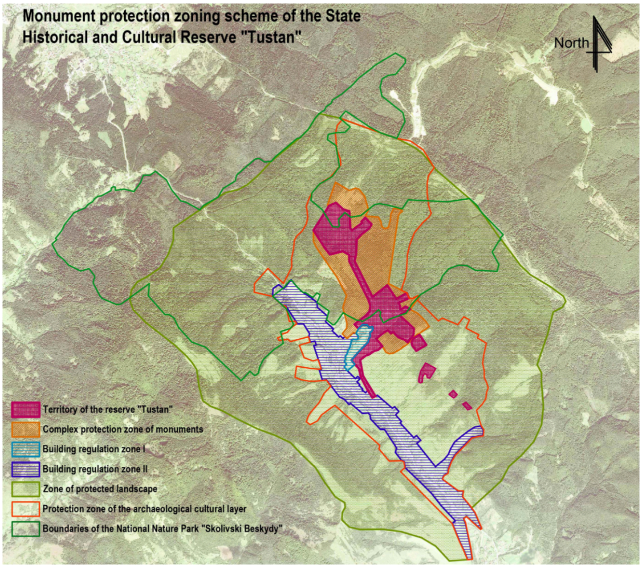


Figure 2: Landmark preservation zoning scheme of the Tustan State Historical and Cultural Reserve (author).

Lviv-based higher educational institutions in the research of Tustan in various fields: history, archaeology, architecture, ethnography, art. Dozens of student diploma projects and theses dedicated to Tustan have been defended. At that time, the landmark was popularized in two ways: officially – through reports at government councils and reports at conferences of various levels, and informally – through the dissemination of information among student youth.

In 2005, the Reserve was granted the status of an independent institution, which today reports to the Department of Culture, Nationalities and Religions of the Lviv Regional State Administration. Since then, efforts have been actively made to turn the forgotten history, the remains of material culture and the quality of the landscape into a resource for spiritual, cultural and economic growth. The most difficult was the process of determining the territory of the Reserve and forming the relevant landmark preservation documentation. First, student theses, which were developed in the 1980s, were analysed. Student ideas were not bound by standards, so they looked creative, large-scale and almost unreal at the time. However, they have passed the test of time. Since 2006, landmark preservation documentation has been developed by specialists of various institutions based on the ideas of the 1980s, analysing previous mistakes, comparing options and taking into account possibilities.

The landmark preservation documentation has undergone numerous corrections. The last changes were made in 2019. The urban and architectural regulations for the development of the village of Urych, developed in 2016-2019 and subsequently implemented in the village master plan in 2021, served as the basis for the subsequent changes (Figure 2).

The cultural landscape of Tustan showed its regenerative properties through the creation and activity of the landmark preservation institution. Today, the Reserve carries out its activities in the following areas: protection of cultural heritage sites, scientific research, dissemination of information about the site in various information spaces, restoration, museum development, development of tourist infrastructure, promotion of the landmark: festivals of medieval culture, summer camps, thematic events, youth education (Rozhko 2009, p.707-714).

The protection of the complex landmark is carried out within the framework of the applicable legislation and regimes, which are prescribed for each zone in the landmark preservation documentation. Employees of the institution regularly monitor rocks with traces of buildings and other components of the site: the remains of a stone wall, a cistern, a well, caves, ramparts, the remains of a dam, and the trade route. There is safe access for visitors to the Kamin rock group, where the main building was located. A large number of wooden fragments and other artefacts found during the excavations are stored in the vault. Some of them are exhibited in the museum. The museum collection is represented not only by artefacts, but also by models and videos with photo-realistic 3D reconstructions of Tustan architecture and landscape, mobile AR, VR applications, etc.

The Reserve employees are focused on the preservation of the traditional character of the village and its landscape. For this purpose, they are regularly in touch with the local community. Among the events, we should note the partial restoration of the St. Nicholas wooden church – an architectural landmark of local importance (Kotliarchuk 2012, p.57), the restoration and museification of the Boiky-style hut in Hluboke, the restoration of the original appearance of the presbytery, the transportation and restoration of the Boiky-style hut from the village of Plavie, the drafting of architectural and urban development regulations for the village of Urych, the development of a series of recommended residential and public buildings, as well as landscaping. Exhibitions of local history are organized; tourist routes with indicated toponyms, sites and historical places of the village are laid out. These measures are aimed at preserving the traditional architectural identity of the village with its specific landscape. Constant monitoring of architectural transformations in the cultural landscape of the village is carried out.

In order to preserve the traditional nature of the environment around the site, a landscape protection zone is provided. The protection zone of the landscape is designed to preserve its qualities, in particular, the traditional culture of the forest use, agriculture, ancient boundaries, terracing. However, this sector is the least successful due to the rapid decline in the number of rural residents over the past 50 years. Since the 1950s, the process of re-naturalization of the ancient agrarian landscape has been steadily taking place.

Research conducted in various areas (archaeology, history, architecture, geology, ethnography) reveals little-known information, which is then used in museum and tourism development. For the development of tourism, developed infrastructure has been created in the valley space between the Kamin rock group and the village. Tourists have access to a wide range of services: food, entertainment, rest, souvenir products, information about the attraction and activities of the Reserve.

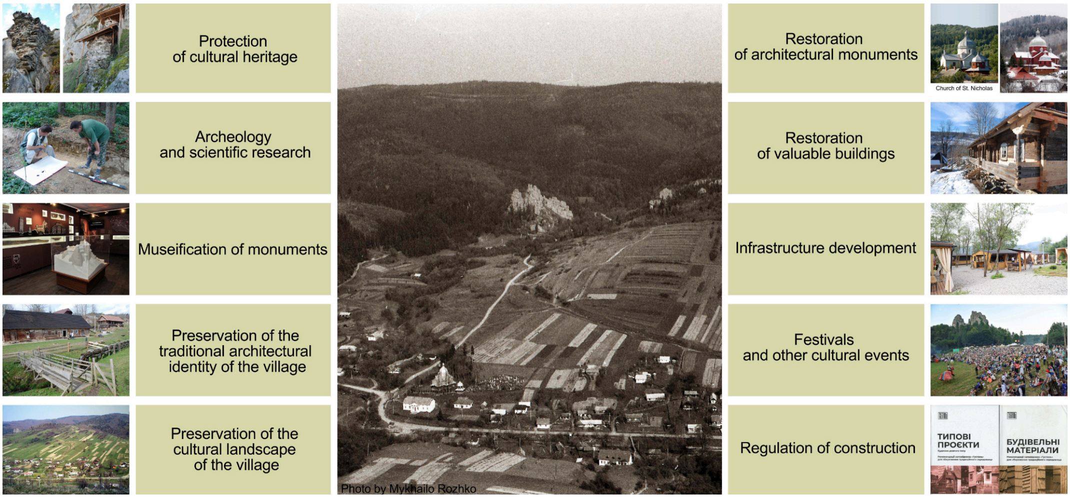


Figure 3: The main areas of the Reserve work contributing to the regeneration of the cultural potential of Tustan, (author).

Since 2006, a festival of Ukrainian medieval culture and folklore events have been held annually. On festival days, the valley before Kamin and the village of Urych were filled with thousands of people. The culture of the once forgotten Tustan comes alive again for a few days. Residents of the village receive additional resources by providing services such as accommodation, meals with regional cuisine, and the sale of souvenirs (Figure 3).

Despite the decline of the fortress and the village, the Tustan cultural landscape continues to be a platform for realizing opportunities. The Tustan landscape preserves traces of ancient cultures. Some are very noticeable while others are poorly expressed in the landscape. Our task is to discover and research these cultures because they become an important factor for spiritual, cultural and economic growth during the re-naturalization of the landscape.

Today, the landmarks of the Tustan Nature Reserve are the most visited in the Lviv Region.

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# Lisbon’s street trees: Identity and cultural heritage to a regenerative urban landscape

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**Abstract:** The historical record of tree inventories allows us to know which species are most adapted to Lisbon's climate and what are the trends of each time period. The successful entry of exotic plants associated to new maritime routes (14th century onwards) in Lisbon benefited from city climate and topography and leads to the enrichment of tree diversity, similar to other cities throughout Europe. These arboreal "novelties" came to address economic issues (such as agriculture and forestry) but also to improve urban hygienist conditions and aesthetic values, an enduring heritage. The present study focused on the evolution of Lisbon's street tree composition between 1929 to 2021. At the same time, it relates the city expansion with the abundance, richness and diversity of trees. Since 1929 there was a significant increase on the tree abundance, from 21.822 to 70.792. The richness and diversity were improved, from 33 to 140 genera, including native and exotic species. These trends were linked with consecutive phases of urban planning towards a greener and more people-friendly city, depicted in the newest parishes (e.g. Parque das Nações). The tree heritage contributes to the increase of biodiversity and resilience in the context of global changes. As an outcome Lisbon was distinguished with the European Green Capital 2020 award. Green infrastructures, as botanical and cultural heritage of our city, support the interface of tourism, recreation, nature protection, ecology, education, health and well-being. Besides management and maintenance costs, they also bring us benefits that greatly contribute to urban comfort. For a sample of 6.928 street trees environment benefits were estimated at 62.000 € annually. Recording the past and knowing the present is a crucial step to design the transition to a regenerative urban landscape resilient and sustainable, always respecting Lisbon’s identity and cultural landscape.
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**Introduction**

In 2019, a protocol was established between the Lisbon City Council (CML) and the Higher Institute of Agronomy (ISA) of the University of Lisbon, for the inventory of the street trees of the 24 parishes of the municipality of Lisbon (LX-Tree protocol), with the aim of completing the record of the street trees of the City of Lisbon as well as quantifying the ecosystem services provided by the street trees in the city of Lisbon.

A comparative study shows the evolution of Lisbon's street tree composition between 1929 to 2021. At the same time, it relates the city expansion with the abundance, richness and diversity of trees. Since 1929 there has been a significant increase in the tree abundance, from 21.822 to 70.792, and also their richness and diversity has improved, from 33 to 140 genera, including native and exotic species.

Over the last two centuries, developed countries have experienced increasing urbanization, accompanied by deep social changes and improved living standards of the population. However, this urban growth has been compromising the sustainability of cities, such as climate change, with rising temperatures, heat waves, extreme rainfall, floods and droughts, events that consequently have critical effects on ecosystems and the services they provide. It is imperative to take measures to mitigate these changes as well as to take measures to provide the improvement of urban ecosystem services. It is known that street trees, parks and public and private gardens, in the interior or on the outskirts of the city, are one of the most important urban infrastructures to improve and enhance these services.

Consequently, it is important to invest in the recording of urban trees as a tool to support its maintenance, management and future planning.
It is estimated that more than half of the population currently lives in cities and the forecast points to the total urban population being 70% by 2050 (UN 2013). These values reinforce this twenty-first century

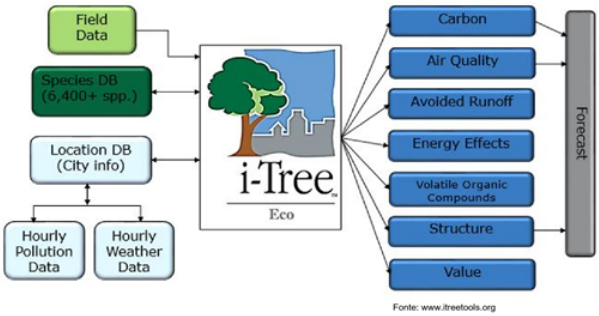


Figure 1: Relational scheme of how i-Tree Eco works (Source: www.itreetools.org)

challenge of quantifying and valuing ecosystem services, ensuring and valuing biodiversity, taking measures to ensure resilience to climate change, always with the aim of making cities more sustainable and resilient as well as to promote urban comfort (Camps-Calvet et al. 2016).

The urban ecological structure promotes the capacity for urban resilience by minimizing the negative effects of urbanization. This contribution is observed at various levels, e.g., in the purification of the air due to the filtration of pollutants (CO, NO2, O3, SO2, PM10 and PM2.5); the reduction of rainwater due to the intersection of rainwater with tree structures, which allows flood peaks to be delayed or reduced in many cases; in the reduction of the urban heat island through the shade provided by the trees and consequent temperature control, which can allow energy savings especially in the warmer months; and carbon storage and sequestration, which contributes to climate change mitigation (Nowak 2001; Livesley et al. 2016).

**Methodology**

The STRATUM computational tool helps quantify the structure and function of trees, as well as the value of some of these services in different cities. The application of the STRATUM programme, launched in 2006 by the USDA Forest Service (Forest Service of the U.S. Department of Agriculture), in the city of Lisbon, revealed in particular that under the conditions in which the study was carried, the street trees provided 4.5 times more benefits than costs (Soares et al. 2011). Nevertheless, the advantages arising from the application of the STRATUM programme, with emphasis on the objectivity associated with the results, it should be noted that the aforementioned programme does not include several benefits from urban trees, namely some invaluable advantages of a social, recreational and aesthetic nature.

For the present study, the development of tree qualification parameters in the field of ecosystem services and their quantification is based on the *i-Tree Eco v6 programme.* In this tool, the data collected in the fieldwork were processed with information on ecology and physiology of tree species and meteorological and pollutant data in the air for the city, in order to obtain results on various parameters of structure and function of the grove, which can allow predicting the evolution of this ecological system in different scenarios (Figure 1).

| Tree species | Population (%) | Leaf area (%) | Valuation index (IV) |
|---|---|---|---|
| | | | |
| Celtis australis | 16,70% | 21,20% | 37,90% |
| Jacaranda mimosifolia | 7,70% | 6,80% | 14,50% |
| Tilia cordata | 4,50% | 4,80% | 9,40% |
| Platanus x hispanica | 4,40% | 8,80% | 13,20% |
| Fraxinus angustifolia | 4,20% | 3,40% | 7,70% |
| Acer negundo | 3,20% | 3,50% | 6,70% |
| Melia azedarach | 30% | 3,10% | 6,10% |
| Tilia tomentosa | 3,00% | 5,30% | 8,30% |
| Acer pseudoplatanus | 2,80% | 1,30% | 4,10% |
| Tipuana tipu | 2,80% | 4,80% | 7,60% |

Table 1: Most important species in the street grove of the Municipality of Lisbon according to the sample made: Relative frequency (in %) of the number of individuals, leaf area and Valuation index (IV).

**Results**

The results presented concern 6,928 trees sampled from the universe of urban trees made available by the CML, distributed by the parishes in proportion to the estimated existing trees. The year 2017 was used as a reference to use this software, considered extremely dry and hot, which corresponds to an extreme in relation to the potential of urban trees to provide SE.

In the sample of the Municipality of Lisbon, the dominant species, in terms of leaf area, are Celtis australis, Jacaranda mimosifolia and Platanus x hispanica. The ten species that contributed the most to the leaf area are listed in table 1, where the valuation index is also presented. This index corresponds to the sum of the percentage of the population with the percentage of leaf area and expresses the dominance of these species in the structure of the street grove in these parishes (assuming the sample as representative).

The analysis of the street grove in the Municipality of Lisbon was carried out through a sample of 6,928 trees distributed by 24 parishes. This universe of street trees is dominated by deciduous broadleaf species with considerable specific richness (157 taxonomic entities), although a little more than 1/3 of this set is composed of four species (Celtis australis, jacaranda mimosifolia, Platanus x hispanica and Melia azedarach). In the sample of street trees, lime trees also stand out, both for their diversity and for their representativeness (six species that represent about 12% of the total sampled).

In general, in the sampled grove there are few mature individuals, with only 10 with DBH higher than 100 and about 26% of the individuals have a DBH lower than 16cm.

Urban vegetation can, directly or indirectly, affect air quality through changes in the urban atmosphere, mainly related to: reduction in temperature and other microclimatic effects; removal of pollutants; emission of volatile organic compounds and other metabolites from the tree; change in the energy efficiency of buildings.

It is the cumulative and interactive effect of trees on climate, pollutant removal and compound emissions that determines the impact of trees on air pollution (Nowak 2000).

The ecosystem services provided by the street grove of the Municipality of Lisbon were evaluated according to the i-Tree computer package, using field measurements (6,928 individuals corresponding to a diversity of 157 taxa). The evaluation revealed that this set of trees provided annual environmental benefits totaling around 62 thousand euros per year.

The approaches presented in this study allowed us to perceive those trees with larger canopy and leaf area contribute more to the ecosystem services analyzed. Also, some species, due to their intrinsic characteristics (size, leaf persistent, canopy structure, among others), contribute more to certain environmental services than others. This conclusion has implications for the management and maintenance of the grove, as it supports the idea that it will be important to promote the variety and diversity of trees in the municipality, both at a specific level and in terms of ages and dimensions. This and other strategies for urban trees and street trees in particular will be beneficial for air quality and other environmental services in the parishes of the municipality.

The information presented here, plus data on the contribution of street trees to energy efficiency, can be associated with the proposal for a tree regulation, to allow the Lisbon City Council to have support instruments for decisions on urban trees and for communication with the public on the environmental values of urban trees.

**Final remarks**

Trees are an important element to the regeneration of urban landscape. We´ll present the scenario of tree diversity in the last nine decades. And assess the benefits of Lisbon's street trees related to ecosystem services (ES) through the i-tree model.

The i-Tree was applied to Lisbon´s Street trees 2021 inventory to ES. Some results as that the deciduous species are dominant on the streets of Lisbon and to refer the species that could be helpful to regenerate urban landscape (native and exotic species) as Celtis australis and Jacaranda mimosifolia.

Contribute to activate and preserve cultural urban landscape heritage. These inventories are also useful tool for public entities with responsibilities in management and helpful to scheduling future interventions. And apply models to quantify the benefits of trees at the urban SE, as well to future scenarios for urban planning in order to preserve the city cultural heritage and to promote a regenerative urban landscape.

**Acknowledgements**

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# Contribution of HUL to sustainable urban regeneration a case study of a historic neighborhood in Tel Aviv

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**Keywords**: Historic Urban Landscape (HUL), urban regeneration, sustainability, open spaces, Tel Aviv historic neighborhood

**Introduction**

Preserving and integrating historic urban landscape (HUL) heritage values into urban fabric regeneration processes is a significant challenge for urban planners. This integration process presents conflicts, including the potential destruction of existing fabric, increased building density, and the disconnection between physical and social revitalization. However, when properly balanced, integrating HUL into urban fabric can generate positive synergies, contributing to sustainable physical, social, and economic revitalization while preserving the spirit of place. Historical open spaces and their components within this framework are crucial in creating continuity across time dimensions while maintaining spatial coherence.

This paper examines the contribution of HUL elements to achieving key urban planning agenda goals through integrating cultural heritage in open areas and strengthening urban ecosystem services. Researchers accomplish this by analyzing landscape heritage elements in open spaces through case studies of historic neighborhoods in Tel Aviv.

**HUL and Sustainability**

The recognition of cultural landscapes' value (UNESCO, 1972) and the influence of ecological planning approaches in the late 20th century led to the development of the holistic Historic Urban Landscape (HUL) approach to conservation and planning (Rodgers and Bandarin, 2019). Within the HUL approach, historical spaces and open areas play a fundamental role in the urban scenic fabric (UNESCO, 2011, section 9). Urban open spaces constitute a central urban objective and a mechanism for sustainable leveraging of natural and cultural heritage in urban environments (SDG 2030, U.N., 2015, NUA, Habitat U.N., 2016).

Historical landscapes possess many characteristics that significantly contribute to sustainable regeneration processes. For example, throughout history, urban areas have frequently integrated drainage systems and runoff water utilization harmoniously with natural topography and soil conditions. Traditional practices such as minimal surface coverage, pre-concrete construction technologies, and extensive plantings are now recognized as effective means of mitigating extreme climate conditions at both local and global scales (O'Donnell, 2008).

Another example is related to the fact that most of the cities constructed before the mid-20th century were designed for pedestrian accessibility, considering walking distances between various uses: residential, commercial, public, and open spaces. This manifested in a network of streets, boulevards, crossings, alleys, and squares that created the physical urban continuum and facilitated diverse interactions. These elements shaped street spaces, fostered favorable microclimates, and enhanced

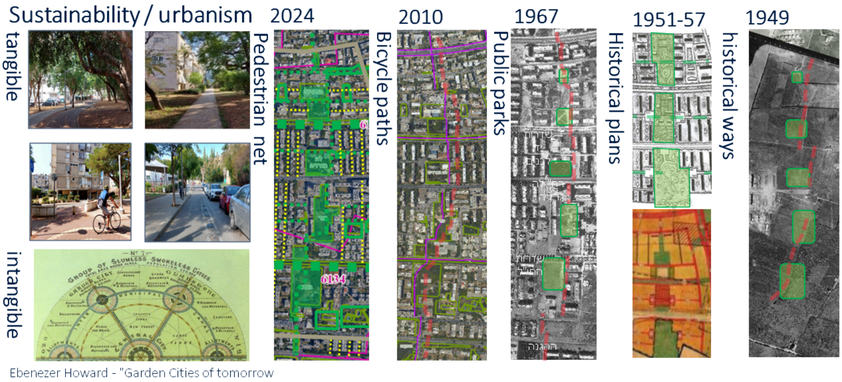


Figure 1: Historical urban landscape development by tangible and intangible layers. Illustration by author, combining aerial photo of the Yad-Eliyahu neighborhood, map department of the Tel Aviv-Yaffo municipality, photographs by author and a Garden city schema, Wikipedia


Figure 2: Ramat Aviv neighborhood and Garden City approach. From right to left: an aerial photo, 2022, Tel Aviv-Yaffo municipality GIS website. Historical plan, 1958. Source: Israel Pharmacist Award brochure for engineering plants, Tel Aviv-Yaffo municipality, 19.6.1958. A diagram of Garden City, Wikipedia.

orientation through emphasized urban axes (Meeks and Murphy, 2016). Adopting these concepts encourages Walkability and connectivity, reducing motorized traffic while promoting soft mobility and community interactions (Gehl, 2010). These planning principles now constitute core components of sustainable urbanism policy.Their implementation enhances urban system services by utilizing areas for water management, climate mitigation, increasing biodiversity, and reducing greenhouse gases (Figure 1).

**The Case Study of the Ramat Aviv and Yad-Eliyahu Neighborhoods**

Ramat Aviv and Yad-Eliyahu neighborhoods were established on flat, agricultural lands that various civilizations had used from ancient times until the late 1940s In the early 1950s, following the foundation of the State of Israel, autonomous neighborhoods adjacent to the city of Tel Aviv were designed by a team of urban planners and landscape architects, adapting the principles of Ebenezer Howard's "Garden City" concept and modern public housing. This system, designed according to modernist residential urban planning principles, creates a continuous connection between shared residential building courtyards and public pathways, extending to parks and public spaces associated with community and commercial buildings (Treib, 2022). Over the years, the neighborhoods have become part of the city, and today, in light of the city's overcrowding and high housing demand, they are in advanced urban renewal processes.

The system of open spaces in both neighborhoods encompasses communal yards, pathways, gardens, and public squares, providing significant examples of historic urban landscape elements' potential contribution to urban sustainability and regeneration. Among the primary HUL elements identified in the neighborhoods are a net of paths in public spaces and common yards, preservation of historical natural soil throughout most of the neighborhood, fence-free planning of private and public lot boundaries, grove-style plantings, and the planning heritage-based on Garden City principles and modernist approaches (Figure 2).


Figure 3: An open spaces system, providing space for paths, plants, and access to Public Buildings in the center of the Ramat Aviv neighborhood. Aerial photo, 2022, Tel Aviv-Yaffo municipality GIS website. Photos by author.

**The Contribution of HUL Elements to Sustainability and Urbanity in Ramat Aviv and Yad-Eliyahu Neighborhoods**

An in-depth examination of the HUL elements in the neighborhoods provides several compelling examples of their significant contribution to Ecosystem services in urban renewal,. The planning heritage of Garden City and modern housing conceived open spaces as a synthesis of urban and rural fabric, providing residents with vegetation-rich green spaces. Additionally, the communal social ideology that inspired the planning of the neighborhoods in the 1950s led to the creation of an open public community center serving residents' immediate needs (Shadar and Maslovski, 2021).

The physical manifestations of these principles are realized in a continuous, planted, and protective system of open spaces that includes semi-public courtyards with connecting pathways to open public spaces, the neighborhood center, schools, and adjacent municipal institutions. This pedestrian path system, designed in the 1950s to connect parts of the neighborhood and benefit an autonomous community, aligns with "new urbanism" and sustainable planning approaches that Tel Aviv is currently implementing. These conditions allowed the Tel Aviv-Yaffo Municipality to pave and connect the path system of the historic open spaces of Yad Eliyahu neighborhood to the central bicycle path of the eastern parts of the city (Figure 3).

Moreover, due to the post-World War II economic crisis during the 1950s development, planners minimized expensive, massive alterations to existing terrain. Residential buildings, groves, public squares, and roads were designed to conform to existing ground levels.

The preserved ground surface offered advantages in maintaining soil properties, water infiltration capacity, and the area's natural biotic reservoir.
To optimize irrigation costs and address drainage challenges, surface runoff was directed to grove-planted public areas, functioning as urban forests. Over time, the natural soil conditions and absence of barriers between buildings and public open spaces facilitated the development of a natural habitat rich in local flora and fauna.


Figure 4: Contribution of historical urban landscape features to the services of the urban system in the Ramat Aviv neighborhood. Illustration and photos by author.

These spatial attributes led the Tel Aviv municipality to designate Ramat Aviv as an urban nature area in 2012. Furthermore, the 2024 city plans identify the neighborhood as central to Tel Aviv's first urban ecological corridor (Figure 4).

**Preservation and Integration of HUL Strategies in Sustainable Regeneration**

By adopting an integrated preservation and renewal strategy, planners can effectively capitalize on the advantages of historical, scenic elements in sustainable urban renewal. This approach not only resolves conflicts between historical preservation and future development but also enhances the distinctive character of the urban landscape.

In Ramat Aviv, for example, neighborhood renewal planners and the city's conservation department recognized that the unique character of the open space, as well as the ability of a variety of wildlife to live and move through the ecological space, would be harmed if fences were erected between private lots and open spaces. Currently, the plans allow for the planting of vegetation but do not allow for the construction of hard material fences.

This policy currently allows more privacy for the residents and preserves the historic character of the neighborhood, which is characterized by the absence of a built boundary between public and private. At the same time, it encourages the development of urban nature in the place and reinforces the principles of sustainable planning in the neighborhood (Figure 5).

A significant challenge in residential building regeneration involves raising and expanding the structure, while also adding underground parking beneath the building and to large parts of the lot. These actions damage soil surface conditions, water infiltration capacity, established vegetation, and the distinctive relationships between yards, streets, and

Figure 5: Ramat Aviv neighborhood: a continuous physical and visual transition without built fences through vegetation between the built and open public space. Photos by author.

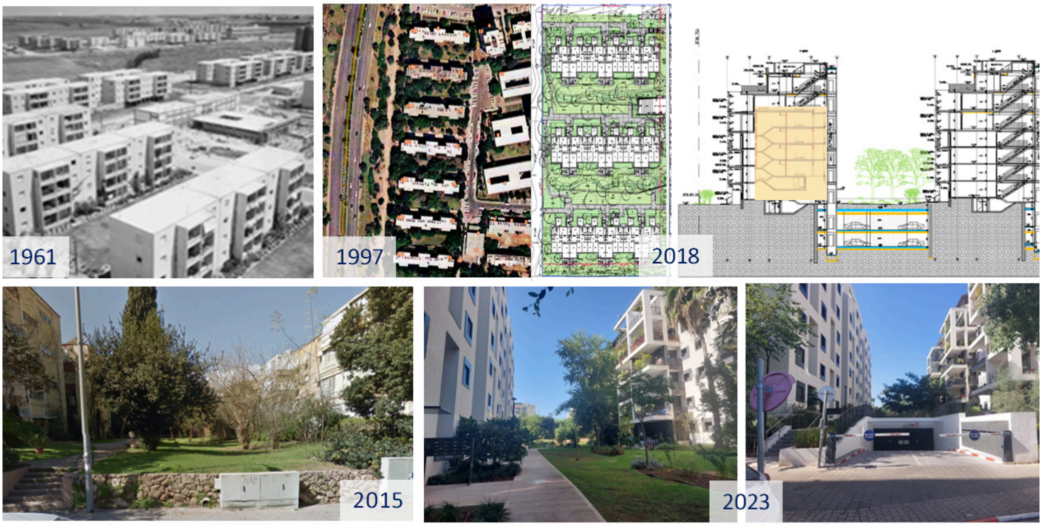


Figure 6: Regeneration and construction of an underground parking lot of residential buildings in the Ramat Aviv neighborhood. From left to right, top: Aerial photo, 1961, Willy Polander collection, courtesy of the Tel Aviv-Yaffo Municipal Archives, aerial photo 1997, Tel Aviv-Yaffo Municipality GIS website, plan and cross-section Barorian Architects, Engineering Archive, Tel Aviv-Yaffo. Bottom: Google Photo Maps 2015, photographs by the author

open spaces. This challenge is particularly acute in private areas subject to developer requirements and contemporary construction standards. The study suggests that a potential resolution to such conflicts could involve regulations requiring a minimum of 30% of the lot area to be free of underground construction, the maintenance of historical entrance levels to yards and houses, and the preservation of underground construction-free zones at lot boundaries. Aggregating such areas across multiple lots creates significant ground-level continuity. These guidelines accommodate increased parking capacity while preserving essential place characteristics (Figure 6).

**Conclusion**

This study emphasizes the importance of identifying and integrating HUL components in sustainable urban renewal. The utilization of these components enhances environmental system services in historical areas undergoing regeneration. The adoption of strategies incorporating HUL elements that contribute to the surrounding environment promotes urban development while achieving balance between natural and human systems and preserving the distinctive spirit of place.

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# Regenerative therapeutic and sensory gardens: A new paradigm

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**Keywords:** historic mental hospital gardens, therapeutic landscapes, regenerative landscapes, sensory stimulation

*"The enjoyment of scenery employs the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influences of the mind over the body gives the effect of refreshing rest and reinvigoration to the whole system."*
Frederick Law Olmsted, 1865

**Introduction**

Shaping landscapes that facing climate change scenario use the nature's contribution adaptation potential (Colloff et al. 2020) is a current challenge. Regenerative landscape approach implements nature-based solutions which rely on the systemic use of natural processes and interconnected systems to build resilient landscapes and cities (Lafortezza et al., 2018). It also refers to helping people to regenerate their bonds with nature to regain the psychological balance (Stott et al., 2024). Landscapes prove that not only nature can regenerate neglected or destroyed areas like postindustrial areas through phytoremediation (Guidi Nissim and Labrecque, 2021) but also research into therapeutic gardens shows that landscape can contribute to the mental well-being of people and regenerate their users (Barton and Rogerson 2017, Pantiru et al. 2024).

The paper explores the aspect of regenerative landscapes in the context of therapeutic and sensory gardens around historic mental hospitals in Europe that need changes in their redesign, maintenance, and care related to climate change. Involving users in those actions can bring numerous benefits and advocacy for improving historical healing gardens and creating new sensory therapeutical gardens. Social engagement may lead to involving patients in the maintenance activities carried out as various green therapies (Staniewska, 2022).

**Benefits of contact with nature and regeneration through landscape in historic mental hospital grounds.**

The benefits of contact with nature and gardens, are widely acknowledged and were intuitively understood for ages. The concept of therapeutic landscapes builds upon the experiences of places considered spiritually and physically healing (Gesler 1992). Nowadays research provides us with manifold empirical evidence for beneficial influence of greenspace exposure (Freymueller et al. 2024). Contact with nature may result in better physical and general health (Hartig et al. 2014) and disease prevention (van den Bosch and Ode Sang, 2017). Spending time in the green environment may be regenerative because it helps to restore psychological resources since it is an environment free from physical and social stressors (Kaplan 1995). Moreover, it contributes to the improvement of the cognitive functions including memory, attention, concentration and impulse inhibition (Berman et al. 2012, Burdon and Belmin 2021). Even looking at vegetation and undertaking activities in green spaces can help reduce depression, anxiety, and stress (Ulrich 1986). Exposure to plants, green space and gardening

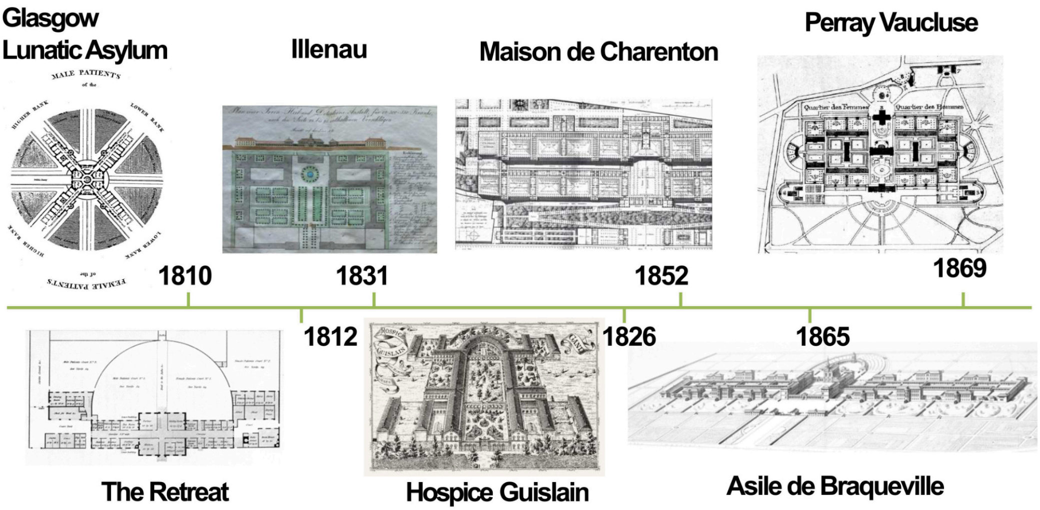


Figure 1: Evolution of plans of mental health hospitals in Europe in 19th century, drawings in public domain, timeline by A. Staniewska.

is now recognised as a valuable type of social prescribing for problems of mental and physical health (Adewuyi et al. 2023) and one of the supporting therapies. All in all, subjective well-being followed by restorative effect of being in a garden affects and overall improves mental health.

Mental health hospitals in Europe have developed as a special type of buildings and settings since 19th century (Figure 1). They represent distinctive type of composed therapeutic landscapes (Rutherford, 2003). In their early years the model institutions (often private such as the Quaker Retreat or Brislington House) resembled English noble house estates with extensive grounds and offered patients a pleasant retreat to soothe and regenerate their troubled mind. The treatment was based on the moral therapy which was to be the opposite to the incarceration typical for the earlier asylum institutions. The patients were encouraged to take physical exercise, walk and work in the gardens and their regime included also regular nights' sleep, healthy diet and occupational therapy (Hickman, 2013). This approach was also implemented by the psychiatrists employed in state institutions which were established in many European countries, who suggested building for patients at least ward gardens in form of so-called "airing courts". Over the time the number of psychiatric patients was significantly growing and the architectural shape of mental hospitals also evolved to follow the progress in medicine. At the turn of 19th and 20th centuries mental hospitals were in detached pavilions distributed on hospital grounds arranged as large parks and green estates (Figure 2). While some patients in frames of therapy were administered to spend time in the gardens to rest and exercise, some of them who were capable worked on the hospital farm, in the orchards, cultivated arable land and maintained the ornamental grounds of the institution. Green fabric was a constitutive element of the plan and in some cases the layouts of hospitals resembled even the diagram of the „garden city" published by Ebenezer Howard in 1898 (Allmond, 2017).

However, the therapeutic work was probably not successful since numbers of patients and institutional inertia thwarted healing efforts. Paradoxically, this model called "an open institution" offered mainly the


Figure 2: Plan of the park and gardens surrounding the Babiński Clinical Hospital in Kraków-Kobierzyn, drawing from 1909 by Wiktor Żochowski, design implemented in a simplified form.

isolation and seclusion of the patients rarely enabling them to recover and return to society. The reforms of psychiatry in the second half of the 20th century led to the closure of most large hospitals. Yet although nowadays psychiatry recommends care in the community, still in some countries modern psychiatric care centres work in historic heritage hospitals surrounded by extensive parks and gardens. This results in several challenges and opportunities for both the heritage and its users.

**Regenerative features of hospital gardens – therapeutic potential of historical gardens of former psychiatric hospitals.**

A connection to nature in historic mental health institutions was an important factor which influenced the location and plan of the hospital. Until now several elements and features of historic structures are still visible in hospital landscapes. The setting of the hospital was also important – especially the distant views. In many institutions still exist small gardens at each pavillion/ward with earth terraces or balconies exposed to the south (Figure 3). In the parks still grow large ornamental trees and often pine woods planted at the time of the hospital construction. Sometimes old farm buildings and glasshouses remain, and agricultural land is partly used.

Currently, this abundance of green space and its arrangement can be used for several types of activities that support medical treatment and offer regeneration by exploring features typical of sensory gardens. Small gardens adjoining the wards may be used as spaces for basic physical exercise, gardening therapy, or relaxation. Potential sensory gardens can

Figure 3: A sunny terraced garden adjacent to the southern façade of the pavilion for patients in the Babiński Clinical Hospital in Kraków-Kobierzyn, photo by A. Staniewska

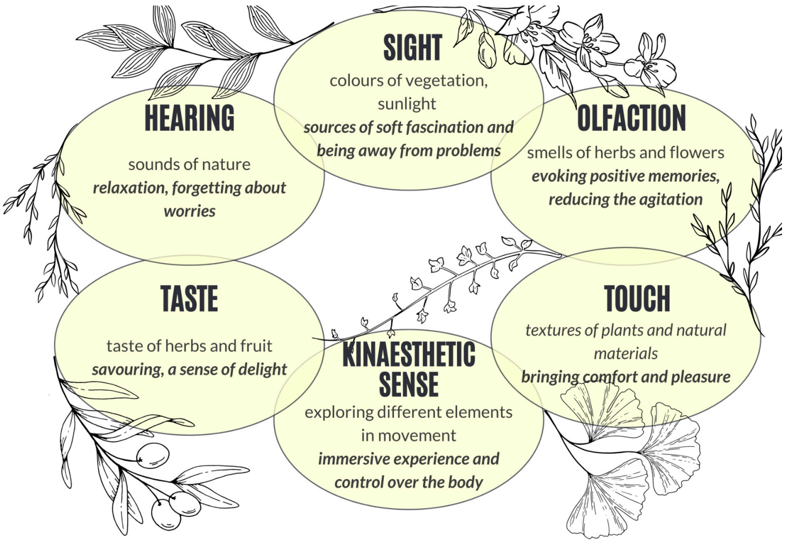


Figure 4: Sensory features of hospital gardens and their restorative potential,as re-establishing a connection to nature (graphic by A. Staniewska)

also provide rest during short breaks for employees. The ornamental grounds and woods now form large parks that encourage therapeutic walks, nature observation, and various social activities, including therapeutic meetings. Former orchards and hospital farms are perfect places for gardening therapy or social urban farming. Such an approach can bring numerous benefits to both the heritage therapeutic gardens and their users, activating the hidden potential of the place and communities (Figure 4).

**Regeneration of a historic park/ garden in the current situation: Challenges related to the contemporary use of parks and gardens surrounding historic mental hospitals**

While regenerative powers of nature are widely recognised concerning human psychological well-being and mental health, maintenance of historic gardens in the era of climate change is challenging and urges for sometimes tough decisions. This relates to several aspects.

Firstly, mental hospital gardens were designed largely as decorative landscapes, and they needed and still need excessive maintenance. However, their current owners and managers (often underfinanced public health institutions) have limited monetary resources and workforce for the upkeep. Many decorative trees live to their age and become veterans offering various ecosystem services but needing also specialist care. On the other hand – the greenspaces in the past were maintained more circularly. A very important aspect worth exploring is the "self-sustainability" of old historical gardens which was the practice at the times when they were established and resulted from the economic model of functioning the estates. The pertinent question is if we can try to restore nowadays some of those practices guided by the circular economy principles? Would it bring expected outcomes in a larger context? Reducing the environmental impact of numerous costly and energy-consuming maintenance practices means that emphasis should be placed on nature-based solutions embedded in design to ensure its ecologically balanced functioning and systematic regeneration.

Secondly, historically planted species are not adjusted to contemporary climate conditions and they are weakened and vulnerable to pests and

Figure 5: A garden maintained by the patients during gardening therapy sessions at in the Babiński Clinical Hospital in Kraków-Kobierzyn, photo by A. Staniewska.

diseases. That is why there is a need to complement the historical layout with contemporary planting. Here, a re-evaluation of planting choices is needed regarding their resistance to changing climate and extreme weather conditions while keeping the therapeutic features and composition values. Further research could focus on examining how the choice of native plants and reducing maintenance contributes to lower resource use and how composting of organic waste in historic therapeutical gardens may be linked with fertilizing the grounds and regenerating the old gardens. The open question remains how green therapies can contribute to regular maintenance although an effective solution would be rather organizing social enterprises in frames of the care in community after acute episodes needing hospital treatment (Staniewska, 2022), (Figure 5).

To sum up, possible measures connected with regenerative approach to historic mental institutions and their landscapes to be undertaken could include among others:

- Partial rewilding of the less frequently used areas;
- Reduced mowing regime – meadows instead of manicured lawns – increasing biodiversity;
- Extensive re-use of rainwater and creating rain gardens where possible;
- Introducing organic farming practices within the hospital therapeutic farms;
- Composting organic residues to obtain good gardening soil;
- Accepting the process of ageing and dying of originally planted old park trees (deadwood in the parks);
- Obtaining seedlings and saplings on site, planting native species;
- Making gardens fully accessible – according to principles of universal design;
- Encouraging people to use the site – by providing benches, excercise equipment, places to rest, and water features – small architecture

**Conclusions**

Landscapes can be regenerative in the way that they influence our behaviour and play a vital role in recovery from mental fatigue. This is particularly valid in case of historic mental hospital landscapes and gardens which are demanding examples of garden heritage which is often still in use.

Figure 6: A balancing sculpture exposed on the Babiński hospital grounds – a contemporary artist Jerzy Kędziora has his atelier in one of the auxiliary hospital buildings, photo by A. Staniewska.

A catalogue of the benefits for the contemporary users of mental hospital landscapes is long, including but not limited to:

- The abundance of already existing green spaces: there is no need to plant the whole garden from scratch; gardens close to the wards;
- Beautiful park features are already on site – alleys, paths, solitaire trees, meadows, views;
- Park areas are often open for the local communities not only patients;
- Shade of the old trees, and green oases provide thermal comfort;
- Mental hospital parks and gardens are biodiversity hotspots within the cities (offering good conditions for birds and pollinators);
- Available natural material for creative art therapy – flowers, leaves, cones…

Moreover, involving people (not limited to patients) in the maintenance activities carried out as various green therapies should be treated as and added value (Figure 6). Also, an opportunity to use regenerative therapeutic spaces may contribute to a better understanding of the changing aesthetics and a shift from highly manicured representative green areas towards more naturalistic spaces that are more sustainable.

All in all, regenerating historic therapeutic park and garden landscapes is about finding the balance between protection and restoration and providing users with gardens adjusted to climate change conditions.

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# Locals' needs and perception of cultural ecosystem services related to green infrastructure in peri-urban areas

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**Introduction**

Development of green infrastructure (GI) in municipalities is a key factor for a regenerative urban landscape. There is a growing need to take social aspects into account under the framework of GI. Many documents and strategies emphasize the role of social inclusion in the GI development process. This is particularly important in agglomeration-pressured settlements. Several researchers highlight that more attention should be paid to cultural ecosystem services (CES) and GI in order to elaborate the most effective resource management to decrease the negative demographic and land use impacts (Jaligot et al., 2018; Oteros-Rozas et al., 2018). In order to regenerate efficiently landscapes, we need a deeper understanding of the CES provided by GI and their perception by local communities. During our research, we applied public participation GIS (ppGIS) method for involvement of local communities. Our results showed interesting relationships among CES and conflicts perceived by locals related to GI and the real structure of GI.

**Literature review and Theoretical background**

Negative effects of rapid urbanization and suburbanisation processes are recognizable also in peri-urban areas (Chen et al., 2019). Despite the growing number of studies, several researchers emphasize that more attention should be paid to peri-urban ecosystem services and GI in order to develop the most effective policies and resource management strategies to decrease the negative demographic and land use impacts (Jaligot et al., 2018). Development of green infrastructure (GI) in urban and peri-urban areas is one of today's most important professional tasks, and a key factor for a regenerative urban landscape. Thus, several types of green spaces at peri-urban areas are existing, urban greenery is an important objective for sustainable planning at these areas (Mortoja et al., 2020; Berke and Conroy, 2000). From this perspective socially inclusive planning approaches (van Herzele et al. 2005) and the reduction of the uneven distribution of green spaces within cities (e.g., Dai, 2011) are able to maximize social benefits. Most of the research on GI focuses on ecological aspects, however, there is a growing need to take social aspects into account, and understand deeper the CES provided by GI (Oteros-Rozas et al., 2018). According to the most c ommon definition, CES are those nonmaterial benefits which are obtained from the ecosystem, and which influence human well-being (MEA, 2005). The evaluation of CES is still difficult, mainly because of the intangible nature of them and because their relative importance varies along urban-rural geographical dimensions (Chen et al., 2019). Researchers emphasized the importance of a better understanding of the urbanization effects on perception and valorisation of CES (Jaligot et al., 2018) especially related to GI. CES evaluation requires either indicator measures using existing database or empirical work. In the latter data collection is mainly means mainly specific surveys (e.g., questionnaire surveys, in-depth interviews), most commonly with participatory mapping (PPGIS) (Brown and Fagerholm, 2015). PPGIS is a general term used to describe techniques that combine modern cartography with participatory methods to collect and represent the spatial information. By such an approach, spatially explicit biophysical and perception-based data can be linked (Garcia-Martin et al., 2017). PPGIS has received increasing attention in the last decade and reviews have been carried out in order to give an overview about the existing methods and main results (e.g. Garcia-Martin et al., 2017). These showed the geographical pattern of studies; the majority of them are located in North-America (e.g. Huang and London, 2016), Oceania (e.g. Brown and Weber, 2011) and Northern-Western Europe (e.g. Samuelsson et al., 2018). Recently an increasing number of studies were published from Central-Eastern Europe (CEE), mainly focusing on local urban areas (e.g.Valánszki et al., 2022).

Parallel with the formers, many several international documents and agreements - such as the Aarhus Convention (UNECE, 1998) or the European Landscape Convention (Council of Europe, 2000) - emphasize the role of social inclusion during the planning and strategy-building processes (Chen et al., 2019), and in this way during GI development process. This is particularly important in agglomeration-pressured settlements (Dai, 2011; van Herzele et al., 2005).

In our study we analyze and evaluate CES provided by GI and their perception by local communities in order to help us to regenerate efficiently landscapes of peri-urban areas. To explore this issue, a Hungarian district from the Budapest Agglomeration Region was selected as a suitable example.

The analysis was guided by the following research questions:

- How do the GI elements influence the perception of CES?
- What kinds of CES and problems do locals associate with GI in a town under urbanization pressure?
- To what extent do the CES and problems associated with GI meet the vision of the municipality?

**Materials and Methods**

*Study area*

Vác, also known as the southern gateway of the Danube Bend, is a town located on the left bank of the Danube, at the foot of the Naszály Mountain. It is located approximately 20 km north of Budapest. The area of Vác is 61.5 km2, with a population of 34,040 people (KSH, 2023). Vác is a significant settlement in the Budapest Agglomeration and has a substantial influence as a population attraction and regional center. According to the current urban development plan, the green areas categorized as public parks and public gardens within the administrative area of Vác cover an area of 87 hectares (size of green areas per capita is 26.15 m2). The public recreational green areas (e.g., playgrounds, sports fields) are

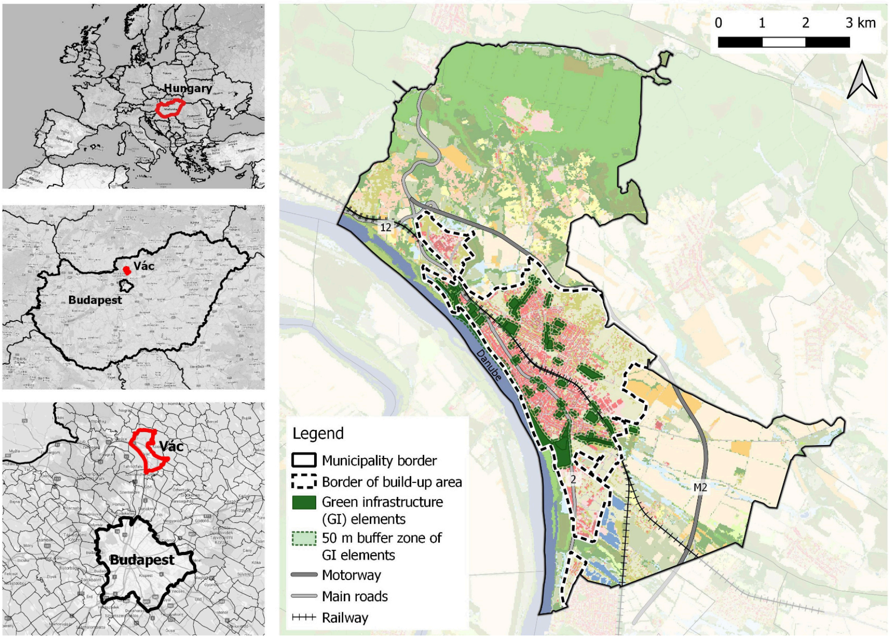

Figure 1: Location of the study area, town of Vác in the Budapest Agglomeration area (own figure based on OSM)

predominantly found in the residential areas surrounding the historic city center (Figure 1).

*Methods*

During our research, we applied public participation GIS (ppGIS) method for involvement of local communities. In total six CES and six development preferences/problems were selected and mapped. They are mainly based on existing participatory and GI-related typologies (e.g., Fagerholm et al., 2016). The indicators were developed applying an operational description to help locals to respond. The six selected CES are: Places with high natural value and rich flora; Places for social activities; Places of historical and cultural interest; Places for physical or mental health, recharging; Well-ordered places with a beautiful townscape; Places for quiet rest and relaxation. The six development preferences/problems are: Congestion reduction is necessary in these places; Safety improvements are necessary in these places; Strengthening nature and environment protection is necessary in these places; The development of facilities, equipment and opportunities for leisure activities in these areas is necessary; Strengthening leisure services in these places is necessary; Improving accessibility and availability in these places is necessary.

The data collection was carried out between September 2023 and April 2024 involving bachelor and master students of the Hungarian University of Agriculture and Life Sciences, Institute of Landscape Architecture, Urban Planning and Garden Art.

Interviews were carried out with 375 residents (gender: 202 women, 173 men; age: 0-17 years (84), 18-39 years (129); 40-64 years (88), 65- years (74)), using paper maps and a basic questionnaire (Valánszki et al., 2022). For an easier orientation, the names of the main streets and the neighborhoods of the town were marked on the map. During the mapping, simple point markers were used. Minimum 1 and maximum three markers were employed per indicators. The 10-20-minute-long interviews started with exploring basic demographic characteristics and place of residence of the participants, and finished with the mapping process (Valánszki et al., 2022). The interviews were randomly distributed regardless of age and gender. In order to involve a high number of people, the interviews were carried out at many different locations such as railway stations, bus stops, schools, cafes, health care centers, parks (Fagerholm et al., 2016).

The mapped almost 5000 points were digitized in Quantum GIS software. The database contains the geographical location of points and the associated data (type of indicator demographic characteristics, etc.). The database also contains GI elements of Vác with 50 m buffer zones, both of them were overlaid with the marked points. Further analyses were performed partly by GIS methods and partly by statistical analyses.The results were analyzed in tables and also on cartograms to understand the geographical relationships.

**Results**

First, the most commonly marked CES-type and development preferences among locals were analyzed. Out of the 4926 points 2695 were CES, while 2231 were development preferences points. The order of the CES points was the following: Places for social activities (556); Places of historical and cultural interest (501); Places for quiet rest and relaxation (436); Places with high natural value and rich flora (406); Well-ordered places with a beautiful townscape(406); Places for physical or mental health, recharging (390). The order of the development preferences was: Congestion reduction is necessary in these places (470); Safety improvements are necessary in these places (441); Strengthening leisure services in these places is necessary (408); Improving accessibility and availability in these places is necessary (333); Strengthening nature and environment protection is necessary in these places (310); The development of facilities, equipment and opportunities for leisure activities in these areas is necessary (269). From these results, we can see that the most important type of CES for the local citizens is "Places for social activities", while the most important development preference is "Congestion reduction is necessary in these places".

The spatial patterns of the mapped CES and development preferences points were visually analyzed.  As Figure 2 shows in the case of CES, participants perceived them mainly along the river Danube (northern and southern from the center), and along the river bank of the town center. Clear concentration of CES points is visible in the center of Vác and also an east-west axis is drawn in the middle of the build-up area. Compared to the development preferences, the CES map shows higher concentration of mapped points, and less spread beyond the center of Vác. We can only witness some areas with a higher number of perceived CES (e.g. north-east corner of the town). We can see many development preference points in the center, similarly to the CES points, however much less along the river Danube. These results show, that the town center and the popular areas along the Danube are well-maintained, and the developments concentrate in these parts of Vác, while less attention has been paid for those neighbourhoods, which located beyond the

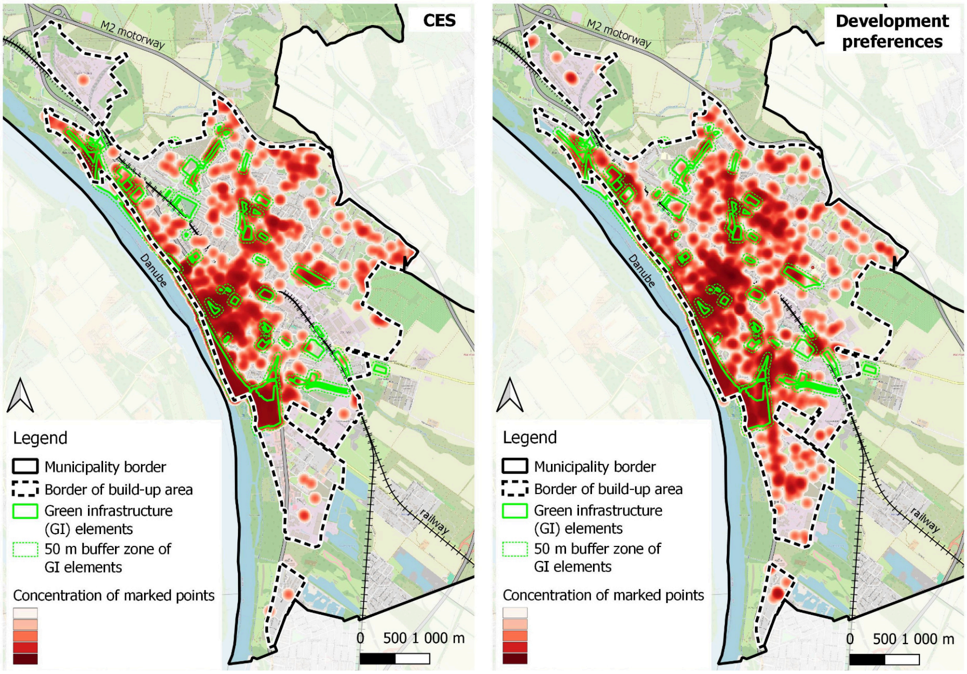


Figure 2: Spatial patterns of the mapped CES and development preferences (own figure based on OSM)

center. Results map also indicate that local citizens marked their development preferences outside of the town center. Compared to CES points, we can recognize a much higher number of development preference points in the southern, eastern and also partly in the northern neighborhoods of Vác. Figure 2 also shows concentrations of points along the train line, which cut the town into two main parts parallel with the Danube (Figure 2).

The spatial distribution of six CES-types and six development preferences were also separately analyzed. We found similar patterns in the cases of the following pairs of CES: "Places for social activities" with "Well-ordered places with a beautiful townscape"; " Places with high natural value and rich flora" with "Places for quiet rest and relaxation". We also found quite a strong connection between the patterns of mapped points of "Places of historical and cultural interest" and "Well-ordered places with a beautiful townscape". Points related to "Places for physical or mental health, recharging" have drawn a unique picture (Figure 3).

The points of development preferences formed the following pairs based on similar spatial patterns: "Congestion reduction is necessary in these places" with "Safety improvements are necessary in these places"; "Strengthening nature and environment protection is necessary in these places" with "Strengthening leisure services in these places is necessary". Spatial patterns of "The development of facilities, equipment and opportunities for leisure activities in these areas is necessary" and "Improving accessibility and availability in these places is necessary" are very diverse and spreaded all over the town (Figure 4).

The relationships between GI elements of Vác and CES and development preferences were also analyzed. We could observe a stronger connection between CES-types and GI: points of the various CES-types overlapping with GI elements varied between 33 and 69%. While weaker connections were identified between development preferences and GI: points of different development preferences overlapping with GI elements varied between 8 and 47%. The strongest connections were seen in the

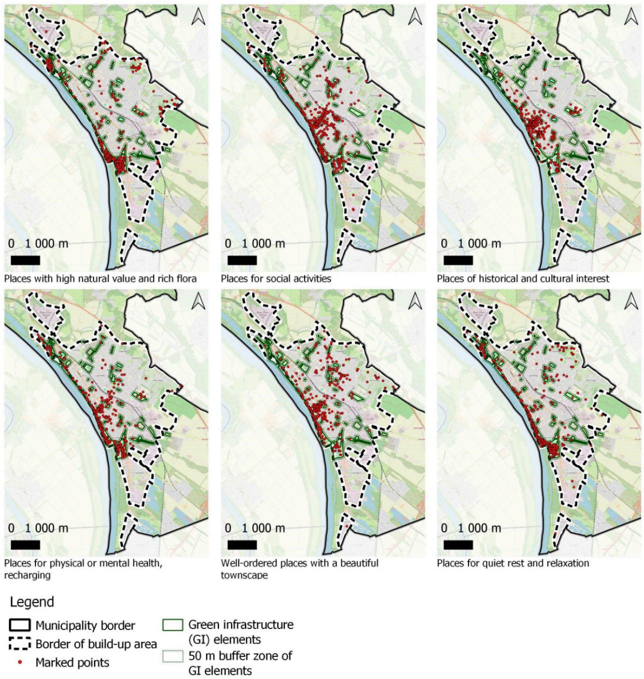


Figure 3: Spatial patterns of the six mapped CES-types (own figure based on OSM)

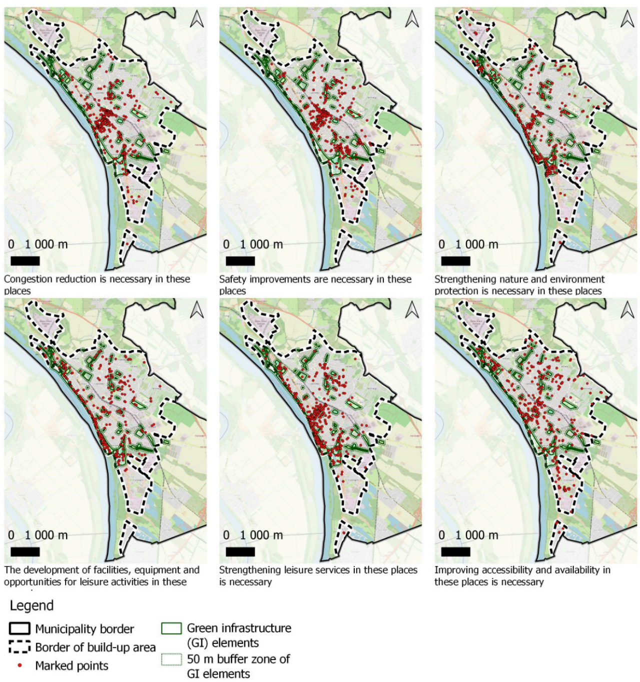


Figure 4: Spatial patterns of the six mapped development preferences (own figure based on OSM)

cases of "Places with high natural value and rich flora" (69%) and "Places for quiet rest and relaxation" (69%). The weakest connections were observed in the cases of 2 types of development preferences: "Congestion reduction is necessary in these places" (11%); "Safety improvements are necessary in these places" (8%). Considering the GI elements together with their 50 m buffer zones, similar results have been found: the connection was the strongest in the case of "Places for quiet rest and relaxation" (83%), while the weakest in the case of "Safety improvements are necessary in these places" (31%).

**Discussion and conclusions**

The paper gives an example of the aspect and needs of green space development of Vác town in Budapest agglomeration. The study area is strongly related to River Danube and the locals have strong attachment to green spaces at river bank, and historical values are also important attractions at town center. However, typical problems of urban sprawl are also seen: emerging new artificial surfaces, tension caused by transport infrastructure.

Based on the results of the survey and PPGIS evaluation the green spaces are mentally connected to cultural values and are not highlighted from development perspectives. Also, development needs come up, like "Places for social activities", but not so articulated as in the case of other infrastructural systems.

Another important result of the study is the highlighted difference between town center and areas outside the center. Most important cultural services related to the centers are social and recreational activities, as well as historical and cultural values in well-maintained places with a beautiful townscape. In contrast, outside the center naturality and relaxation are more often mentioned. Development preferences show different patterns. While in the center the congestion and safety are highlighted, beyond the center nature protection, leisure activities, accessibility and availability are more important factors. These different needs have to be taken into consideration for sustainable urban green development and regenerative landscapes as well.

The current urban development plan of Vác treats the conflicts, problems and opportunities of the green space system without detailing local needs. It lacks the analysis of problem areas from the perspective of local citizens and conditions, as well as a deeper understanding of their interconnections, thus the plan remains at a relatively superficial level. Future research should compare these results with population density, vegetation indexes, and land cover categories of urban tissue in order to improve the understanding of locals' needs related to urban green infrastructure. These aspects will bring us closer the understanding of the importance of physical aspects and vegetation density.

**Acknowledgements**

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# Beyond Cheap Nature

# Beyond Cheap Nature
# A critical reflection

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The protection and enhancement of ecosystems has been at the core of landscape architecture since its beginnings. Designing with and for nature at the interface of society and the environment is a fundamental value of the discipline. However, six out of nine planetary boundaries have been already transgressed (Richardson et al, 2023) and landscape architects, in collaboration with other experts, need to envision and design new ways to move back into a safe operating space. In this point, nature protection is not enough, and we must explore opportunities for accelerating nature regeneration by recovering the damaged foundations of life on the planet. This is about soil, water, air, flora and fauna that are overexploited today and will continue in this condition as capitalist systems build on the idea of 'cheap nature'.

In an attempt to recognize the value of nature and natural resources, we have witnessed during the last decades the development of new concepts that, following a long Western tradition, promote a utilitarian and anthropocentric approach to nature (e.g. ecosystem services, natural capital) (Galan, 2020). Despite the positive initial intentions, an inadequate or self-interested use of these concepts, might lead to the conviction that natural systems exist to serve human interests and growth. Within this context, nature becomes a commodity, and the environment is monetized in order to incorporate it in decision making processes supporting a 'weak sustainability' approach in which a consensus must be achieved between environmental, societal, and economic (capitalistic) demands (Hopwood et al., 2005). Interestingly, the 'translation' of nature to an economic language pretends to make its values more visible and tangible to the public, but by calculating its direct monetary value (e.g. timber, crops, etc.) or indirect monetary value (e.g. savings in the health system by improving air quality or access to green areas), nature becomes a good that can be negotiated in the economic system and that can be spuriously used to support nature washing. In contrast, several authors claim that a healthy environment is a precondition for societies to exist, and that the economy should be perceived as a tool for collective development. However, this 'strong sustainability' approach (Redcliff, 2005), in which nature comes first and that was common in other societies, often collides with current economic systems, with contemporary ways of living, and with an undisputed association between quality of life and levels of consumption.

In answer to this situation and with the 'Beyond Cheap Nature' term we want to open a public discussion on the methods, cultural frameworks, and practices that we use to conceptualize and operationalize nature in planning and design. Thus, in contrast to anthropocentric, short termed, individualistic and consumption-based approaches, we want to explore if other eco-centric, long termed, collective, and regenerative approaches are possible. In this regard, since the appearance of the EU's Green Deal (EU, 2025), there has been a lot of discussion about green growth, in the sense of decoupling economic growth from the exploitation of natural resources. The ultimate goal is promoting another type of growth less linked to material and energy consumption, or even to the promotion of a controlled degrowth. What if we defined growth not any more by GDP, but by the degree of regenerated nature?

If we accept that the value of nature is not its market price, and that the self-regenerative capacity of nature has been already surpassed, we need to explore ideas that go beyond nature protection and impact mitigation as facilitators of the classical growth agenda. These ideas should rethink the economy as we know it and address some pertinent questions: Which innovative operational models for regenerating nature are already out there and which ones do we still need to invent? What can we learn from other disciplines, cultures and our own history to address this fundamental task?

In this ambitious mission, the landscape can become a powerful and holistic framework to promote new approaches and systems thinking in a climate change scenario in which transformation is more urgent than ever. Thinking and acting with a landscape perspective opens opportunities for innovation and breaks conventional boundaries between sectors and between interest groups with, seemingly, competing values and goals. Landscape can act both as a conceptual framework and as a medium for activating a transformative and regenerative capacity.

The need for this change is clear since we are currently operating beyond the capacity of our planet. Within this context, it is not sufficient aiming for a zero balance but for transforming landscapes into active tools for planetary regeneration. The key questions that we need to answer regarding the promotion of regenerative landscapes are: How might we define them? How do they work? Why do they work? What is supposed to be regenerated and how can we monitor regenerative processes in the landscape? In this regard, new ontologies for nature in the Anthropocene are needed (Crutzen, 2002) and new transdisciplinary processes must be designed to address interspecies wellbeing and regeneration in each specific site.

Accordingly, non-human agendas must be incorporated in planning and design if we want to overcome purely anthropocentric approaches, but… how can we listen to the trees and the insects? How can we talk with the air and the roots? In this new dialogue, landscape regeneration needs to make compatible ecological restoration and human needs, being extractive and mining landscapes a critical example of degraded landscapes in which specific knowledge is needed to promote interspecies and systemic regeneration. The comparative analysis of good international practices can be a good starting point in this research and unveil the potential of good and ambitious planning and, at the same time, reveal how our cultural perception of nature and social learning processes determine what is acceptable or unacceptable in our closest landscapes (Clement, 2006). All these issues are discussed in the following chapters and provide a new insight into the real value of nature and the new frameworks that we need to recover its regenerative capacity in planet Earth.

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# The impact of historical and evolutionary changes on landscape degradation and methods for regeneration

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**Keywords:** mining, degraded landscape, landscape management, natural regeneration, mining landscapes

**Introduction**

Human activities significantly disrupt ecosystems. Regeneration of degraded landscapes is increasingly being pursued to improve environmental and landscape conditions and quality of life (Fernandes et al. 2017). One of these disrupting activities is mining, which not only alters landscapes but also disturbs ecosystems at multiple levels, often leading to irreversible environmental problems. Many mining operations result in degraded landscapes, and now, more than ever, we should be looking to regenerate these sites.

**State of the art**

Numerous investigations have been conducted to regenerate abandoned mining sites, with various approaches being implemented: starting with active approaches that aimed at environmental regeneration by using physical and chemical methods to treat soil contaminants, followed by erosion control and phytoremediation using plants to degrade or fix contaminants (Kennen e Kirkwood, 2015). Studies are often conducted to understand the natural vegetation of each site to facilitate effective ecological restoration. The treatment of water sources in these areas is challenging, since it is highly impacted by the formation of acidic ponds and/or the presence of Acid Mine Drainage (AMD) (Borma, 2002). However, passive methods are also usually employed, such as safeguarding dangerous areas offering controlled opportunities for access and public visitation.

With that in mind, an in-depth examination of the ecosystem is mandatory to ensure successful regeneration. The landscape architect's role is crucial in these studies because of their holistic understanding of landscapes (Li, 2018; Zheng e Kirkwood, 2020). In a regeneration project we need to address environmental factors (e.g., geological, biological, hydrological, etc.), but also social aspects deeply attached to the site's *genius loci*, such as their historical, demographic, and territorial context. An understanding of the evolution of the landscape, before and after disturbance, is also key to develop an effective regeneration proposal.

**Objectives**

This work seeks to follow this line of thought, identifying challenges and strategies to ultimately present a reliable proposal suitable for such a unique location as Lagoas de Midões in Portugal. Thus, the main objective of the project is to regenerate it, focusing on the soil, water, and vegetation of this post-mining landscape, ensuring its safe visitation and appreciation, as well as implement on going management in order to recreate a healthy ecosystem that is faithful to nature.

**Methodology**

The work methodology began with a survey of the current situation of the site's environmental and biophysical factors. Next, understanding and studying the history and evolution of the site was a challenging but crucial stage, requiring extensive research. From

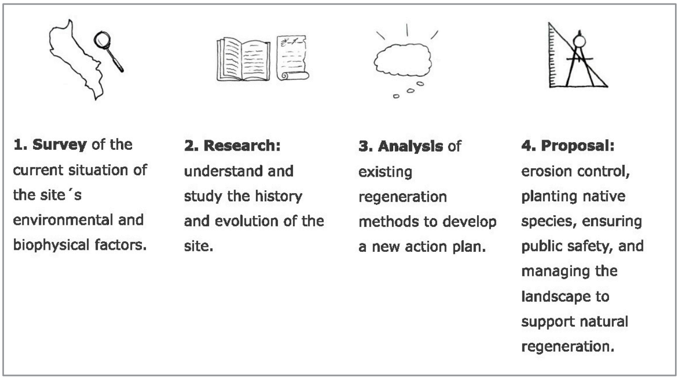


Figure 1: Methodology scheme (self-authored)

there, existing methods for landscape regeneration were studied and, after a critical analysis, a new and multidisciplinary action plan was developed. Finally, regeneration methods including erosion control, planting native species, ensuring public safety, and managing the landscape to support natural regeneration over time were proposed (Figure 1).

**How is the landscape now? - Regenerative Landscapes: How might we define them?**

Midões can be defined as a landscape undergoing regeneration. This area was explored through mining, deeply disturbed and then abandoned, without an environmental recovery plan, as many others in Portugal until the 90’s. New decree-laws were later published to implement those so-needed recovery plans, but, somehow, many of these abandoned mining areas were forgotten and left for nature to encounter their new balance. Since the Midões mine ceased, in 1992, the site has shown a capacity for natural regeneration. Nevertheless, it remains in the process of regeneration as it is facing environmental and landscape problems.

The Lagoas de Midões (Midões ponds) are situated within Serra’s do Porto Park, a protected landscape, defined by its natural and landscape values and the intimate relationship between humans and nature coexisting in a harmonious manner, making it crucial to regenerate this area. It is a place visited by many people, mainly those passing through on the various existing trails. The site is highly valued for the vast views and the glimpses of the ponds' scenic beauty, with their turquoise or greenish colours contrasting with the dark soil (Figure 2).

The site is characterized by a steep-sided valley with an elevation difference of around 100 m between the lowest and the highest points. Due to this large elevation difference and slopes above 25%, a large portion of the area is experiencing severe erosion problems (Dias, 2023). Together with the steep slopes, the poor vegetation in these steeper areas worsens this problem. Also, the intensive planting of *Eucalyptus globulus* in this area since the 20th century, resulted in the persistence of this species, now unwanted, which hinders the growth of native

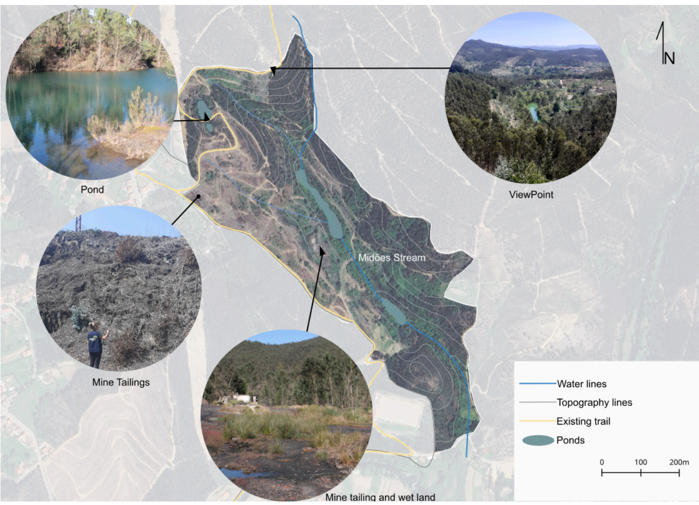


Figure 2: Existing plan (self-authored)

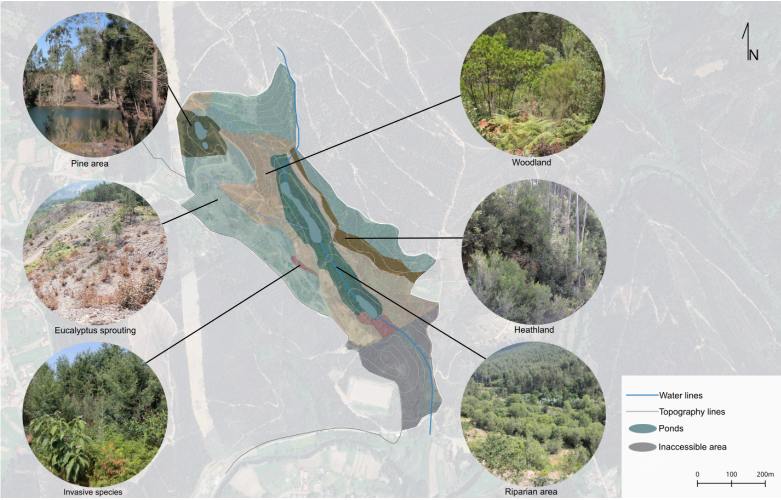

Figure 3: Existing vegetation (self-authored)

plants due to its fast-growing characteristics and regrowth capacity after cutting. The proliferation of invasive species such as *Acacia dealbata, Cortaderia seloana*, and *Phytolacca americana*, among others, is also noticeable in some parts of the landscape, forming small groups. These factors hinder the site's recovery and exacerbate the problems left by mining. The remnants of mine tailings, combined with the topography and the proliferation of invasive and exotic species, increases erosion problems and make their control more challenging (Figure 2).

The hydrographic network comprises one main watercourse, the Midões stream, which flows along the valley bottom, tending to dry up in the drier months. In addition, there are three ponds of anthropogenic origin with acidic pH levels, a common problem in abandoned coal mining areas, due to the formation of AMD. Around each pound, some mine tailings are visible (Figure 2) (Rocha, 2019).

In terms of native vegetation, the area comprises three characteristic formations: heathland in the higher areas, woodland, and the riparian zone at the valley bottom. The vegetation presents a high rate of natural regeneration, although there are some constraints. Firstly, the eucalyptus sprouting area coincides with the heathland, a steep and exposed area. Secondly, the woodland areas are affected by the proliferation of invasive species and soil erosion. Thirdly, near the two southernmost ponds, the riparian zone has a higher rate of natural regeneration but encounters occasional invasive species (Figure 3).

**Why does the landscape present this way? – Regenerative Landscapes: How do they work?**

To regenerate degraded sites, it is crucial to thoroughly investigate and understand the existing problems. Often these issues share similarities in terms of the geology, existing minerals, ore mined, and mining methods. However, each site has its particularities, and these regeneration methods may not be universally applicable. Therefore, the methods should be adjusted to fit the site rather than forcing the site to conform to the method.

Understanding these factors proved vital in the case of Midões, but also challenging. Existing historical documentation only mentions the underground exploitation at the site. Nevertheless, during a field visit, clear signs of open-pit exploration, such as the ponds, were observed. These ponds did not exist in the past, as they are not indicated on any historic map. Upon analysing various old mining documents and plans, it was discovered that several mine shafts were marked throughout the area. Some coincided with the ponds and others with the wetlands on the site. This highlights the importance of researching the evolution of the site and understanding the mining techniques used. Without this documentation, it would not be possible to know about the underground mining, and without the on-site visits and markings, we would not been able to conclude that there was open-pit mining. This also reflects the interconnection of the two techniques used to exploit the ore. The presence of mine shafts near the ponds indicates that they are being supplied by underground water.

We understand that the ponds maintain an acidic pH as they retain the water coming from Acid Mine Drainage (AMD), but we needed to investigate the reasons for this and understand how they are able to maintain water levels all year. One of the main factors relates to their interconnection with the hydrographic network of which these ponds are now part. Extensive research has allowed us to compile a chronology spanning almost 100 years of history in Midões: from underground exploration between 1912 and 1927, which lead to the opening of several mine shafts (de Sousa, 2017), research and prospection between the 1940s and 1950s, and finally open-pit mining between 1984 and 1992 (Dias, 2023). As such, it is evident that the aquifer was lowered due to the underground exploration, and at the end of the century, the excavations led to the formation of these ponds which now store both groundwater and run-off water.

The development of AMD is closely associated with the type of exploitation. Mine shafts give rise to this process underground while run-off water that flows over mine tailings generates this process at the surface. This happens because the minerals in the rocks oxidize when they come into contact with oxygen. As the water flows through, it carries these oxides with it, which end up being retained in the ponds, lowering the water pH (Borma, 2002; Rocha, 2019).

**How to regenerate it? - Regenerative Landscapes: Why do they work?**

As mentioned previously, Midões is a landscape undergoing regeneration. The natural potential of the site has been studied and presented, showcasing the adaptive capacity of the vegetation. However, due to the existing problems, a proposal has been designed to assist this natural regeneration process (Zheng e Kirkwood, 2020).

For a proposal to reclaim this area, different regenerating methods and various existing case studies were consulted. These methods ranged from in situ treatment of degrading factors to cases of old mines being reclaimed over time. Nevertheless, many of these methods were found to be unfeasible for Midões, as it will be explained subsequently. In addition, we have successful examples of mines from the copper era or Roman mines, which over the centuries have recovered and become sustainable ecosystems, similar to what is being observed in Midões at an early stage. For example, in other regions of the Serras do Porto Park, the romans mainly exploited gold from underground, creating

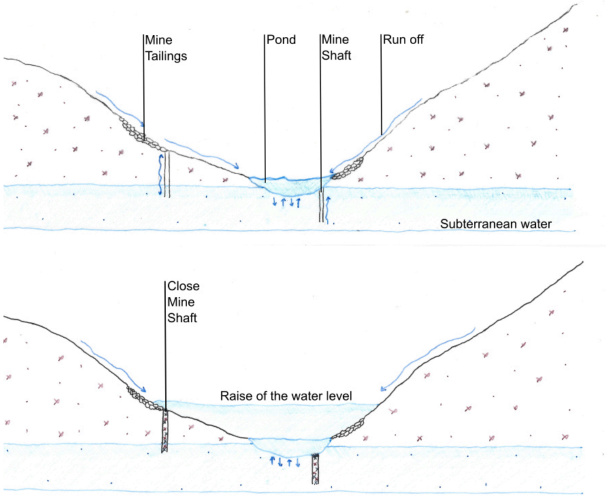


Figure 4: Close mine shaft methods scheme (self-authored)

cavities known as “fojos”. Over time, these cavities have developed favourable climatic conditions fostering the establishment of significant plant and animal communities. Notably, an endemic salamander *Chioglossa lusitanica* as well as various ferns such as *Vandenboschia speciosa.* These areas are now under protection, demonstrating the environment’s resilience and ability to adapt after a disturbance (Andresen et. al., 2018). Although this is hopeful, it will take time and there are dangers affecting this site, especially for visitors due to the site being currently used as a crossing point for several marked trails. Therefore, it's important to take measures to speed up the process of regeneration of the site to mitigate them.

As explained below, the case of Midões presents a complexity of factors that challenge existing methods. For instance, the challenging topography, the presence of the water course and the different mining methods used that have led to increased environmental issues. With the research carried out and discussed previously and the various field visits, it was possible to correlate biotic, abiotic, and orographic factors to justify and better understand the complexity of this ecosystem. This presented a challenge to its recovery that was reflected in critical thinking and new recovery methodologies. These multidisciplinary analyses involved various researchers from areas such as geology, biology, hydrogeology, and landscape architecture, who discussed the ecosystem's functioning *in situ* and evaluated potential recovery solutions for the site. The study of the various recovery methods began with a critical analysis in light of the existing situation leading to either a rejection or modification of the methods. One commonly used method to stop AMD would be to fill up the mine shafts with aggregate to stop water from feeding the ponds (Morais, 2009). However, this method would damage the landscape due to the hydrographic network to the Midões stream since it would interrupt infiltration and the connection of this water line with the subsoil (Figure 4). As a result, since the site constitutes a valley, the likelihood of higher-level smells is high and worrying.

Another method is to treat the water in the ponds by filtering it through water treatment tanks (Morais, 2009). Once the water is treated and its pH is balanced, it would return to the ponds. However, this method is not feasible for this site due to the topography and, as previously mentioned, the connection to the water network to which the ponds are associated, with continuous contact with groundwater.

The phytoremediation method involves using plants with the capability to either fix or break down contaminants present in soils and water bodies (Kennen e Kirkwood, 2015). Even though this method is commonly used in abandoned mines to treat contaminated water, the vegetation requires

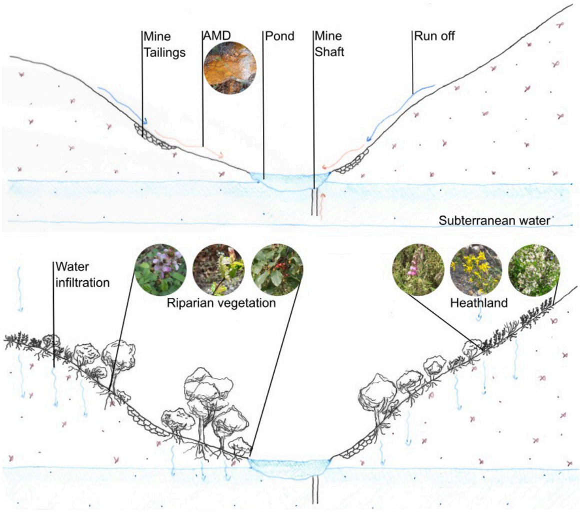

Figure 5: AMD formation and regulation scheme (self-authored)

environments less acidic. In Midões, where the water has a pH of around 3, no plant can thrive (Dias, 2023; Schneider, 2006). However, further studies could be carried out *in situ* to investigate this issue more thoroughly. In these acidic and lifeless ponds, a question arose: how can vegetation exist around the ponds and in the surrounding area? The answer lies in the ability of plants to adapt to new environments, especially because near the ponds, where the Midões stream passes, it is likely that there was already a riparian zone. This plant formation has survived and adapted to the new conditions, managing to regenerate itself.

Part of the AMD in this area is caused by surface run-off (Figure 5). This can be mitigated by introducing vegetation that serves as a filter and stops this process while improving soil erosion conditions. The study of the existing situation revealed a considerable rate of natural regeneration, especially in the riparian zone where willow trees, known for their phytoremediation abilities, are present.

With all this in mind, active landscape management is proposed, including hydroseeding, native species planting, invasive species control, and bioengineering to prevent soil erosion.

- *Hydroseeding:* To quickly stabilize the steepest areas of the hillside, hydroseeding is proposed. This method would also be unique and site-specific because it involves using seeds of heathland species harvested from the region itself, thus increasing the chances of successful germination and growth. This method not only helps to combat erosion, but it also provides rapid growth, consolidation, and ground cover. Additionally, it helps prevent the spread of unwanted species, such as eucalyptus. Another advantage is the fact that hydroseeding makes it possible to plant areas that are not feasible for manual planting and that cannot be accessed with machinery due to the steep slopes.

- *Controlling invasive species and planting native species:* to effectively tackle invasive species, in addition to removing them, this control is only effective in combination with the planting of native species. This way, native plants prevent the generation of favourable conditions for the development of undesirable species, leading to better long-term results. Due to the accessibility of these sites, it also presents opportunities for volunteer efforts to control and plant them, involving the general population, and raising awareness of environmental problems.

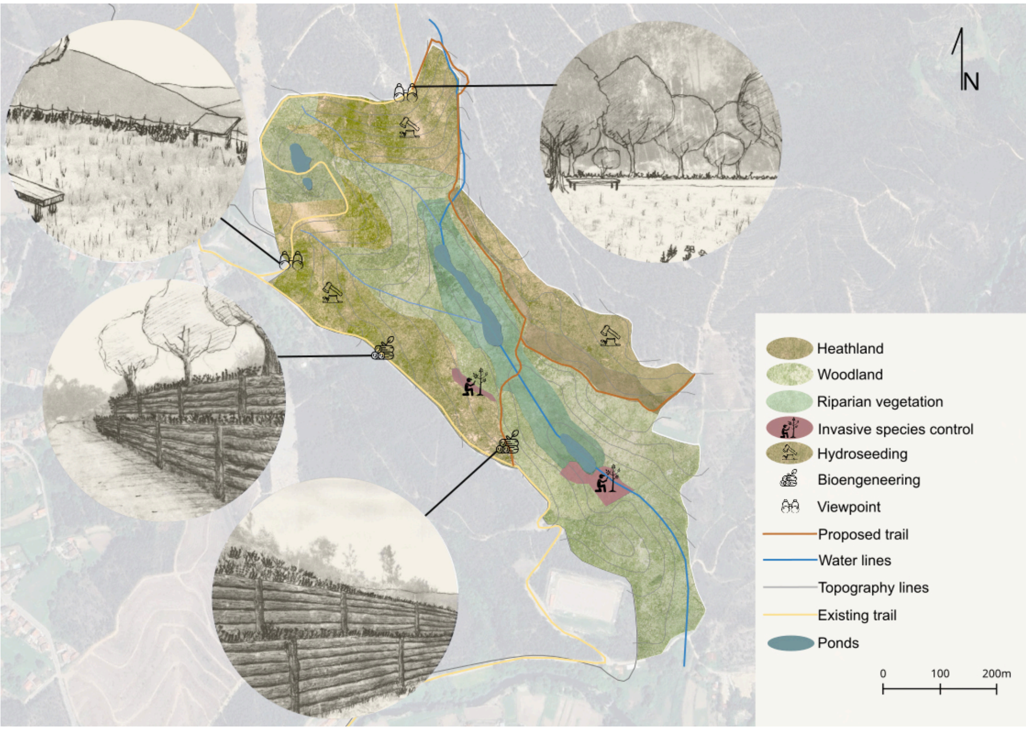


Figure 6: Master Plan with landscape restoration proposals (self-authored)

- *Bioengineering:* in areas where erosion is higher and more visible, especially along pathways and borders, bioengineering methods are proposed, such as the bank crib. This ensures that the soil is supported, allows native species to be planted, and is also aesthetically pleasing as it is located along the paths. This method promotes the rehabilitation of the soil with the help of the plants and wooden trunks used for its structure, which increase the proliferation and shelter of fauna.

To ensure the safety of visitors to this site, some measures were proposed, from signs informing of the dangers of the ponds, to barriers that prevent direct access to them or the risk of falling into more dangerous areas. In addition to the voluntary contributions by the population mentioned above, adding awareness to the area it is important to explain existing dangers and what is being done to mitigate them. This way we educate the general public about problems left by human activities in ecosystems such is the case of mining activities.

Another opportunity is the rehabilitation of the site's identity through history. Since it had been forgotten and lost in time, this research allows this identity to be brought back to this territory. In this way, Midões becomes a place for information and literacy about both historical and environmental issues. Taking advantage of the viewpoints that naturally occur on the site and allowing views over the entire landscape, it is proposed to add informational panels to raise awareness and educate visitors. To improve visits around the site and the connection between the various existing trails, a new path is proposed allowing for safe exploration through the site (Figure 6).

**Conclusions**

This work is mainly a survey. The research conducted enables us to recognize and understand the site's ecosystem, along with the discovery and description of the historical aspects that contributed to the landscape's evolution over time. By linking these factors, conclusions were drawn to support the best regeneration measures.

The proposal to regenerate the landscape takes into account that, being a protected area, the main objective is to maintain its natural characteristics. We do not expect a change in its typology, but rather a faithful and supportive intervention in harmony with nature to make the site viable for public access and visitation. This will create a space for education and awareness-raising, as well as volunteer activities to educate about environmental problems. At the same time, we will be restoring the site´s identity by informing society about its history.

This paper emphasizes the idea that various methods can be used and combined in a regeneration proposal. It not only promotes natural regeneration, but also highlights the importance of actively managing environmental and landscape recovery. It addresses decisive factors in choosing solutions and aims to address existing problems from a more landscape-based perspective. It opens up opportunities to conduct site-specific studies on an ongoing basis, such as an open-air laboratory, in search for solutions to other problems presented and studied in this work

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# Ecospacing? – Towards a local framework for interspecies well-being and regeneration

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**Keywords:** spatial ecologies, transdisciplinary framework, biology, sociology, architecture,

## Introduction

The planetary imbalances that we humans are causing call for continuous ontologies and research methods bypassing an Anthropocene 'cheap nature' distinction between terrestrial and built biotopes, human- and bio-diverse sociality (Crutzen 2002). To grasp the complex environmental linkages between our ability of multi-species coexistence and embodiment of our places of habitation, we are tasked with rewriting and joining our disciplines. As biologists, sociologists, and architects, we have engaged this challenge by unfolding the notion of *Ecospace*, stemming from biology (Brunbjerg et al., 2017), as a 'traveling concept' through 18 hours of mutual interviews aimed at mirroring and integrating definitions, theories, and methods across the three disciplines. As findings from these preliminary interviews, we propose a radical transdisciplinary research frame for activating the regenerative potential of local spatial niches across terrestrial and built biotopes based on their capacity for interspecies well-being as *Ecospacing*.

## Disciplinary reflections beyond the Anthropocene

Today, the mass of man-made constructions exceeds the total biomass (Elhacham, 2020). These constructions rewrite the environment to a point where the built environment (i.e., the variety of urban constructions) becomes also a habitat for terrestrial biodiversity (i.e., the variety of life forms found on land). Simultaneously, the built environment can be observed to suffer from a lack of spatial diversity in its capacity, even as a human habitat, as argued since the 1970s (Gehl, 1971). Concretely, the regeneration of the resulting planetary imbalances calls for research methods that apply locally (Lury, 2020) and enable a radical qualification of the spatial capacity of our constructions for interspecies co-existence and well-being (Latour & Schultz, 2022). Establishing such methods transcends disciplinary boundaries necessitating a joinery of hard science and plural situational forms of knowledge. Our work addresses this challenge across the disciplines of biology, sociology, and architecture.

In this matter, we are building upon early concepts of human- and plant community ecology (Warming, 1925), through which the Chicago School of urban sociology demonstrated strong interdependencies between species co-existence, material resources and life (Park & Burgess, 1925). Yet, focusing on the way culturally and socially different human beings became distributed in different areas of the city, this early 'urban ecology', remained anthropocentric and had difficulties in relating to other forms of environmental questions. Consequently, a New Urban-Environmental Sociology is being called for (Angello & Greenberg, 2023). Likewise, ground-breaking efforts in biomimicry and biodesign have enabled the integration of natural processes from biology within architectural processes as exemplified in the development and emerging implementation of biogenic- and living organisms as materials pursuing an environmentalization of architectural construction (Pawlyn, 2019). However, these efforts are still predominantly anthropocentric, learning from nature

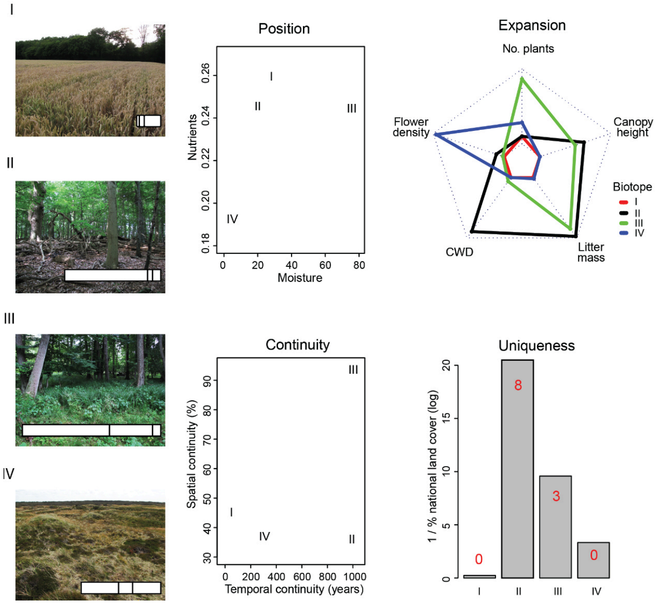


Figure 1 Ecospace mapped empirically for four contrasted biotopes in Denmark, showing how biotopes may vary independently in position, expansion, continuity, and uniqueness; and how that affects α-diversity. Photos: Lars Skipper, Copyrights: Held by the authors, reproduced from (Brunbjerg et al. 2017).

mainly for the benefit of humans rather than concerned with interspecies socialities. Hence, that of enabling integration of footprint and interspecies well-being in the architectural design of spatial ecologies locally remains a critical gap (Francart et al., 2024). We are addressing this gap by searching for continuous ontological and methodological ground across the three disciplines, using the notion of Ecospace as a point of entrance.

Within biology, the notion of 'biodiversity' goes beyond ecosystem functioning signifying the inherently co-existential potential of life, a potential that is inseparable from the development of the spatial capacities of the biotope. Therefore, comprehending the variation in species diversity remains a significant challenge in ecology (Pennisi, 2005), the area of biology that studies the interplay of living organisms and their habitat. The concept of Ecospace (Brunbjerg et al., 2017) has been proposed as an ecological framework for understanding the biodiversity potential of local biotopes through a systematic mapping of the abiotic conditions ('position', e.g., nutrients, water, temperature, light), the biotic 'expansion' (diversity and volume of organic resources) and the spatiotemporal 'continuity' (extent of the habitat in space and time) (Figure 1).

Ecospace thus unfolds a comprehensive approach furthering classical ecological theories, e.g., niche theory (Hutchinson, 1957). Theories in which individual species' occurrence is linked to local habitat conditions and community assembly theory (Zobel, 1997) where environmental conditions and species' interactions form the community of species present in a given area. Thus, Ecospace unfolds a general, yet contextual theory, which enables the prediction of local variation with potential for upscaling (Brunbjerg et al., 2017). Ecospace is parameterized in such a way that it can be tested empirically (e.g. Brunbjerg et al. 2021). In this way, Ecospace offers a possible bridging of the gap in biological methods for comprehending the variation in species diversity towards activating ecological knowledge in regenerative processes. In other words, the theory enables the study of the regenerative potential of a local biotope to nurture the socio-spatial co-existence of the inhabiting organisms, yet without embodying the human species, nor the built environment as part of the baseline.

From an architectural and a sociological perspective, we have identified this as a radical potential to confront our anthropocentric bias in local design decisions if imagining Ecospace as a continuous theory across bio- and technosphere. We hypothesize that detailed local design decisions are vastly influential at a larger scale holding the potential to transcend social and material divisions towards regeneration of the capacity of our constructions for interspecies well-being within planetary boundaries (Hvejsel, 2022, Latour & Schulz, 2022). Yet we are in need of a local framework to qualify our decisions in this context. These observations led us to engage collaboration across disciplines with the authors of Ecospace with the idea to develop and expand the notion as an active transdisciplinary research frame; Ecospacing. In this matter, we are motivated by the hypothesis that Ecospacing opens a unique potential to formulate and qualify a continuous ontology crossing species diversity, built and terrestrial biotopes, in its capacity as a possibly general yet situational spatial theory of a universal 'diversification' process.

**Towards a transdisciplinary regenerative methodology?**

In the following, we are using the notion of Ecospacing as a 'traveling concept' (Neumann & Nünning, 2012) across the disciplinary lenses of biology, sociology, and architecture in an attempt to develop and expand the notion, stemming from biology, as a common research object. In this matter, we have conducted a series of mutual semi-structured interviews, 9 sessions of 2 hours each, focused on the identification of ontological complementarities and possible contradictions across the conceptual definitions, theories, and methods of each discipline. Imagining a 'mirroring' of the terrestrial definition of Ecospace into the built environment, we have identified a series of radical potentials towards placing humans and nonhumans in the same regenerative realm of Ecospacing.

*Transdisciplinary definitions for an 'ecospatial' approach to regeneration*

In biology, Ecospace implies that the regenerative potential of a local terrestrial biotope is defined by its capacity to positively influence diversification processes at a wider scale. In the case of terrestrial biotopes, the implications thereof for the environmental crisis are currently not manifest, as the loss of biodiversity itself does not appear up front in contrast to e.g. carbon emission. The biodiversity crisis is not an immediate threat to human survival but it clearly reflects a disconnection and disenchantment of human existence. Also, the biodiversity crisis and climate crisis are both heavily influenced by excessive human consumption of natural resources (Pereira et al., 2023, Pörtner et al., 2023). For built biotopes, where we likewise hypothesize that the social capacity of what we build influence the environmental sustainability of our constructions (Hvejsel, 2022) a 'mirroring' of the notion of Ecospace into the built environment holds radical implications. If we can shift the focus of life to creativity and diversity rather than resource consumption, it increases the chance that we can also achieve sustainability. If we imagine the regenerative potential of a built biotope described by its capacity for diversification processes as implied in Ecospace, a radical potential opens to consider the social dimensions of architecture through a concrete empirical measure related to its environmental footprint within a local spatial niche. A footprint which we have well developed methods of quantifying within the architectural discipline as we have become able to state the energy consumption as well as the embodied energy of the materials applied in the construction. Materials that are now a part of the biological 'base line' for regeneration. Hence Ecospacing, traveling as a concept from biology describing terrestrial biotopes into the built environment, uncovers a complementarity at the ontological level towards definition of a continuous baseline for regeneration across terrestrial and built biotopes considering interspecies sociality across bio- and human diversities. From the sociological point of view, this opens a potential to study the similarities and/or differences across the definitions of human and more than human sociality, diversity and sense of affluence and how this difference or similarity relates to habitat conditions.

**Transdisciplinary theories for why an 'ecospatial' framework could work**

The Ecospace theory implies 'uniqueness' as a measure of the biodiversity potential of a given biotope at a wider scale (Figure 1). Hence, a local biotope with specific capacities that have evolved over hundreds of years might enable the inhabitation of unique species with unique adaptations, but be limited in scale. Correspondingly the institution of architecture has a long history of a myriad of strategies for how architecture mediates 'unique' correspondences between nature and humans, informed by 'genius loci' (Bjerregaard, 2005). Hence, at a theoretical level, the 'mirroring' of the terrestrial definition of Ecospace into the built environment uncovers a possible theoretical parallel between the notion of biodiversity in biology and that of quality in architecture. We consider it fundamental, and fundamentally challenging, that biodiversity is not 'necessary' for the survival of either the planet or mankind, in the same way as we consider the uniqueness of architectural qualities and social bonds to be vital. Biodiversity in the biologists' understanding is qualitative, a quality of evolutionary creativity, an affluence, a richness, just as social bonds across differences are for the sociologist. Hence, through our mutual interviews, it became clear that aesthetical diversity in the physical environment is also an affluence. It thus stands as a central hypothesis that a rich aesthetic architectural environment, in line with rich biodiversity, is an affluence that we should not restrict through the logic of necessity, economics and marketing, exactly because it opens a potential to recalibrate our sense of affluence at an ontological level. Consequently, we hypothesize that Ecospacing could work as a radical transdisciplinary ecological theory as it implies a correlation between affluence in nature and affluence of the built environment and thereby a potential to regenerate our ontological understanding and sense of need.

**Transdisciplinary method for how an 'ecospatial' framework could work**

At a methodological level, Ecospacing as a concept traveling from terrestrial biotopes into the built environment, towards a continuous theory, implies that we should be able to predict a population from a socio-spatial analysis of an architectural setting. The biological definition of 'continuity' (Figure 1) marks a key point in this matter since it describes measures for a processual development, hence, a change over time that is predictable without human intervention. In the creative process, the practice of the architect involves imagining, inventing and hereby intervening into developments in space and time, although often informed by tacit knowledge and speculative visualization rather than empirical measures. And often we find our attempted predictions to miss the target, when making drastic, yet well-intentioned transformations of the built environment such as the modern attempt to mend the housing crisis through large scale implementation of industrial construction technology (Gehl, 1971). In Ecospace, 'continuity' is defined on two axes; temporal continuity and spatial continuity. When traveling from terrestrial and into the built to include the human species and our constructions as nature, Ecospacing implies a potential to activate the field specific methods of each discipline, and hereby for triangulation of the findings. Hereby taking advantage of the methods of the biologist to observe and measure the living organisms, of the architect to visualize the materiality of the biotope in space and time, and of the sociologist to uncover the socio-material aspects of affluence in a local spatial niche. Hence, as a result of the 18 hours of preliminary interviews, we propose a transdisciplinary research frame for activating the regenerative potential of local spatial niches across terrestrial and built biotopes based on their capacity for interspecies well-being across bio- and human diversities (see figure 2). The research frame enables mutual qualification of the natural scientific methods of the biologist, the creative and matter-based methods of the architect, and the heterogeneous-

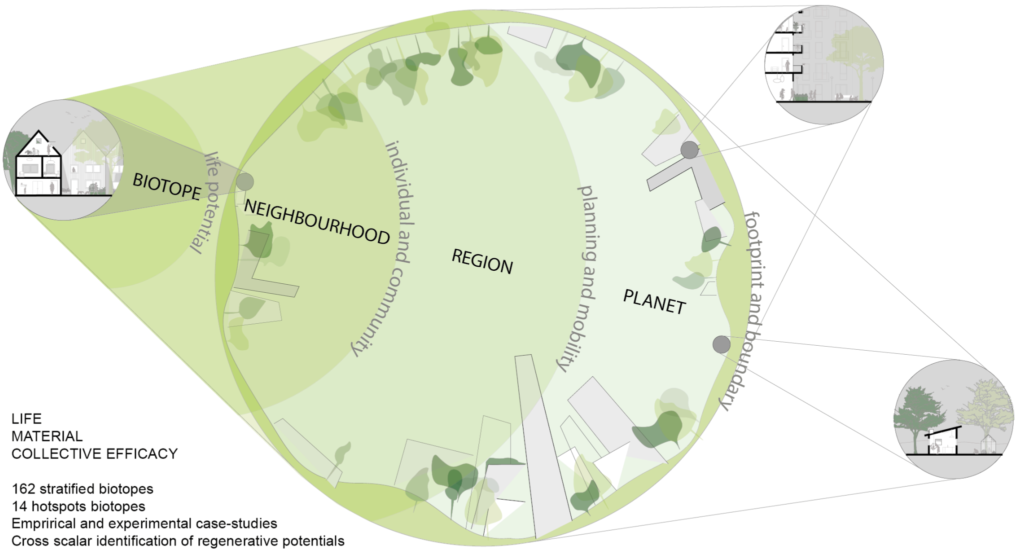


Figure 2. 'Ecospacing?' Visualization of the cross scalar transdisciplinary research design. Diagram: By the authors assisted by Katrine Friis Dahl-Nielsen, copyrights by the authors

sensitive methods of the sociologist in an iterative process. We will explore this potential through stratified, yet criteria-based, selection of a series of 162 continuous biotopes through public digital building registers that will be studied through the disciplines as described above supplemented by 14 hotspots selected to address 'uniqueness' based on field specific hypotheses formulated by each discipline.

**Ecospacing?**

In its capacity as a general yet contextual spatial theory of 'diversification' processes, we hypothesize Ecospace could be developed to imply Ecospacing by opening a potential for the conduct of situated transdisciplinary action-based research informed by cross-scalar data. Informed by the 'critical zone' mapping conducted by Aït-Touati et al., 2022, Ecospacing developed as a radical transdisciplinary research frame implies an understanding of the ecosphere as a finite space, yet here focus is on registration of correspondences between life and material in local spatial niches. In our research design the capacity of Ecospacing as a general yet situational spatial theory of 'diversification' processes opens the potential to link empirical studies through 'Ecospace mapping' with action-based research approach as Ecospacing informed by the scalability of patterns and data across local and global contexts. In conclusion, we want to address the pitfall of transdisciplinary processes to encompass too large questions, 'what is architecture, biology, sociology'? But also, to argue, that there is a necessity to revisit these questions when we pursue transdisciplinary research designs for application in specific contexts with potentially vast consequences! Through Ecospacing, it is (perhaps) possible to build a method where we do not 'water down' the discipline-specific knowledge but manage to synergize them in a mutually 'qualifying' continuously 'thickening' ecological description, in which we have found a fertile ground for further work.

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# Building acceptance for spontaneous vegetation in urban green spaces through early learning

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**Keywords:** spontaneous vegetation, early learning, inquiry-based learning, vegetation dynamics, urban green spaces

The international project EDUSCAPE aimed to create a set of educational units for children aged 6–15 years, focusing on climate change, biodiversity loss, cultural heritage and identity in the education of children and youth through engagement with landscape. The project emphasizes spontaneous vegetation, highlighting its role in biodiversity and urban sustainability in the context of climate change. The unit "Where the landscape grows wild" introduces students to landscape dynamics and exploring ecological succession. The unit contains three parts: principles of landscape dynamics, field exploration of examples and a final creative application of concepts learned. Feedback from teachers during the piloting of the teaching materials showed that the activities were well received and increased pupils' engagement and awareness of nature. The learning experience was highly appreciated, and teachers are motivated to continue integrating the landscape dynamics learning unit into the curriculum.

**Introduction**

The purpose of the international EDUSCAPE project was to develop fifteen learning units for schoolchildren aged 6 to 15 to teach topics such as climate change and biodiversity conservation through engagement with the landscape. The project is distributed in an overall introduction and four thematic lines: History, culture & heritage, Landscape as a resource, Nature designs, Human designs. The project was shared by four universities, Rey Juan Carlos University Madrid (Spain), Technische Universität Wien (Austria), Czech Technical University in Prague (Czech Republic), University of Camerino (Italy) and as well as the Czech NGO Child friendly city based in Prague.

**Dynamics and aesthetics of spontaneous vegetation**

Landscape is constantly changing with the dynamic processes in which different plant communities alternate and create new ecosystems starting from the raw soil. In this way, the landscape is constantly adapting to changing living conditions. Especially on urban wastelands and vacant lots, these processes can be experienced vividly when new forms of wilderness, defined by Ingo Kowarik (1992) as Nature of the Fourth Kind, emerge in our immediate surroundings over the years. Spontaneous vegetation, also called "The Flora of the Future" by Peter del Tredici (2014), therefore plays an important role as a flexible survivor in extreme locations.

Against the backdrop of climate change, this natural dynamic of vegetation represents great potential for preserving biodiversity and creating resilient and sustainable green spaces in our urban areas. However, areas of spontaneous vegetation can look untidy, and the question of aesthetics and public perception of these elements remains unresolved. For Gilles Clément (2006, p. 99), the "aesthetic value resides in the astonishing biodiversity" and the "pleasure derived from the new knowledge that

Figure 1: Spontaneous vegetation on vacant plot in Aranjuez, Madrid. Foto credit: Laura Jeschke

comes from understanding the mechanisms at work in the ecosystems" of the so-called third landscape. Studies on the perception of naturalness, biodiversity and vegetation structures show links between the acceptance of spontaneous growth and the knowledge of its added ecological value, e.g. for pollinating fauna (Hoyle et al., 2019). Here, the socio-cultural background plays an important role in the acceptance of and interest in spontaneous vegetation in urban green spaces.

Furthermore, the importance for human well-being of experiencing nature has been widely documented since the 1980s in the field of environmental psychology with studies addressing nature's ability to not only mitigate stress, but also its restorative effect (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995; Ulrich, 1983). It has been shown that a high degree of nature and green is an important quality factor for the population and (Tessin, 2008) vegetation therefore plays an important role for the positive perception of urban spaces.

The learning unit "Where landscape is growing wild" is included in the thematic line "Nature designs" of the Eduscape project. It aims to familiarize young people with spontaneous and ruderal vegetation and explore the new aesthetic aspects of near-natural green spaces in addition to their ecological significance. Addressing these issues at an early stage is a first step towards creating awareness and acceptance among the population for the conscious integration of these "wild" vegetation elements into urban green spaces (Figure 1).

**Development of teaching materials**

*Aim and Structure*

The learning unit on spontaneous vegetation is structured in three main parts: First, principles of dynamics of landscape and ecological succession are taught and related to climate change. In a second step examples of ecological succession are explored in the immediate surroundings of the school. As a third step, the lessons learned will be applied in a creative way. The materials for each activity are designed for learning units of 45 minutes and specifically adapted for students aged 6 to 11 (Primary School) and 12 to 15 (Secondary School).

The five interdisciplinary activities developed involve biology, geography, arts, language studies, and literature. The didactic approach focuses on transversal, project-based learning and includes methods such as inquiry-based learning, group work, outdoor investigations, semi-open and self-organized learning, digital media, and creative crafts. Therefore, all sorts of graphic material such as flash cards or memory cards, info cards to define basic terms as well as instructions for teachers and students were developed.

The teaching materials should be designed to work in different European countries and adapt to analog classrooms and tight budgets.

*Methods and process*

The task of designing the learning units and its materials was a huge challenge out of the academic comfort zone and with the need to keep things simple and fun. Therefore, the input and pedagogical know-how of teachers was crucial for the development of the project. The URJC team included primary school teacher Maria Melcón from the very beginning, who was able to provide important input and feedback from her practical experience of teaching children at all stages of the project.

Following the development of prototypes of the teaching materials, the EDUSCAPE project's approach involved a series of meetings and feedback sessions with schoolteachers and the materials were randomly tested in school classes for the first time.

The updated learning units from the first test phase were then piloted in April 2024 with around 140 students from the CEIP Valdebernardo public primary school and the IES Joaquín Rodrigo public secondary school in the Vicalvaro district of Madrid. In accordance with the bilingual curriculum for Madrid schools, the learning units could be tested in both Spanish and English with children from both school levels.

*Activities and materials*

The units of the EDUSCAPE project were developed in such a way that, depending on the time available to teachers in the classroom, all five parts or only individual activities can be carried out on a modular basis. Teachers are provided with instructions and various additional tips and information on spontaneous vegetation.

The three introductory units to the EDUSCAPE project deal with the questions generals related to landscape and can be used as an introduction before the activities of the learning unit "Where landscape is growing wild".

**Part 1: Motivation and Acquiring Basic Knowledge**

In the first introductory activity "From open ground to forest" students learn about dynamics of landscape and the role of vegetation in this process with the help of illustrative pictures of real landscapes. Therefore, flashcards with photos of landscapes of different stages of ecological succession are shuffled and displayed and students are asked to arrange the cards in order. By using cards, the role of (pioneer) plants in the process and their adaptability to extreme living conditions are explained. For the youngest students series of explicit impacts, such as a volcano eruption or a wild fire are used.

In the second activity "Coming and going of species" with the help of illustrative diagrams, students learn to recognize and name basic principles of ecological succession. A set of memory cards is used to discover the stages of primary and secondary succession and the influence of climate change and human activity on the process is discussed.


Figure 2: Activity 1 – From open ground to forest. "Discovering the order of how nature grows was mind-blowing." Foto credit: Maria Melcón

Figure 3: Activity 4 - Photosafari for two. "The highlight was to go out - this rarely happens in class." Foto credit: Maria Melcón

**Part 2: Mapping the field and analysis, problem definition**

The third activity called "Travel agency to wilderness", askes students to map the places conquered by vegetation and make an inventory of the plants to be found. The results of their discovery missions in the immediate surroundings of the school are brought back and presented in class. Alternative variants were developed for this activity so that it could be implemented as part of homework or virtually in the classroom in the event that no excursions are possible as part of the school lessons.

In the fourth activity "Photo Safari for two" students discover and identify the urban flora and its intrigue beauty. Pupils are divided into pairs and given the task of showing each other beautiful or remarkable plants that grow spontaneously in the immediate neighborhood of the school. Options are given to develop the activity with or without electronic devices. With older students the plants will be determined by a plant identification app. In addition, facts and ethnobotanical stories of three selected plants as poppy, common mallow and narrowleaf plantain that can be found all over Europe are discovered with the kids.

**Part 3: Designing solution and shaping**

The fifth activity, 'Seed bombs for climate change', gives students the opportunity to make their personal contribution to ecological succession and learn about local wildflowers in a creative way. It consists in the elaboration of seed balls with seeds of local wildflowers. The learning goal consists in taking action by students starting their own ecological succession somewhere and being enabled to observe the evolution of the seed mixtures. In addition, posters are available to illustrate the plants contained in seed mixtures for the Mediterranean or Central European climate and the planting technique Nendo Dango created for reforestation is explained in illustrated infocards.

An additional fifth activity "My wildest garden" was for younger students and proposes the creation of an imaginary garden for a particular pollinating insect in a shoebox or other box and thus deal with the needs of the animals and the potential of spontaneous vegetation as food and habitat for wildlife and the preservation of biodiversity.

**Results from the piloting process**

The experience gained from the close co-operation with the teaching staff in the development of the teaching units and the results of the piloting in the schools were an important contribution to the creation of the teaching material. On the one hand, playful learning techniques such as various types of card games were introduced and, on the other, realistic possibilities for using digital devices such as tablets were demonstrated by the schoolteachers. Discussions with the teaching staff also revealed

Figure 4: Activity 5 - Seed bombs for climate change.
Foto credit: Laura Jeschke

Figure 5: Activity 5 - Seed bombs for climate change: "We are contributing to make our school patios and play areas more beautiful." Foto credit: Maria Melcón

difficulties such as limitations in the possibilities for excursions or a lack of technical equipment in the classrooms, which had to be considered when creating the material.

In terms of content, it was necessary to simplify the material for the little learners, in particular, but the concepts taught per unit were also reduced for the older pupils and adapted to the 45-minute time frame per activity.

**Conclusions**

Both teachers and students enjoyed the piloting experience, especially the small excursions during the lessons and the making of the seed bombs. In primary school in particular, teachers noticed an increased emotional connection and nature awareness among the children through these active methodologies.

The learning unit "Where landscape is growing wild" and the final version of the teaching materials were highly appreciated by the teachers and considered extremely useful for further use in the classroom. The study of the dynamics of the landscape and its vegetation was seen as an important addition to the curriculum. The teaching materials of all fifteen learning units will be available in English, Czech, Italian, German and Spanish on the EDUSCAPE webpage: https://www.eduscape.online

*Cross-Cutting Question 1: Regenerative Landscapes: How might we define them?*

Regenerative landscapes can be defined as dynamic environments that intentionally integrate ecological succession and spontaneous vegetation to create and maintain resilient and sustainable urban greenspaces.

*Cross-Cutting Question 2: Regenerative Landscapes: How do they work?*

Regenerative landscapes operate through the dynamics and ability of spontaneous vegetation to constantly adapt to changing exogen and endogen conditions of the environment. Its high biodiversity and high tolerance of extreme environmental conditions such as drought, poor soil quality and temperature extremes contribute to this. However, urban populations in particular lack knowledge about these characteristics and the importance of these plants for biodiversity conservation and adaptation to climate change in our urban environments.

*Cross-Cutting Question 3: Regenerative Landscapes: Why do they work?*

Regenerative landscapes that are shaped by dynamic ecological succession processes are characterized by a new aesthetic that is still perceived ambivalently by the population, especially in urban settings. The early learning of children about spontaneous vegetation and its benefits can be a first step towards an increased appreciation of its potential among the population.

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# Listening spiders and travelling trees: Experimental approaches for exploring and representing the more-than-human

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This paper critically reflects on experimental representational approaches, beyond the human experience of place, as a starting point for designing more-than-human futures (Edwards and Pettersen, 2023). It is based on the results of an international and intercultural landscape architecture course Global Design Studio jointly organised by Newcastle University and BOKU Vienna in the Spring of 2023 that investigated linear, peri-urban sites, through a phenomenological focus.

The Global Design Studio was set up for the master students at BOKU Vienna to provide international and, most importantly, intercultural design experiences. Every year, BOKU reaches out to another school to develop a specific design task which can be implemented on similar sites in both cities where the schools are located. Up to two teachers and 15 students of each University hold workshops in both locations. The course at BOKU counts for 6 credits, the partners choose courses of a similar workload. The same or similar topic is adapted to both sites and the design exercise provides an insight into different cultural backgrounds with regards to design processes and sociocultural and political contexts.

The intercultural exchange is intended to raise awareness of personal views and prejudices. For the collaboration between Newcastle (UK) and Vienna (Austria), we chose more-than-human experimentation as the underlaying topic for both sites. At the core of the exercise was the experience and analysis of the site from non-human angles as a starting point to design more-than-human futures.

In landscape architecture, we are always confronted with the need to contextualise and understand spatial issues from a holistic view of the landscape, including but not limited to ecological, political, aesthetic, and cultural considerations. Landscape Architecture students therefore embark on their training to join a broad- and open-minded profession. They are interested in all aspects of landscape development: ecology, society, economy, and design. They aim to take an active part in shaping future environments - analytically, creatively, and conceptually. However, design education often focuses on visual impressions and human actors, both in the actual production, i.e., plans and images, and in the projection of the built project; whereas regenerative landscapes are the result of inclusive multisensorial approaches beyond the human. After all, it is through multisensorial approaches that we actively engage with our surroundings and experience cities as stages 'for a multitude of dynamic, interdependent and complex [human-non-human] relations' (Ruiz Arana, 2023, p.30). And it is multisensorial approaches that can encourage alternative aesthetic evaluations in the public realm (Ruiz Arana, 2024). For example, listening and smelling can increase the value of post-industrial landscapes that might be rich in sounds and smells as a result of their spontaneous wildness, encouraging landscape architecture approaches that work with the existing processes of the site (ibid.)

To expand on current pedagogical approaches, broaden horizons and shift perspectives to get a full picture of a place, the Global Design Studio incorporated sensorial investigations and encouraged engagement with the possible experiences of other living things. The fact that the task was set in two different cities (Gateshead and Vienna) and countries (UK and Austria) highlighted the influence of the context.

**More-than-human experimentation and representation**

The design brief for both settings (Gateshead and Vienna) was intentionally open to bring attention to ways of experiencing and assessing the landscape in 'less rational, more material, performative and dynamic ways' (Maller 2021). Students worked in groups to notice the qualities of each site, research those qualities, and bring attention to them as the starting point for future interventions on site.

We placed a strong emphasis on noticing during the briefing sessions, site visits and tutorials, as noticing is aligned with the origin of the word design as 'to point out...or indicate' (OED online 2023). We invited students to notice with all their senses and encouraged them to move away from drawings as the only medium of design communication. The goal was for students to become aware of things that were already there, things that they might miss by only looking with their eyes, and treat them as 'worthy of recognition' and baseline for design (Rosen, Normark and Wiberg, 2022).

Through this emphasis on sensorial noticing, students instinctively attuned to other beings, their needs, and their capacity as designers for envisaging new futures for the sites. In these pages, we focus on two of the projects and experimental methods developed and their application to more-than-human design.

**Sensing vibrations (Gateshead Riverside Park, UK)**

Gateshead's Riverside Park sits 2km southeast of Newcastle city centre. The park occupies a narrow linear site characterised by its peri-urban situation and steep, south facing river valley topography. Gateshead Riverside has been made and remade collectively by its human and more-than-human communities over centuries. Humans, Goats and Rabbits, Grey Seals and Eurasian Otter, Curlew and Cormorants, amongst many others, have overtime and collectively, shaped and organised the valley landscape, along with the ebb and flow of the River Tyne itself and the prevalent winds sculpted and amplified by the Tyne Gorge's morphology. The Park's sympoiesis or collective making provided the inspiration and setting for the first studio, with its emphasis on sensorial noticing, as a means of attuning to the needs of other beings and their capacity as 'designers'.

At Gateshead, students focused on listening as a catalyst for noticing. Listening through ears and bodies enables organisms to interact with their environments, move through them and thrive in them. Listening thus connects us with those environments and the organisms living within them. Students made

Figure 1: How can we put ourselves in the point of ear of non-human others without projecting our own hearing capacities and ways of listening? Using specialist microphones, hydrophones and contact microphones (shown in figure), students explored how non-human inhabitants of the park - brown trouts, gray cross-spiders and bumble bees – perceive the vibrations around them and how they experience the place as a result. (Image credit: Usue Ruiz Arana)

use of specialist microphones (hydrophone and contact microphone) to record how ordinary species inhabiting the park - brown trout, gray cross-spider and bumble bee – listen (figure 1). The recordings portrayed sounds that are outside our normal perception (underwater sounds) or that cannot be heard with ears and that therefore we might not know how to interpret (vibrations to be sensed through touch). Through these recordings, thus, us listeners did not put ourselves in the point of ear of other species, projecting our capacities into theirs, but rather we understood the myriads of different ways of listening, and therefore of sensing and knowing the landscape.

**Voicing plants (Westbahnpark, Vienna)**

Westbahnpark, Vienna, is a linear site on a warehouse area adjacent to existing and working railway tracks. It is a contested site where inhabitants and grass root initiatives have been fighting for a 7-hectare park. The stroke of land is situated in the densely built-up fabric of "Gründerzeit", an area from the turn of the 20th century. There is a critical lack of green spaces and the site is part of an important air corridor.
Activism has taken on a range of different forms to raise awareness of the site and its potential. Accordingly, students were asked not only to dive into the non-human elements of the site but also to communicate those qualities to the wider public. At Westbahnpark, students focused on the spontaneous vegetation thriving in this abandoned railway corridor (figure 2).

One group of students chose to focus on how three plant species – poppy, field maple and wild cherry – had spontaneously arrived at the park, and how they were interacting and trying to thrive within it. Their account took the form of an interview where plants were anthropomorphised and thus portrayed as agents with intentionality. Their accounts, however, brought to the forefront interagency, the result always of interactions and interweaving of beings (Despret, 2013). The helicopter seed of a maple, for example, that is picked by the girl to be played with is in turn calling the girl to pick her, offering possibilities for play (figure 3). 'Agenting' as Despret terms it, is 'a relational verb that connects and articulates...different species, things, and contexts. There is no agency that is not interagency.' (ibid, p. 44)

**Critical analysis and conclusion**

The intercultural exchange of students from six different countries around the world was intended to raise awareness of personal views and prejudices and varying sensorial capabilities. Students found a common ground on working with the different senses and the memories that these elicit (for example,

Figure 2: How can we use our senses to envisage potential new futures for an urban environment on the cusp of development? How can we present our proposals through actions in place of drawings? Prompted by these questions, students linked to the sensorial qualities of the site and focused on plants – as the dynamic agents currently shaping and designing these ephemeral landscapes, and as the common ground amongst many cultures. (Image credit: Lilli Lička)

smells), and the non-human agents that they could link back to their home countries. Inviting students to critically expand on traditional methods of site-based investigation and standard modes of representation, via both creative and technical experimentation, enabled them to move beyond a human-centred approach to design. It allowed them to consider spatial, temporal and experiential dimensions of landscape architecture from a more-than-human perspective. The resultant responses to the two briefs were strongly performative rather than two-dimensional.  Both interventions focused our attention on landscapes 'rich in affects, full of beings able to affect and be affected by others' (Despret 2013). Acknowledging other ways of perceiving and knowing the landscape, as the first project did, and expanding agency to interagency, as the second project encouraged, can both be regarded as essential starting points for more-than-human design, as they acknowledge how humans and non-humans are inevitably connected in a myriad of ways and how any intervention that we plan and design will have cascading consequences for all those interconnected beings.

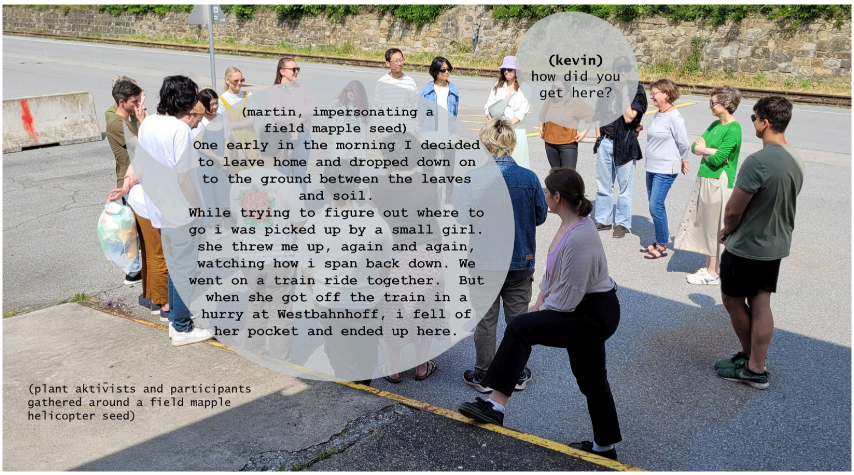


Figure 3: Interview between a plant activist and a student, impersonating a field maple seed. (Image credit: Lilli Lička)

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# Assessing two existing models of conservation and ecological regeneration for application in the EU's Nature Restoration Law

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**Keywords**: Sustainability Nature Regeneration Policy Model

**Abstract:** The EU Nature Restoration Law (2024) sets objectives for restoring ecosystems that have been lost or degraded. The European Commission estimates that 81% of Habitats in the EU are in poor condition. EU countries are required to develop strategies to achieve ecological restoration targets of at least 20% of the land area in long-term ecological recovery by 2030, and 90% by 2050. Scientific methods will establish criteria for measuring progress, but the required National Restoration Plan for each Member State will be largely a public policy challenge.

**Background**

In August 2024 the EU Nature Restoration Law went into effect in the European Union, with the stated objectives to "restore ecosystems, habitats and species across the EU's land and sea areas in order to enable the long-term and sustained recovery of biodiverse and resilient nature [and] contribute to achieving the EU's climate mitigation and climate adaptation objectives" (European Commission, 2024). The Nature Restoration Law is identified as a key element of the Biodiversity Strategy for 2030 which, among other things, "aims to put Europe's biodiversity on a path to recovery by 2030 and contains specific actions and commitments". The European Commission states that 81% of habitats across Europe are in poor ecological condition and they are still in decline (European Commission, 2024).

The law is expansive with many details and targets, but the focus here is the specific targets of placing at least 20% of terrestrial ecosystems that are in poor condition on a long-term path to restoration by 2030, and 90% of those degraded ecosystems by 2050. To implement these goals, each EU Member State is required to create its own National Restoration Plan by summer 2026. Much of the Nature Restoration Law text discusses the importance of science-based planning to develop ecological criteria to monitor the progress of ecological recovery, however a National Restoration Plan is largely a public policy strategy. Within that framework, each EU Member State has flexibility to develop a National Restoration Plan that works for its conditions, while being able to meet the targets of the Nature Restoration Law. The plans should also take advantage of synergies with agriculture, forestry, energy strategies, climate adaptation, and disaster prevention, and fulfill requirements to be a transparent process with public participation. That leaves each Member State to develop, in less than two years, a National Restoration Plan that works with complex stakeholder interests, patchwork land ownership and management, fragmented ecosystems, and competing political interests to achieve extensive restoration of a large percentage of ecosystems across Europe over the coming decades.

There are two examples from the United States of large-scale strategies that have been implemented over more than a century and took unique approaches to ecological restoration and landscape protection that may be valuable models for Member States developing their plans. The first is the State Forest Preserve created by the State of New York through an amendment to the State Constitution in 1894 that is colloquially known as the "Forever Wild Clause". The second is the creation of the National Scenic Byways Program in 1991 to help local communities balance economic interests with resource conservation, and its framework for individual States to develop their own unique programs with a grassroots nomination process and stakeholder participation that empowers local communities.

Each of these two models are reviewed here and then models for how they could be applied in creating a National Restoration Plan presented.

**The "Forever Wild" clause and the State Forest Preserve**

The State of New York in the United States is a little larger in area than Bulgaria. Within it is a State Forest Preserve divided between two large state parks: Adirondack Park and Catskill Park. Together these parks comprise and area of about 27,000 km2 — roughly the size of Belgium. For European context, that is like creating a wild forest preserve with an area the size of Belgium in Bulgaria. The Adirondack Park is a mountainous region of renowned beauty, with countless pristine lakes and wild rivers. The town of Lake Placid, which hosted the 1980 Olympic Winter Games, lies near the centre of the park. Approximately half of the land area (1.2 million hectares) of the park is publicly owned by the State of New York, while the other half is a patchwork mix of privately owned lands including farms, mixed-species forests in timber production, villages, resorts, and various businesses (figure 1).

In the late 1800s, rampant deforestation by clearcutting of most of the forests for wood and paper products, and farmland degraded old-growth ecosystems and caused mass siltation of rivers and lakes (Silver, 2010). New York City's drinking water supply comes from those water systems and was threatened. Conservation-minded people from urban population centres in the state felt a deep sense of nature loss and demanded something be done. Habitat destruction was a major concern, as was the threat to the drinking water supply. In that context, in an era of rapid industrialization with a mindset of cheap nature that is there for human exploitation, there was a public outcry to protect the landscape and put it on a path of ecological restoration. The result was the strongest protection for wild landscape that can be found anywhere in the world. The Constitution for the State of New York was amended in 1894 to create a large bank of State Forest Preserve land and give that land strong permanent


Figure 1: New York State with forest preserve general areas

protections. Article XIV of the Constitution of the State of New York was originally enacted in 1885 and includes the strong statement of nature conservation and restoration on a large regional scale that became known as the Forever Wild Clause:

*"The lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."* (New York State Senate, 2024)

It is designed to permanently restore natural forests in the region and protect watersheds for urban water supplies. Creating a Constitutional amendment this way is a transparent process that requires approval of the people in a general election, so there is a high degree of public participation, and it offers the strongest protections because the only way the State Forest Preserve can be modified is by another constitutional amendment that requires a vote of the people.

All state-owned (public) land within a "Blue Line" boundary area is protected as Forest Preserve. At the time this law was passed, only about 10 percent of that land was State-owned. Whenever the state acquires land within the boundary, that land automatically becomes Forest Preserve land. Today nearly half of the land within the Blue Line is protected as Forest Preserve and the Blue Line area has been increased to twice its original size. Land may be acquired through direct purchase or gifts, and sometimes NGOs buy land with valuable ecological functions or habitat continuity and then sell it to the State when it has appropriated the purchase in the budget. Conservation easements are also used as a tool to fill gaps in protection while still allowing sustainable economic opportunities that are not in conflict with ecological restoration goals.

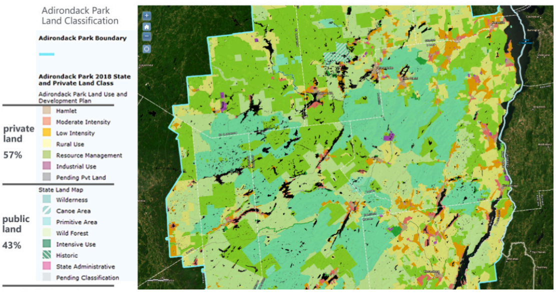

Figure 2: Patchwork of land usem, source: Adirondack park Agency GIS

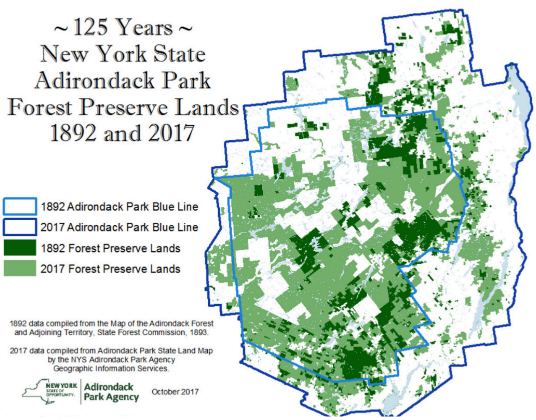

Figure 3: Public land then and now, source: Adirondack park Agency GIS

The Adirondack Park is managed by the Adirondack Park Agency, which is a state land-planning agency responsible for most conservation and economic development decisions. With inevitable conflicting stakeholder interests, the agency is sometimes challenged over its management and decisions, but the Forest Preserve has endured and is strong more than 130 years (Figures 2 and 3).

**Scenic Byways Program and Grassroots Nomination**

The Scenic Byways Program was established in 1991 as part of a larger U.S. national program to revitalize roadways around the country. It was conceived to create economic opportunities for communities along roadways that had valuable natural resources as scenic elements to attract tourism. It recognizes intrinsic scenic, natural, historical and cultural qualities (Federal Highway Administration, 1995). The program has similarities to the Cultural Routes of the Council of Europe program established in 1987 (Committee of Ministers, Council of Europe, 2023), but has as stronger accountability framework that can be applied to nature restoration plans. The Byways program has a unique structure where a pool of block-grant funds is provided by the national government along with a framework of criteria and accountability that is used by individual States to create their own Byways program. The program is designed to find a balance between economic interests and resource protection.

The most significant idea in the program is that the designation of a corridor as a Scenic Byway is done through a grassroots nomination process where local-level stakeholders work in partnership with the communities to create a management plan. The state-level program evaluates the nomination based on the management plan and a specific set of Designation Criteria of recognized characteristics to accept it into the Byways program. With a Byway designation, grant money is available for projects to protect or restore natural and cultural values, and for economic development that synergistically supports the protection of the resources. A local Board of Directors consisting of community volunteers is established to administer the distribution of funds and to have accountability to the State Byways program (figure 4).

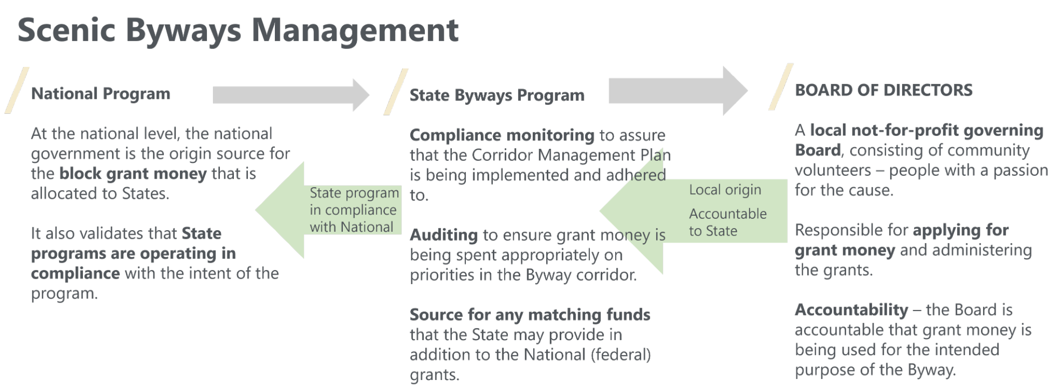


Figure 4: Scenic Byways Management

**Possible Applications for EU Nature Restoration Law**

Focusing on the requirement for each EU Member State to create a National Restoration Plan through a transparent process with public participation, the two reviewed models can be compared for application in the Nature Preservation Law.

*State Direct Action Model: Forever Wild State Forest Preserve*

- A top-down approach through Constitution / Basic Laws.
- Lower stakeholder groups participation, but strong public participation though voting.
- Strong permanent protections in law.
- National government selects land areas for nature restoration.
- National government acquires the land or the necessary easements to direct the use of the land into nature restoration and sustainable economic benefit.
- NGOs can also be partners and contribute to the bank of protected land.

*Grassroots Voluntary Participation Model: Scenic Byways*

- A bottom-up approach where local communities choose to participate to have access to benefits.
- High stakeholder engagement at every step of the process.
- Local government and citizen stakeholders select areas and drive designation process.
- Land generally stays in existing ownership.
- Motivation is funding money to establish protected areas with the balance of opportunities to strengthen the economy of the region.

The State Direct Action Model would generally be a faster process to establish lands in ecological recovery by designating, with the force of Basic Law, 'blue-line' regions wherein it is national policy to acquire lands for re-wilding and ecological restoration, but that speed would be achieved at the expense of some stakeholder group engagement. At the national level, mechanisms for land acquisition, easements, and technical & scientific standards would be established, and necessary EU coordination would be done. Below that, Nature Restoration Regions with administrative agencies could be created that engage community/stakeholders participation in the decisions of the agencies, while the administrative agencies have responsibility for scientific monitoring and coordinating with the national level, establishing and accountability chain (figure 5).

The Grassroots Voluntary Participation Model would create a framework in the National Restoration Plan, and then allow the local-level grassroots process to take hold and drive the banking of land for nature restoration. The incentives would be grants of seed funding for projects, and collaborations between adjacent land blocks to create larger tracts of land in nature restoration that could have a multiplier effect with additional incentives in the designation and funding process. At the national level, the program framework, source of funding through block grants, technical/scientific standards would be established, and necessary EU coordination would be done. At the regional level, individual Nature Preservation Programs would be created that establish regional criteria for evaluating nominations, provide technical support and scientific monitoring, distribute grant money, and perform programmatic monitoring to ensure that goals and targets are being met in coordination with the national level program, establishing a slightly different accountability chain (figure 6).

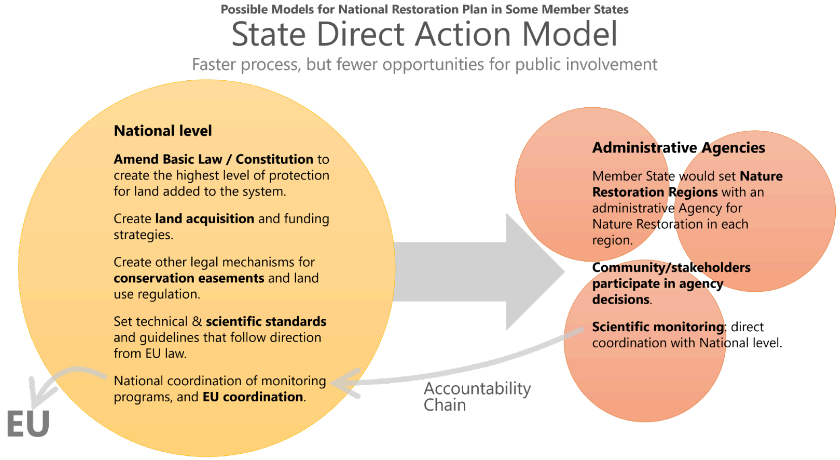


Figure 5: State direct action model

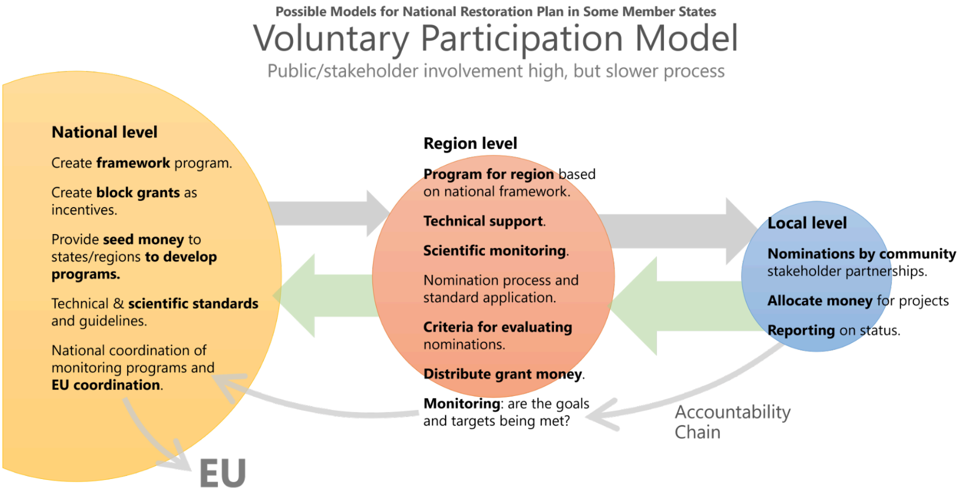


Figure 6: Voluntary participation model

**Conclusion**

These two models represent different approaches that have achieved significant successes in nature restoration and protection in complex land management realities. It is possible that a hybrid of both models could be used, and it is unlikely that these models will be appropriate for every Nature Restoration Plan. Each Member State will need to evaluate existing EU models for protecting natural areas to decide what has the best chance of achieving the targets in the Nature Restoration Law, in the context of the physical and political realities it has.

There is an ethos of a tamed landscape for human use that dominates the European mindset. For the Nature Restoration Law to be effective, that ethos needs to change. How can we change it to an ethos of thriving wild ecosystems? How can more Europeans be convinced that living alongside true wildness is a good thing?

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# Democratic Landscape Transformation & Transformative Learning

# Democratic Landscape Transformation & Transformative Learning

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This chapter brings together contributions that explore approaches to democratic landscape transformation and transformative learning in higher education. The Council of Europe's Landscape Convention reminds us that landscape is defined as "an area as perceived by people" (Council of Europe, 2000), and that participation is key to sustainable landscape development. Translating the goals of the convention into the daily practices of education, research, and professional work in landscape fields remains an ongoing challenge—particularly as we often confront complex, so-called "wicked problems." This chapter presents a variety of approaches in the hope that they will contribute to advancing the field.

Marlies Brinkhuijsen and Sarah de Vries from Wageningen University & Research (NL) present the design of a transdisciplinary mixed classroom. They discuss how master's students in spatial planning, landscape architecture, and related fields, together with professionals in management and maintenance, develop boundary-crossing competences. The ability to think and act beyond one's own disciplinary knowledge is essential for creating regenerative environments.

Karin Helms, Violaine Forsberg Mussault, and Elisabeth Sjödahl from the Oslo School of Architecture and Design (Norway) introduce NATURACT as an example at the interface of research and professional practice. In this initiative, five Norwegian research institutes (NGI, AHO, NIKU, NTNU, and NORCE)—representing disciplines such as risk management, landscape architecture, design, heritage, ecology, and earth systems science—have collaborated in multidisciplinary teams. Using system-oriented design processes, these teams work alongside local communities to mitigate hazard risks. The approach illustrates how Arnstein's Ladder of Participation can be adapted to specific cases of regenerative landscape design.

Elisa Lähde and Martta Nieminen from Aalto University (Finland) offer a more-than-human perspective on urban landscape management. They advocate for recognizing nature as a proactive agent in support of regenerative processes. These practices provide platforms for learning from multispecies forms of organization—ones not necessarily led by humans.

Richard Morton, Dawn Parke, and Vikram Kaushal from the Manchester School of Architecture (UK) present another example from higher education. Through a multi-method, pedagogical, and practice-based research model, they aim to remap landscapes and redefine territorial boundaries and regenerative capacities. Their contribution offers valuable insights into an evolving and practice-oriented educational approach.

Angeliki Paraskevopoulou, Aikaterini Gkoltsiou, Eleni Mougiakou, and Anastasia Christaki from the Agricultural University of Athens and the Commonspace Social Enterprise (Greece) describe efforts to reclaim the landscape values of the Elaionas Plain in Athens—immediate surroundings of the Agricultural University. This case illustrates how higher education institutions can act as proactive catalysts of democratic landscape transformation by transferring landscape knowledge and methods to their local communities.

Mana Taheri from the Estonian University of Life Sciences (Estonia) reflects on the perception and use of urban green spaces by Iranian women before, during, and after the Islamic Revolution, based on a study of gendered spatial injustice. Her research highlights how gendered spatial injustices hinder landscapes from becoming fully socially equitable and democratic.

Overall, this chapter provides insights into the complexity of democratic landscape transformation. The role of the classroom—regardless of age level, and especially within higher education—is crucial. Transformative research strategies can significantly enhance professional practice in this domain. At the same time, much remains to be understood about the political dimensions of landscape, as landscape and place are deeply tied to power structures and questions of justice.

There is no one-size-fits-all approach, as every community and its landscapes are unique. However, what appears essential is that such transformative processes demand deep self-reflection and a strong personal relationship to landscape as a foundation for any collective action. Are we ready for radically new ways of engaging with our landscapes and the communities they support? Do we truly understand what this entails—how it feels, what values are at stake, and which competences really matter?

To further this discussion, a group of academics has launched *OLA – the Open Landscape Academy*. OLA's mission is to build capacity for democratic landscape transformation within the global community, using both academic and non-academic methods. If you would like to stay connected with this initiative and take part in knowledge-sharing activities, you can learn more at:

http://www.openlandscapeacademy.org

OLA

# A conversation over the fence: Transdisciplinary mixed classroom courses in the Netherlands

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**Keywords:** Lifelong learning, wicked problems, competences, boundary crossing

Creating, restoring and encouraging sustainable and resilient public spaces in the context of multiple transitions is a huge and urgent challenge. Tackling such wicked problems requires more than just additional expertise. Boundary crossing competences are needed for integrated approaches and co-creation. Yet, many people lack the necessary competencies for crossing the borders of professions and connecting practical and theoretical knowledge. In this paper, the authors go into the educational design of a transdisciplinary mixed classroom and discuss how master students in spatial planning, landscape architecture and other programs and professionals in management and maintenance develop boundary crossing competences together.

**Introduction**

Public spaces face huge challenges with an increase of more intensive and diverse use and densification. At the same time, we need to deal with major transition challenges such as climate adaptation, energy transition, circular economy and mobility. These changes will affect multiple values of public spaces and their mutual relations: sustainable, biodiverse, circular, resilient, inclusive, healthy, attractive. A reconsideration of the values of public spaces and how to support them is urgent.

These challenges can be considered as wicked problems, given the high levels of complexity, uncertainty and value divergence (McCune et al., 2023). We argue that planning, designing and managing regenerative environments, restoring and encouraging sustainable and resilient public spaces and other values, is only possible if we cross the borders of our profession and connect in a transdisciplinary way. We define transdisciplinarity here as the integration of different disciplines on the one hand and academic and non-academic input on the other. Thus, transdisciplinarity transcends disciplinary and the science-society boundaries. To tackle the challenges, experts and societal actors must collaborate, "open to new perspectives, willing to enter new unfamiliar domains, and able to recognise, understand and integrate perspectives and knowledge from various fields" (Fortuin et al., 2023, p 1).

Planners, designers and managers of public spaces often operate separately, coordinating with each other at most. Deficiencies at organizational and personal level complicate an integrated, comprehensive approach. Many people lack the necessary competencies for integrated approaches and co-creation. Veltman et al. (2019, p 137) argue that "joint action through collaboration presupposes learning that occurs between actors about the nature of the problem, the possibility of doing something about it, and about the context within which the problem-solving process develops". They emphasise the importance of boundary crossing (BC) for understanding and addressing wicked problems. Boundary crossing is a concept to indicate the competences people need to collaborate and co-create in interdisciplinary and international teams (Akkerman and Bakker, 2011). This is why Wageningen University developed courses to develop boundary crossing competences in collaboration with the foundation Managing Public Space in the context of an education and research project aiming at the further professionalization of the management and maintenance of public spaces (Brinkhuijsen et al., 2021).

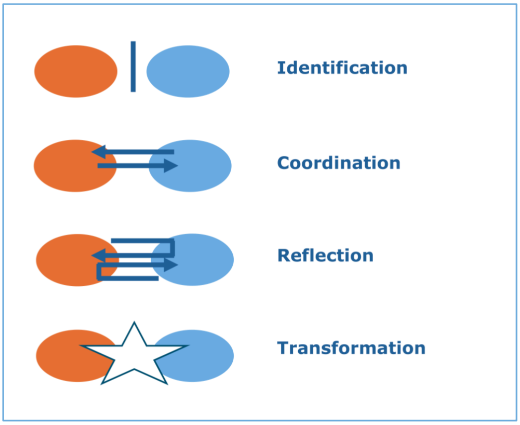


Figure 1: Boundary crossing learning mechanisms (Fortuin, Gulikers et al. 2023, based on Akkerman and Bruining 2016)

**BC in the transdisciplinary mixed classroom**

We developed three different elective courses at master level, each highlighting different aspects of dealing with wicked problems in public space: one that specifically focuses on the integration of planning, design and management, one that focuses on dealing with complexity and uncertainty and one on governance processes. An important aim of the course design was to enable participants to develop boundary crossing (BC) competences by including diverse boundary objects – physical artefacts, shared processes and discourses – as resources for creating new perspectives and practices (Veltman et al., 2019). We built upon the four learning mechanisms introduced by Akkerman and Bakker (2011): identification, coordination, reflection and transformation (Figure 1). Identification is becoming aware of one's own and other people's expertise, perspectives, norms and values. It helps to recognise how people see and interpret the world in different ways. Coordination means finding effective ways to collaborate across disciplines and different practices. Reflection means trying to see the world through someone else's eyes, taking another perspective, thus widening one's own. Transformation refers to developing new practices, routines and/or behaviour because of incorporating alternative perspectives. These competencies show similarities with key competencies in sustainability education (Wiek et al., 2013), (Figure 1).

Participants of the courses are confronted with a diversity of boundaries. First, participants have diverse backgrounds. International master students of different disciplines and educational programs take part: landscape architecture, spatial planning, urban environmental management, geo information science, and metropolitan analysis, design and engineering. In addition, professionals in the field of managing public space participate. So, the composition of the group not only includes disciplinary and cultural boundaries, but boundaries between academic and non-academic, and generations as well. Second, the content of the courses comes from many disciplines. Participants must relate to theories, concepts and methods they are not familiar with, applying them and discussing their different perspectives. Third, the courses include a substantial amount of group work, which means participants must collaborate. They stand in each other's shoes, reflect on practices or take part in a role play. They need to deal with diverse boundary objects and make them explicit in discussions and results. In the last weeks of the courses, participants collaborate in mixed teams in an intensive workshop, applying the lessons learnt. They analyse a real-life case commissioned by a municipality and come up with new, hybrid approaches. Last, participants self-assess their BC competences at the start of the course and make a personal development plan for BC competences. Throughout the course, this is supported with

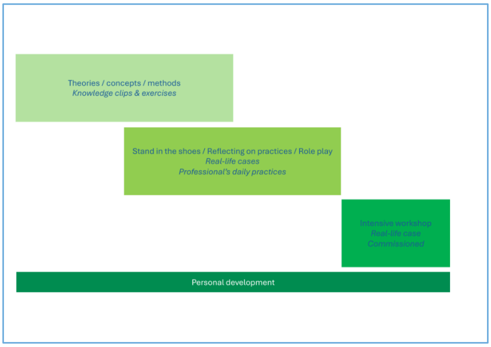


Figure 2: The different components of the courses

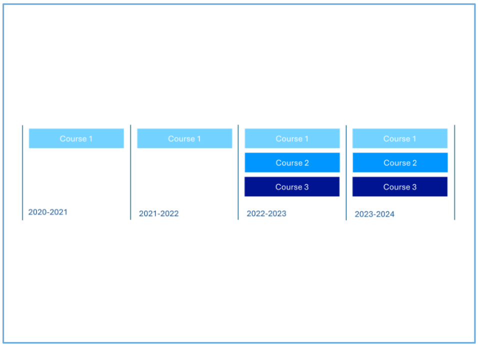


Figure 3: Overview of the courses in the period 2021-2024

assignments and individual coaching sessions. BC competences and learning mechanisms are made explicit and participants become more aware of their learning curve. At the end of the course, participants do another self-assessment of their BC competences and reflect on their learning process (Figure 2).

**Impact on BC competences**

Our understanding of the impact of the courses is based on qualitative data collected from participants' self-assessments and self-reflection reports, oral and online course evaluations, teacher observations and interviews with participants. The data cover 8 teaching periods from February 2021 to March 2024, in which 46 professionals and 90 master students took part in the courses (Figure 3).

The data show that participants, both students and professionals, further developed their BC competences in the courses, though learning curves may differ individually. Sometimes participants realise that their BC competences were less developed than they thought in advance. They learnt that co-ordinating with others is not the same as interdisciplinary or transdisciplinary collaboration. Explicitly discussing BC and the learning process at a meta-level is an eye-opener for many participants, particularly for students and professionals with a technical background who are used to focus exclusively on content.  Participants highlight specific aspects of the course that contributed to their BC development, such as the stand in the shoes/ reflecting on practices/role play and the personal development. The intensive workshop is also mentioned, but several participants would prefer a longer workshop to make more of it, particularly in terms of the fourth learning mechanism, transformation. The opportunity to discuss, explore and experience each other's different backgrounds and practices in the context of a mixed classroom with students and professionals together, formally and informally, is also highly valued. Other examples also recognise the specific value of mixed classroom layouts (Hofman et al. 2021).

**Conclusions**

The outcomes substantiate our claim that our courses improve BC competences, which are conditional for creating regenerative environments. We conclude that facilitating conversations over the disciplinary and transdisciplinary fence and explicitly reflecting on them improves BC competences. It creates a better understanding of each other's expertise and interest, learning from each other, creating common ground and envisioning new comprehensive practices. With our educational design for the transdisciplinary mixed classroom, we contribute to the development of BC competences which are essential for co-planning, -designing and -managing regenerative environments and achieving systems change for a moresustainable future.

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# Participative actions and co-adaptive solutions in large-scale cultural landscapes under hazard threat: rockfall and flood hazards areas in Norwegian valleys

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**Abstract**: Five Norwegian research institutes (NGI, AHO, NIKU, NTNU, and NORCE), representing diverse academic disciplines such as risk management, landscape architecture, design, heritage, ecology, and earth systems science, have collaborated in multidisciplinary teams. Using system-oriented design processes, these teams work alongside local communities to mitigate hazard risks. The NATURACT research aims to develop landscape-based transition plans utilising Nature-Based Solutions (NBS) to adapt to and mitigate climate-induced hazards. At the midpoint of this research, preliminary findings suggest the approach serves as a model for Regenerative Landscape Design. This integrative process provides a framework for sustainable, long-term hazard mitigation planning, grounded in landscape-based perspectives that facilitate spatial connectivity, soil understanding, and cross-sectoral collaboration.

**Introduction**

The NATURACT project aims to promote Nature-Based Solutions (NBS) as a catalyst for large-scale transformations in land use and land cover within vulnerable landscapes. It integrates mitigation strategies for emissions reduction and adaptation measures to mitigate the impacts of climate change. This research addresses a critical knowledge gap highlighted by global institutions, including the IPCC (2018), GCA (2019), WEF (2020), OECD (2021), and UNEP (2021). The project leverages interdisciplinary expertise from five leading Norwegian research organizations, representing the natural sciences, earth sciences, and humanities, to advance integrated approaches to climate adaptation and mitigation through the application of NBS. The consortium includes two leading Norwegian research institutes working with climate systems and impacts, the Norwegian Research Centre (NORCE) and the Norwegian Geotechnology Institute (NGI). University partners include the Norwegian University of Science and Technology (NTNU), which brings their expertise in climate modeling; the Norwegian Institute for Cultural Heritage Research (NIKU), which mobilises the cultural heritage community importance for climate adaptation; and the Oslo School of Architecture and Design (AHO), Institute of Urbanism and Landscape (UL) bring the knowledge in landscape architecture understandings and solutions through Design. AHO's Institute of Design supports the interdisciplinary team thanks to the System-Oriented Design (SOD). As a skill-based methodology, SOD facilitates understanding and designing complex systems (Dudandi, 2020), enabling collaborative climate solutions with communities.

The five-year project (2022–2026), funded by the Research Council of Norway, is now at its midpoint. At this stage, we have identified several intermediate conclusions, overarching visions, and guiding questions. One key consideration is how to advance along the Ladder of Participation (S. Arnstein, 1969) (FIG 5) to address hazard-related challenges. The Ladder of Participation is a framework that categorises different levels of public involvement in decision-making, ranging from mere token participation to full, empowered engagement. In this context, the focus is on determining how communities can move beyond passive involvement to more active roles in problem-solving and co-creating adaptive solutions, particularly in high-risk areas.

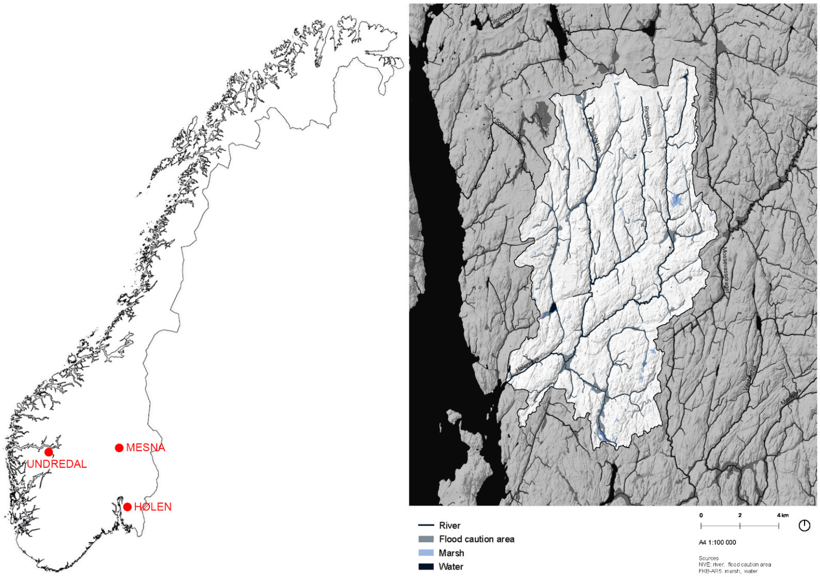


Figure 1: *Sites as watersheds.* Left: Location map of the three Norwegian case studies.
Right: Watershed of Hølenelva, located south of Oslo along the Oslo Fjord, in one of Norway's most fertile agricultural regions. The watershed scale was selected as the focus area because water is the primary trigger for various types of hazards in this region. Working at the watershed scale allows for a deeper understanding of the origins and dynamics of natural hazards. Map by Kaveh Kawousi, Source: NVE

Currently, risk assessment remains predominantly centralised, following a top-down management approach. However, local communities possess tacit knowledge and practical expertise related to adaptation within hazard zones—knowledge deeply embedded in their cultural heritage and specific to their lived experiences and practices. A critical question arises: how can this local and disciplinary knowledge be effectively integrated into long-term, landscape-based strategies for hazard mitigation? The research focuses on three case studies, each situated in distinct landscapes and confronting specific hazard challenges (Figure 1). Hølen, located in Vestby within the Oslo Fjord region, is a fertile agricultural area grappling with quick clay hazards and recurring river floods. Undredal, situated in the inner fjord landscape, is threatened by rockfalls, debris flows, and avalanches. The third case, Lillehammer, internationally recognised as a Winter City, faces landslides and severe flooding while simultaneously experiencing the desiccation of its peat landscapes. The escalating hazard risks in these regions are largely attributed to climate-driven changes, including rising temperatures and an unexpected increase in extreme precipitation. These shifts are compounded by reduced seasonal rainfall heterogeneity, the replacement of cold winters with prolonged rainy seasons, and the intensification of erosion processes. Understanding these dynamics seems to be crucial for developing sustainable, participatory, and adaptive approaches to hazard mitigation that are both ecologically and culturally attuned.

These locations are characteristic of sparsely populated Norwegian valleys, where top-down, grey infrastructure solutions are neither appropriate nor sustainable for safeguarding cultural landscapes or fostering multispecies ecosystems over the long term: Under Norwegian law, Nature-Based Solutions (NBS) are now the sole authorised approach to hazard management, effectively replacing traditional "grey"

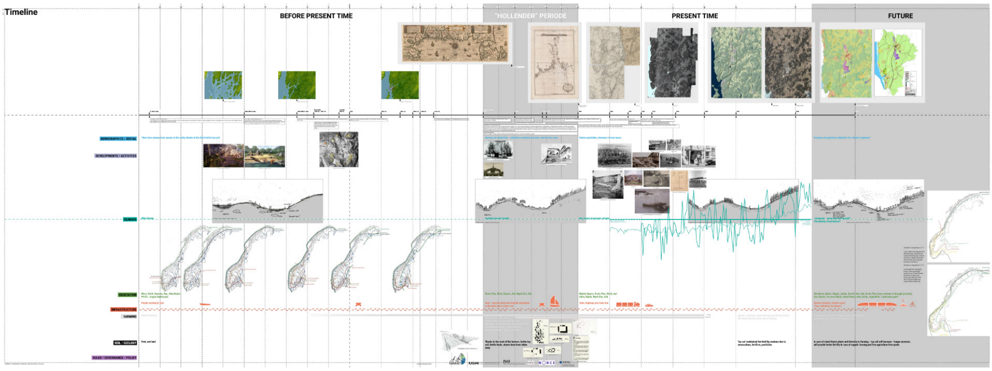


Figure 2: Using themes from the System-Oriented Design (SOD) approach, this timeline illustrates the district's Past, Present, and possible Future(s). It served as an exchange tool during the first community workshop, where participants added information and made corrections. Additional insights were incorporated over two community engagement events. Drawings by Karin Helms; photographs from various sources by NIKU; climate data provided by NGI; and illustrations of Norway's land-use evolution from Kulturminner og Skogbruk by H. Jacobsen & J.R. Follum, Skogbrukets Kursinstitutt (1997, p. 17). Design et layout by Silvia Diaconu.

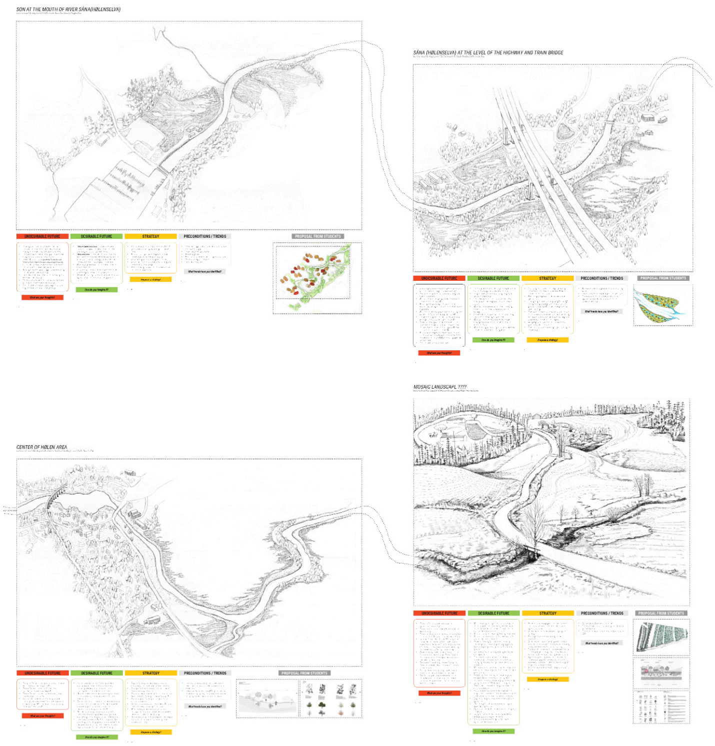

Figure 3: *Interpretative drawings for community engagement* Inspired by The Allegory of Good and Bad Government fresco panels painted by Ambrogio Lorenzetti (1338) for the Palazzo Pubblico of Siena—and further influenced by a contemporary version created in 2019 by Julien Dossier and Johann Bertrand d'Hy for COP21 (French Ministry of Environment, unpublished)—we proposed a version tailored for Hølen. This version enables communities to interact with the drawing, adding information or visions for desirable future(s). The drawing includes four zoom-in areas that highlight sites under hazard threat, specifically focusing on flood risks, quick clay, erosion, and landslides. These drawings were created by Master's students in landscape architecture at AHO during the fall of 2022 as part of a course related to ongoing research on these topics. Drawings by Hedda Louise Gran and Coralie Berker

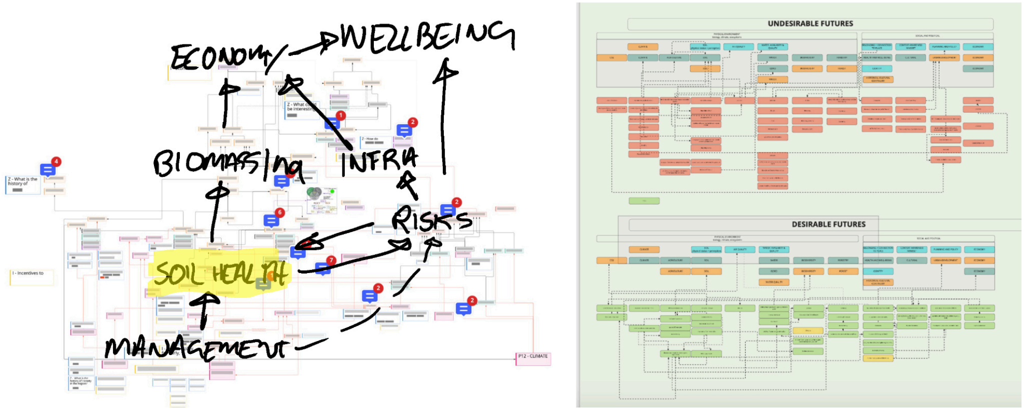


Figure 4: *A holistic approach to landscape issues – using the Zipping method*
Left: The diagram provides a visual representation, used in the System-Oriented Diagram (SOD) method, to map out complex interrelationships in systems. Here, it highlights various natural hazards and their connections, particularly focusing on how "soil health" plays a central role in both triggering and being affected by natural events. Right: This diagram summarizes the community engagement contributions collected in August 2022, capturing key observations and expectations from local stakeholders regarding environmental and social priorities. The term "soil" emerged frequently in our discussions, but its interpretation varied widely based on each community's context.

- Farmers associated "soil" with agricultural productivity and land health.
- Residents near quick clay zones were concerned with soil stability and safety.
- Those with a cultural landscape perspective saw "soil" as part of the heritage that shapes their surroundings.

A recurring request from locals was to preserve the existing cultural landscapes through a minimal-intervention approach. To support this, the community proposed implementing small-scale infrastructure, such as micro-dams, to retain water upstream and mitigate potential soil and water management issues without disrupting the natural environment, *dlagram of Abel Crawford, Janina Lissette Sanchez*

solutions (conventional engineering interventions.) In contrast, NBS emphasises the importance of integrating physical and cultural contexts to implement effective, landscape-based strategies for hazard mitigation.

In order to develop recommendations for scaling up NBS through community-driven initiatives, one focus of the research was to evaluate the impacts, feedback mechanisms, synergies, and trade-offs associated with NBS in vulnerable areas. Using a participatory approach aimed to enhance the effectiveness of the climate adaptation and mitigation strategies, ensuring they are context-sensitive and sustainable at a large scale.

**Method**

In each case study location, different approaches were employed to foster transdisciplinary collaboration. One first workshop focused on building interdisciplinary knowledge among the research team by facilitating the exchange of methods, expertise, and insights. Another approach involved community-based workshops that drew on past and present understandings of site-specific conditions, envisioning potential futures and exploring actionable strategies for addressing hazards (figure 2, figure 3).

The identified landscape-action locations and proposed co-adaptive measures were then shared with the local communities. To evaluate community feedback, we employed ZIP analysis (figure 4), a methodology within System-Oriented Design (SOD) that stands for zoom, innovation, and potential. This approach enabled a holistic assessment of potential intervention areas, innovations, and ideas. The overarching aim was to identify challenges and propose solutions that local communities could implement independently. While not a fully co-design

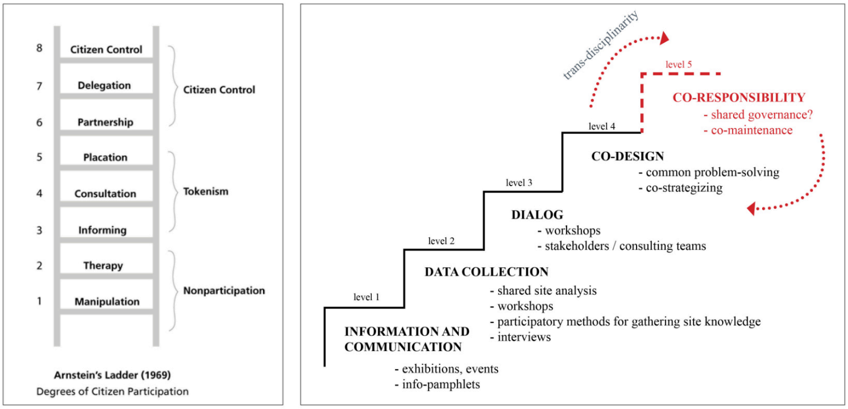


Figure 5: *Increasing the participation ladder in climate action: from participation to co-responsibility and co-maintenance?* Left: Arnstein´s Participation Ladder original diagram (Ref. Sherry R. Arnstein's "A Ladder of Citizen Participation," Journal of the American Planning Association, Vol. 35, No. 4, July 1969, pp. 216-224.) Right: Diagram that reinterpret the participation ladder in regard to landscape design. The goal would then be to add an additionnal step towards co-responsibility and go-governance in large scale landscape contexts. Diagram from Karin Helms and Violaine Forsberg Mussault, drawing from insights and contributions from Aga Skorupka (Rodeo Arktekter).

process, this approach represented an iterative and collaborative mapping effort to understand the specific hazard effects and dynamic movements within each site.

As highlighted in the Ladder of Participation (S. Arnstein, 1969), hosting a participatory event alone does not ensure improved outcomes (figure 5). Instead, combining thorough preparatory research with participatory processes leads to more effective and impactful results. Insights from the NATURACT project and exchanges with environmental psychology researcher Dr. Aga Skorupka emphasised the necessity of conducting in-depth research as a foundation for meaningful participatory actions. Hence, active involvement, particularly in empowering communities to engage in decision-making processes, appear crucial for developing solutions that are sustainable and responsive to local knowledge and needs (FIG 5). This involves increasing local ownership and agency in the process, ensuring that community input is genuinely integrated into the decision-making process and that solutions reflect local knowledge and needs.

In Norway, hazards such as landslides can no longer be effectively managed through centralised, top-down approaches or grey infrastructure solutions. This underscores the need to explore alternative strategies that actively involve local communities and stakeholders. However, a significant gap remains in local planning knowledge, expertise, and resources, which presents challenges to implementing such an ambitious participatory approach.

**Results and discussion**

Within the NATURACT framework, landscape-architects and designers played a central role as enablers of the process, supported by the scientific experts and the team leader (NGI). Design proved essential in visualising proposals, with drawings serving as "memory tools" to capture goals set during local meetings and provide planning guidance. These visualisations were intentionally clear, simple, and adaptable, allowing for iterative contributions from the community and acting as catalysts for discussion and action. By capturing the unique qualities of each site and emphasizing subtle indicators of place, they integrated local insights to guide proactive landscape frameworks. These frameworks addressed hazard mitigation by anticipating changes, embracing transformations, accepting losses, and incorporating new elements into large-scale cultural landscapes (Helms, 2019; Naylor & Sackett, 2011).

The proposed future landscape for Hølen envisions transitioning from monoculture to agroforestry, supported by 300 micro-dams along the tributaries of Hølenelva. These dams aim to prevent erosion, promote sediment deposition, and mitigate flood risks. Riparian vegetation would be replanted and expanded in collaboration with local farmers, helping restore the cultural landscape, improve soil health, and reduce the effects of erosion and quick clay. Additionally, diversifying farming practices would enhance food variety and economic resilience. This plan directly addresses climate change by fostering a sustainable, multifunctional landscape designed for long-term resilience.

Researchers in the fields of environment, geography, political sciences, and systemic design have described and coined the term Regenerative Landscape Design (RLD). RLD helps communities co-design their future(s) for a sustainable, long-term cultural landscape that can answer sustainability and safe economic growth. The concept of Regenerative Landscape Design (RLD) aids related disciplines, including landscape architecture, in understanding the design process and the critical role that landscape architects play in collaborative RLD efforts. An example of this is the consideration of scale, as landscape architecture operates at both large scales—such as in rural and forestry settings—and in localized community engagement initiatives. When reading the International Federation of Landscape Architects (IFLA) definition of landscape architecture, it is clear that the profession's aims coincide with the aim of RLD: Landscape Architects plan, design, and manage natural and built environments, applying aesthetic and scientific principles to address ecological sustainability, quality and health of landscapes, collective memory, heritage and culture, and territorial justice. Landscape architects can play a crucial role as key contributors in multidisciplinary research and design teams (RLD), offering their expertise in mapping landscapes and integrating diverse knowledge. They are essential in bridging the gap between different disciplines, helping to transform traditional multidisciplinary approaches into more collaborative inter- and transdisciplinary practices. In doing so, landscape architects can foster more holistic solutions that draw from a wide range of expertise and perspectives, ensuring a deeper and more comprehensive understanding of complex landscape challenges.

NATURACT serves as a catalyst for Regenerative Landscape Design by facilitating participatory mapping and cartography in collaboration with local communities. The regenerative approach emphasizes attention to rivers, watersheds, and natural entities within these fragile landscapes. It aims to anticipate or mitigate hazards while preserving the unique character of the landscape. Rather than focusing solely on human settlements and infrastructure, this approach integrates nature and cultural landscapes as interconnected systems.

The research underscores that effective mitigation solutions for fragile landscapes require a multidisciplinary framework. System-Oriented Design (SOD) has provided a standard methodology for integrating and exchanging knowledge across disciplines, resulting in Regenerative Landscape Design as a key outcome. This integrative process can support sustainable, long-term hazard mitigation planning in partnership with local stakeholders. Preserving the economic sustainability of the Hølen valley, which is increasingly threatened by desertification—a rising issue in northern Scandinavia—demands a collaborative approach focused on landscape-level solutions. By integrating hazard mitigation with the preservation of local livelihoods and bio-economies, this approach not only protects the environment but also ensures the resilience of local communities against the impacts of natural hazards. The NATURACT project emphasises the critical need to safeguard the distinctive cultural and natural landscapes of Norwegian valleys, arguing that such a holistic strategy can foster a balanced coexistence between environmental sustainability and economic viability in vulnerable regions.

**Conclusion**

Locally driven, long-term solutions are the most effective strategy for preserving fragile and unique landscapes. By prioritizing context-sensitive interventions, the NATURACT approach ensures that risk management is adaptive and tailored to the specific needs of each site. The research underscores the role of landscape architects as catalysts for Regenerative Landscape Design, facilitating collaborative mapping and cartography with local communities. This regenerative approach aims to mitigate hazards while preserving the unique characteristics of the landscape. Ultimately, it seeks to support local economies while fostering a broader understanding of landscapes as interconnected cultural and natural systems that benefit both human and non-human inhabitants.

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# Regenerative Urban Nature: Navigating the Anthropocene Shift

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In the intricate web of ecosystems, species have found shared agency, collectively producing a unique ecological identity attuned to local conditions. In urban environments human intervention has, presumably, disrupted this agency shaping urban nature with strong human influence. The management of urban nature has been done in a rigid manner where compositions have been created and maintained with solidity. Yet, in the Anthropocene, marked by increasing unpredictability (Waters et al., 2016), this illusion of stability is shattered, posing new challenges for urban landscape management processes. Therefore, humancentric landscape management style demands alternative approaches. In this conceptual paper, we explore the promise of regeneration in the context of urban landscape management. Regenerative approach aims at replenishing degraded natural ecosystems while building resilience in the communities that rely on them. First, we define regenerative landscape practices in contrast to anthropocentric landscape practices. Second, we suggest that these management practices and the resulting environments offer platforms for learning from multispecies organizing that is not led by humans.

## Evolving relationship

Our societal relationship with nature is evolving. The traditional hierarchical perspective, prevalent in Western societies, which positions humans as superior to nature, is being challenged by systemic approaches that emphasize the mutual interdependence of all living beings, networks, and connections. This evolution prompts a reevaluation of urban nature management. Historically, urban green spaces have primarily served human needs and emerged from urban activities (Wolch et al. 2014). For instance, parks are intentionally designed and maintained to accommodate human recreation, often reflecting prevailing aesthetic preferences (Figure 1).

In recent years, the concepts of green infrastructure and nature-based solutions have gained prominence, emphasizing the functional significance of urban green spaces and provision of diverse ecosystem services (Aartmann et al. 2017). Additional features, such as stormwater management structures, have been integrated into urban green spaces to offer flood protection, climate adaptation and enhance recreational

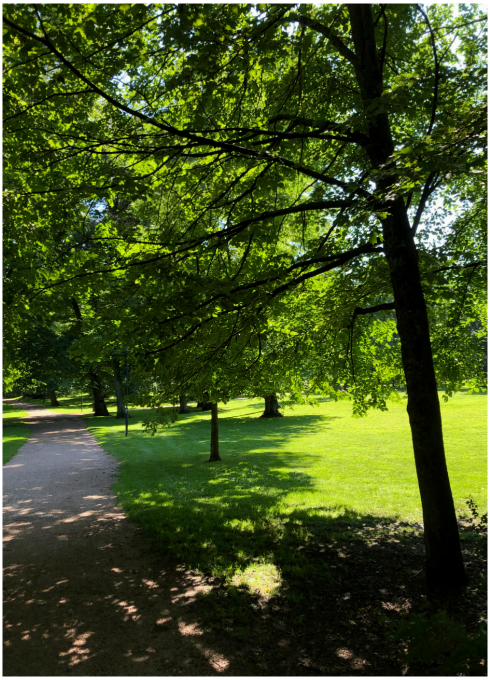

Figure 1: Esplanadi Park in Helsinki has been designed according to the principles of classical park design, representing the 19th-century European park tradition that emphasizes aesthetics and the importance of public space in urban life. (Picture taken by Elisa Lähde)

Figure 2: Stormwater wetland in Central park of Helsinki has been designed according to sustainable development principles to enhance water quality of Töölönlahti bay and area's habitat provision and recreational opportunities. (Picture taken by Elisa Lähde)

opportunities (figure 2). However, the prevailing approach still prioritizes human benefits. In conclusion, urban green structures are typically developed primarily to fulfill human functional needs (Tzoulas et al. 2007). Their size, spatial definition and maintenance practices, such as cutting and weeding, are determined by human activities. The main approach is to control and direct ecological processes according to human priorities. Such an anthropocentric approach has benefited neither nonhuman species nor, counterintuitively, the human species. The environmental crisis can be attributed to the lack of recognition of nonhuman agencies, as the unidirectional, anthropocentric exploitation of the planet has compromised the state of the Earth system (Banerjee & Arjaliès, 2021; Ergene & Calás, 2023b; Sayers et al., 2022).

As an opposing approach, regenerative systems and models seek to transform urban landscapes by embracing ecological principles, fostering collaboration among diverse actors, promoting resilience, and encouraging reciprocal relationships (Reed, 2007). The shift from anthropocentrism to multispecies approaches reflects a broader understanding of urban ecosystems as dynamic, interconnected systems that benefit both nature and human communities. The ecofeminist scholar Donna Haraway (2003) posits that culture cannot be separated from nature since they are intrinsically entangled. These entanglements and relations of the human and nonhuman species are explicit in the urban environment where nonhuman assemblages are impacted by human agency (Morse et al., 2014). Multispecies approach requires fostering systemic approach and a harmonious coexistence between urban development and nature while transcending traditional anthropocentric approaches (Kennedy 2022).

**Three typologies, four perspectives**

To understand the regenerative potential of urban green structures, we have divided them into three different typologies: natural ecosystems, built greenery, and novel ecosystems. These typologies serve to define regenerative landscape management practices in contrast to anthropocentric landscape management practices. These typologies seldom exist independently in reality; most green structures feature elements of all our typologies. However, this typification aids in the conceptual discussion of how natural and human processes can intermingle and impact each other in a range of beneficial (or less beneficial) ways. Furthermore, the comparison between typologies enables us to assess the underlying values and priorities associated with each typology, including considerations such as nature's capacity for self-organization, humanity's relationship

| Typology | Natural ecosystems | Built greenery | Novel ecosystems |
|---|---|---|---|
| *An example* | A protected semi-urban forest | An urban park | A ruderant |
| *Required level of management* | Self-regenerating (Perino et al., 2019), guided by nonhuman agencies | Controlled by human agency | Affected by human agency but still self-sustaining, multispecies organizing (Ehrnström-Fuentes et al., 2023) |
| *Resource generation capacity* | Outputs resources (Perino et al., 2019) | Requires inputs of resources | Potential to create resource output (abundant clean water, habitat for pollinators) (Hobbs et al., 2014) |
| *Temporality* | Preserved or museumified habitat which is expected to stay unaltered in time | Quickly evolving habitat which obeys the quick time span of neoliberal efficiency | Evolves in its own time not obeying the human expectations |
| *Aesthetics* | Only authentic nature is beautiful | Humancentric approach to aesthetics: controlled environment looks beautiful | Ecocentric perspective: all living is beautiful? |

Table 1: Three urban nature typologies approached from four different perspectives to understand the regenerative potential of urban green structures.

with wildness, and aesthetic preferences. This understanding helps us to comprehend, navigate, and respond better to intricate and ever-evolving urban landscapes, fostering a transition towards practices that transcend anthropocentrism.

We examine these typologies (natural ecosystems, built greenery, and novel ecosystems) from four different perspectives - required level of management, resource generation capacity, temporality, and aesthetics (table 1). By required level of management we mean the processes through which the typology comes into existence. For example, a built greenery, such as an urban park, needs repeated management to sustain its form and may require extensive management practices after an hazardous event. In contrast, after a natural disturbance a natural habitat type reorganizes and reconfigures itself (Perino et al., 2019). In such a habitat, disturbance may lead to even increased ecosystem complexity which leads us to the next perspective, resource generation capacity.

By resources we refer to the amount of material resources the habitat requires or provides. Habitats may create resources for other species or at least maintain/circulate the existing resources, or they may demand input of resources, like added compost. With the temporal perspective, we aim to examine the time span over which the habitat evolves or more fundamentally, is expected to evolve. Temporality includes the level of synchronization of human agency with the agencies of nonhuman beings too. The scope and range of human aesthetic preferences have recently been examined in terms of their role in promoting sustainability in contemporary societies

(Lehtinen, 2021). Lehtinen (2021, p. 262) notes that "aesthetic value is an underused leverage in sustainability transformation". To explore why certain landscapes become more valued, we added aesthetic perspective to assess how the varying habitats are perceived by the human inhabitants.

**Learning together**

We suggest that analysis of the typology specific landscape management practices and the resulting environments can offer platforms for mutual learning. Regenerative urban system advocates a shift from exploitation to reciprocity, emphasizing the exchange of resources for mutual, multispecies (human, plant, animal and microorganism) benefits. In nature, all species within an ecosystem exhibit a shared agency, collaboratively producing natural habitats that adaptively respond to local conditions. This inherent dynamism ensures resilience and sustainability, as various organisms engage in intricate interactions that facilitate the continuous regeneration of their environments. However, human activities have often disrupted these shared interactions, imposing an artificial order that undermines the natural adaptability of ecosystems.

"Landscapes provide a conceptual and actual space for human–nature interactions" (Duflot et al 2024, s. 72), Urban nature, in particular, comprises various structures within which human agency has shaped composition and maintenance, often creating an illusion of solidity, stability, or permanence. This perception was marginally more accurate during the relatively steady Holocene epoch but is far from true in the unpredictable Anthropocene era. The Anthropocene is marked by significant human disturbances that have hindered the regenerative processes of ecosystems, leading to ecological imbalances and crises.

Typical urban ecosystems, typified by unseen cycles and processes, mirror our linear society, wherein elements such as death, disease, and disintegration have been sanitized and removed from view. This sanitization reflects a broader societal tendency to control and compartmentalize natural processes, which ultimately undermines the inherent resilience of ecosystems. In contrast, regenerative urban nature signifies a shift from mere exploitation towards reciprocity, fostering exchanges of resources for mutual benefit across multiple species. This approach necessitates surrendering control, allowing outcomes to be determined collaboratively by various actors within the ecosystem (Smithwick et al, 2023).
The human role, both at the individual and societal levels, is thus recontextualized as merely one component of a broader ecological cycle in need of balance. Ecological crises often stem from humanity's desire to singularly dictate processes that are fundamentally collaborative. This hierarchical worldview, where individuals operate under the illusion of superior knowledge, is inherently dysfunctional. The myopic, partial optimizations that frequently inform decision-making have proven to be

short-term and damaging. Ecosystems, given the chance, are self-organizing and self-regenerating, capable of maintaining balance and resilience without constant human intervention.
The question of leadership in creating regeneration and rewilding is critical. While existing natural habitats prioritize native species, hybrid landscapes consider deeper socio-ecological wholes (Fig. 3). This integrative approach recognizes the interconnectedness of human and non-human actors, fostering landscapes that support both ecological and social resilience (Kennedy 2022).

The aim of regenerative practices is to replenish degraded natural ecosystems while building resilience in the communities that depend on them. A place-based approach, systems thinking, and a holistic perspective are fundamental features of these regenerative practices. By embracing these principles, landscape architecture can contribute to creating resilient, adaptive, and regenerative urban environments that harmonize human and ecological needs.

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# Remapping landscapes to redefine territorial boundaries and regenerative capacities of landscape: A multi-methods pedagogical and practice research-led model for design

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**Keywords**: transdisciplinary, multi-methods, architecture, infrastructures, territories

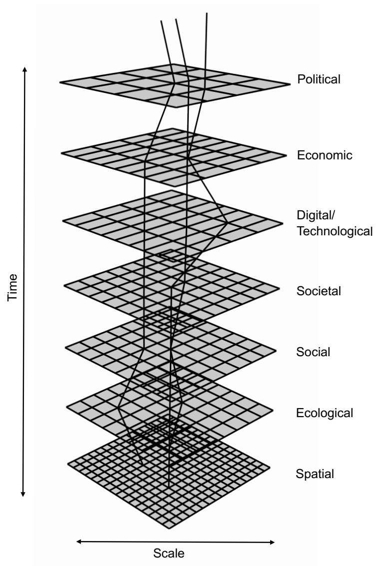


Figure 1: The atelier's stack of processes that make up place (Adapted from Bratton, 2016).

**Introduction**

Infrastructure Space is a research and teaching atelier at the Manchester School of Architecture. It was set up in the early 2000s to acknowledge the fact that there is little distinction between the fabric and fabrication of space (Morales, 1995; Allen, 1999). This contemporary thinking has evolved into a focus on the systems and flows or the infrastructures that make up place. In recent years, the atelier has theorised about how place can be considered as a 'stack' of processes, which are inherently intertwined, and with little distinction between them (Bratton, 2016). We define the processes of this 'stack' as spatial, ecological, social, societal, digital/ technological, economic and political. It is this thinking that underpins the work of the atelier and that of its students. The atelier has historically always focused on architecture and urbanism however in 2023, it was identified that the atelier could develop a more transdisciplinary approach. As such, it has formally combined Master of Landscape Architecture with both undergraduate and postgraduate Architecture programmes (figure 1).

**Methodology**

This paper will discuss the work of the atelier in 2023 and 2024, focusing on the multi-methods and transdisciplinary approach (figure 2) used to explore regenerative landscapes. The atelier was made up of 96 students: 30 BA Architecture (BA), 21 first-year

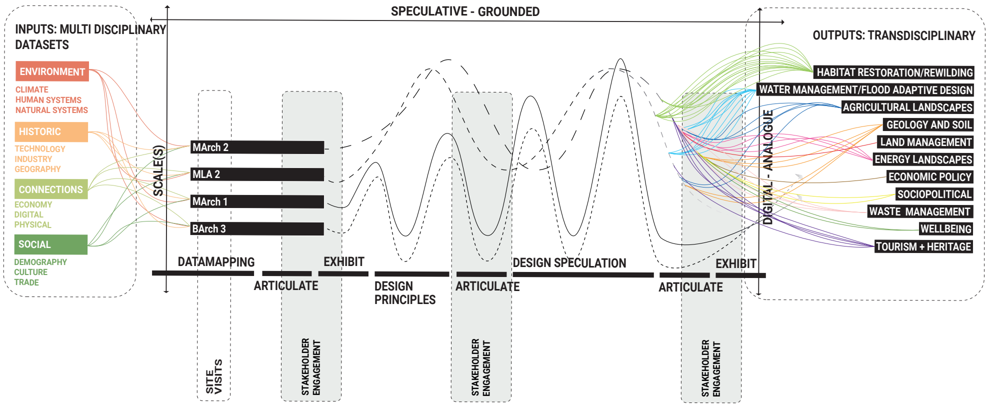


Figure 2: The atelier's multi-methods design approach and emergent MArch2 and MLA2 project themes (Source: Infrastructure Space, 2024).

Master of Architecture (MArch1), 34 second year Master of Architecture (MArch2) and 11 second year Master of Landscape Architecture (MLA2). Approximately 50% of the students were international. This paper will focus on the analysis of MArch2 and MLA2 work. Results are presented in three parts. The first part will illustrate the atelier's data mapping method, through which we define regenerative landscapes. The second part will demonstrate how we work with regenerative landscapes through transdisciplinary collaboration between designers and stakeholders. The third part will collate and categorise the broad themes addressed by the students. The thematic overlaps between architecture and landscape architecture will be highlighted in this part. The discussion will provide insights into the potential impact of the methodology in the regeneration of landscapes. All work has been previously published by the students at the 'End of year show' at Manchester School of Architecture (14th June – 29th June 2024) or online at: https://www.msa.ac.uk/2024

**Regenerative Landscapes: How might we define them?**

We define and develop the notion of regenerative landscapes through the exploration and critical understanding of the territories in which we operate. We are interested in explorations of territories as they enable the designer to define the edges of the landscape based on themes of enquiry. This challenges the geopolitical lines drawn on maps, acknowledging that these political boundaries may have an impact on the space and the interpretation of the territory. The method of thematic data mapping applied within a specific context encourages designers to gather, evaluate, and synthesise information to generate new insights, identify latent patterns, and produce new knowledge about the study area.

**Thematic Data Mapping**

Data mapping is conducted using 12 thematic research groups to serve as lenses to explore the

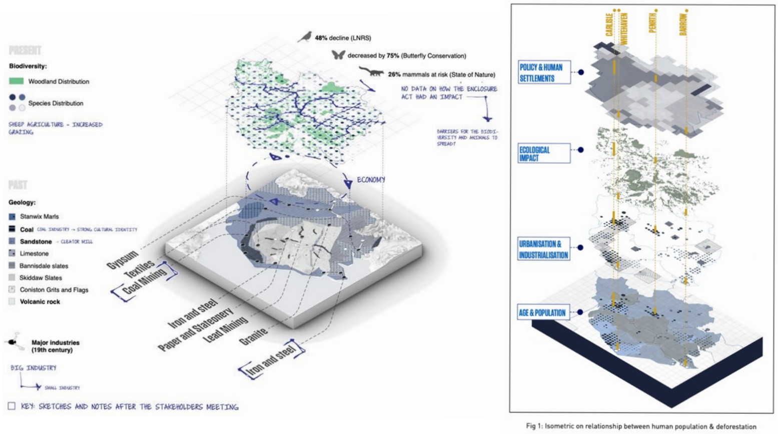


Figure 3: Data mapping conclusions relating to environmental themes of analysis (Source: Infrastructure Space students, 2024).

territory (see figure 2). The selected themes intentionally overlap to encourage groups to examine similar or conflicting datasets, fostering critical inquiry.

The approach of layering datasets is not new to either landscape architecture (Ian McHarg,1969; Steinitz, 1990) or architectural fields (Loukissas, 2019; Williams, 2020). The stacking and synthesis of data across the disciplines, combined with spatialisation of typically non-spatial data such as qualitative data and policy documents, provides novel insights into the territory of study which could not be achieved without this transdisciplinary approach.

This process of data generation, collection, and analysis is then developed into narrative accounts of the territory, site, histories, and futures, which situates this knowledge and informs future projects. Workshops and multiple iterative presentations ensure each thematic group is exposed to the other, enabling critical evaluation, and the integration of the data analyses from other groups into all the thematic work. During this process, careful consideration should be taken to the multi-scalar nature of findings, evaluating whether conclusions apply at the macro, meso or micro scale(s). By the end of the process, a substantial body of work is generated, peer evaluated, and presented. These resources are then published, forming an archive of information for use in future projects.

The data mapping conclusions form a key driver for developing research questions, design principles and briefs as illustrated in fig. 3. These outputs generate analysis focusing on environmental themes, and spatialise and visualise emergent questions, such as: How can we shift focus from the industries to restore the ecological balance in Cumbria? How can we address the gap between the industries and ecology? How can we produce and manufacture with care towards forests (figure 3)?

**Regenerative Landscapes: How do they work?**

As an atelier, we take the position that successful regenerative landscapes are developed through an understanding of how stakeholders interpret the processes that make up place, enriching our transdisciplinary approach. Capturing different viewpoints is an important part of the design process but it remains the role of designers to synthesise and interpret these viewpoints. This enables designers to

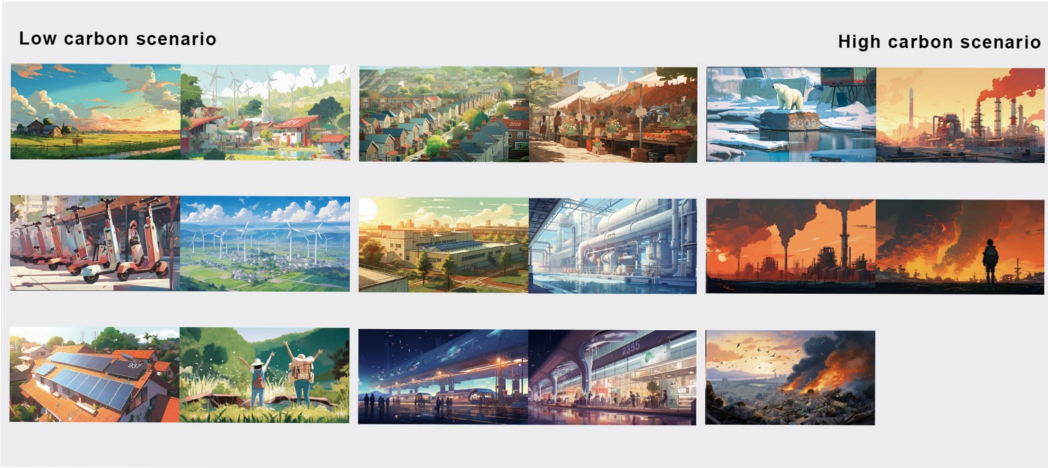


Figure 4: Illustrates the use of AI to generate visual speculations (Source: Infrastructure Space students, 2024)

test and explore how policy, theory, and economic models are applied to local contexts while understanding them in relation to their social, societal, technological and ecological implications.

**Stakeholders**

To explore the scale, scope, and influence of actors in a given territory, diverse voices and sources were integrated to create briefs and expose designers to various perspectives. Relationships were developed with local authority civil servants, industry representatives, site owners, and local organisations to investigate key themes in studio briefs. Direct engagements with these stakeholders allow designers to gather qualitative information and understand the potential conflicting interests involved.

Engagement recurs throughout the academic year, as illustrated in figure 2. This enables designers to assess gathered information, critically evaluate their positions relative to stakeholders' interests, develop responsive proposals, and test their design hypotheses. Stakeholder engagement includes roundtable interviews, formal critiques, and exhibitions, which are experimental by nature, and designed to differ from typical professional practices to level power dynamics and foster rich discussions. An interactive exhibition aimed to challenge assumptions and foster public debate on Cumbria's challenges are a key stage in the engagement process. 2023 exhibition topics included perceptions of the nuclear industry, the Lake District National Park policy, and climate change policies. Figure 4 illustrates outputs from an installation that used AI-driven computational tools to visualise potential future landscapes of Cumbria governed by different carbon emissions and sequestration policies. Stakeholder engagement is crucial for validating findings and creating design principles (figure 4).

**Regenerative Landscapes: Why do they work?**

The outcomes of the data mapping and stakeholder engagement generates design speculations or design principles through which policy may be critiqued and understood spatially and temporally, avoiding orthodoxies of the application of 'place-blind public policy' (Collier, 2024). The approach challenges professional boundaries, recognising the expertise and value of each stakeholder, to generate transdisciplinary knowledge and inclusive and diverse ways of working. Design principles and design speculations translate the research into projects, through the testing and articulation of ideas.

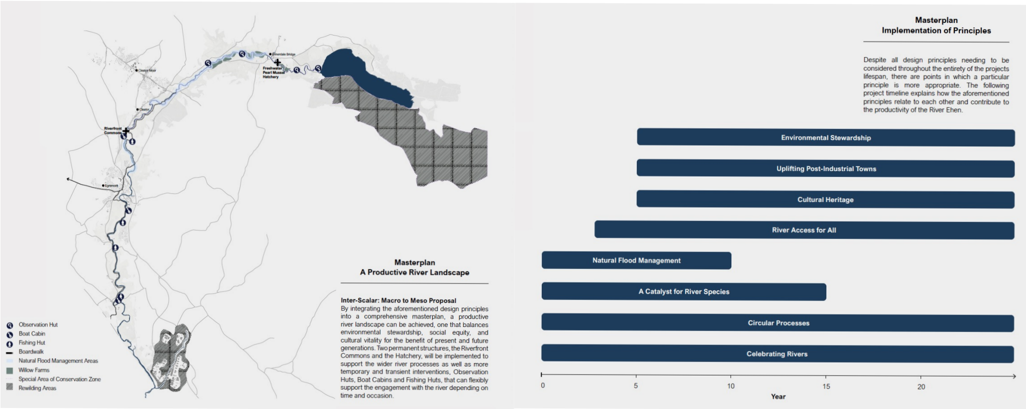


Figure 5: Work demonstrating the spatial and temporal application of design principles, derived from data mapping and stakeholder engagement (Source: Infrastructure Space students, 2024).

**Design Principles**

Design principles are used as a key method to synthesise the challenges and opportunities that have been highlighted throughout the data mapping, interactive exhibitions, and workshops. They may also be interpreted as outcomes. Designers generate a minimum of five principles and three must address climate, inclusivity and biodiversity. Drawing on established methods from figures like William McDonough, Michael Braungart (2009), and Ebenezer Howard (1965), design principles were integrated into the methodology. They synthesise research findings into rules that refine design briefs and evaluate design responses effectively, as illustrated in figure 5. Crafting design principles that synthesise research conclusions and underpin the design speculation, increases the likelihood that resulting design responses will be well-considered, effective, and impactful (Figure 5).

**Design speculation**

Problem-based design briefs are inherently speculative in a traditional sense, but the atelier aims to develop upon Dunne and Raby's (2014) approach by framing speculation as a method that first seeks to comprehend a territory's historical and current operational systems before projecting potential future trajectories. The MArch2 and MLA2 designers are provided a common brief which serves as a framework for the atelier’s multi-methods approach. The research and process driven speculations engage with multiple scales of time and space within the given territory. Discourse with teaching staff and stakeholders foster collective and individual responses as well as the articulation and representation of speculations. Table 1 demonstrates the range of themes associated with MLA2 and MArch2 projects. The depth and breadth of design speculation supports the emergence of divergent outcomes (Table 1).

The project themes were identified through a review of completed project work extracting, compiling, and comparing research questions and design specu-lations. The project themes were then grouped and categorised by the atelier staff into overarching themes. It is important to note that the overarching themes above are related to student outcomes and not the data mapping themes.

| Overarching Project Themes | MLA2 Projects | MArch 2 Projects |
|---|---|---|
| Rewilding/habitat restoration | (+10) | 1+(4) |
| Water Management + Flood Adaptive Design | 6 | 4 |
| Geology and Soil | 2 | 3 |
| Agricultural Landscapes | 2 | 3 |
| Land management | | 1 |
| Energy Landscapes | | 4 |
| Economic Policy | | 2 |
| Sociopolitical | | 2 |
| Waste Management | | 4 |
| Wellbeing | | 2 |
| Tourism, Heritage | 1 | 4 |

Table 1: MLA2 and MARCH2 categorisation of project themes (Source: Infrastructure Space, 2024).

Table 1 contains 11 themes. The top 3 highlighted themes represent both MLA2 and MArch2 students. These are new themes of enquiry for MArch2 students in comparison to previous years, as students have embedded a greater awareness of the reconciliation of human and natural systems.

**Discussion**

The exposure of MArch2 students to the discipline of landscape architecture and its engagement with rewilding, habitat restoration, water management, flood adaptive design, geology and soils, has no doubt influenced the students' novel outcomes. Students have also engaged with the cognate disciplines of landscape architecture as key stakeholders. We recognise that this has increased student competency in designing regenerative landscapes. We have expanded our understanding of the infrastructure that makes up space. To that end 'the Stack'(fig.1), now explicitly addresses ecological systems, moving from interdisciplinary to transdisciplinary research and practice.

As an atelier we have a pedagogy which is grounded in social constructivism (Vygotskiĭ et al., 1978), encouraging student learning not only from our stakeholders, experts and staff, but also through peer-to-peer engagement. This has manifested in the way that MArch2 has worked in an increasingly inter-scaler approach. Traditionally March2 have been comfortable operating at a strategic regional level but have often struggled to apply their holistic understanding of the multiple processes encompassed in 'the territory stack' (fig.1), as tangible, buildable interventions. This year, our MArch2 students, supported by their MLA2 peers have found this transition from data mapping to design speculation easier (see fig.6). Landscape architecture students are more adept with the application of systems thinking to the design process, as it is considered inherent to the discipline (Steinitz, 1990).

It is also clear that MLA2 students have been equally supported through this transdisciplinary methodology. They have benefited from the MArch2 student's design fluency and ability to engage with policy and economic theory. When MLA2 students enter the atelier, many have limited experience in design when compared to the five years of design education that MArch2 students hold.

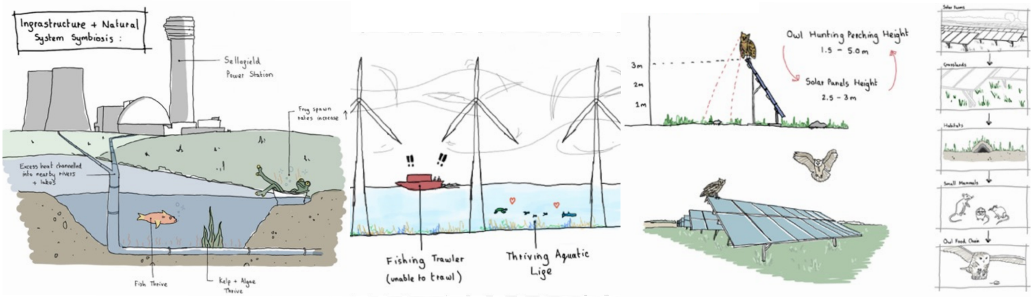


Figure 6: Work demonstrating the transdisciplinary design speculations of the students (Source: Infrastructure Space students, 2024).

This peer-to-peer learning has extended beyond students, to staff, stakeholders, and experts. A challenge that has emerged from this transdisciplinary process is the differences in the use of language between disciplines. For example, 'ecologies of place' is a term often used in architecture to refer to the socioeconomic complexities of place (Beatley & Manning, 1997). The term, when interpreted by landscape architects, generally refers specifically to organisms and their interrelationships with their physical environments. The recognition of this difference and nuance, gives stakeholders the opportunity to communicate effectively across disciplines and generate a shared understanding. A measure of success of the method is how well the project outcomes have been received by external practitioners, with most committing to continued collaboration in the coming years.

The atelier's methodology is complex, and this has been reflected in the varying degree of success of student engagement and outcomes. Some students have struggled with the higher-order critical thinking, as they have found it hard to synthesise group outcomes and apply this to their individual work. As we refine the methodology, we also aim to enhance how we communicate this process, creating clearer connections and scaffolding between the methods to help students engage with increasing complexity.

**Conclusion**

Working with an international cohort brings rich and diverse perspectives. We will provide greater opportunity for students to share their individual knowledge and experience within the atelier's transdisciplinary practice to challenge its potential for application to international contexts and territories. We are running a summer school in Cambodia to begin this exploration.

Further testing of the methodology is needed to refine and validate the approach. We aim to strengthen existing stakeholder relationships and forge new ones. The ambition is to expand our network, broaden our transdisciplinarity, and in turn produce increasingly holistic regenerative landscape speculations. We will include a greater number of project sites with associated stakeholders and integrate new experts in computation and artificial intelligence. We will further challenge disciplinary boundaries by increasing opportunities for shared knowledge exchange and the development of projects co-created by Landscape Architecture and Architecture students to support the design of transdisciplinary regenerative landscapes.

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# How to regain our landscape: A democratic/collective approach for regenerating the identity of a historically important landscape

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**Keywords**: participatory design, regenerative landscapes, democratic landscape transformation

**Introduction**

The definition of landscape has encompassed various properties over time (Council of Europe, 2016), and over the various disciplines related to landscape design. It reflects the democratic quality of the debate among the people concerned and the political decisions taken (Council of Europe, 2016). The protection and enhancement of landscapes and place identity are important for people's well-being, socialization, continued acquisition of environmental benefits, and financial viability. The paper aims to present a model to generate proposals on how to transform the unsustainable current landscape system of the Elaionas urban area surrounding the campus of the Agricultural University of Athens Greece to a regenerated sustainable one, embedded in local people's values, knowledge, aspirations and those involved in decisions and concrete actions. As such, the ultimate goal is the local people's re-establishment in a regenerated sustainable landscape through collective thinking and democratic processes.

**Regenerative Landscapes: How might we define them?**

*Theories and discourses*

Since the 1960s, raising concerns of humans' negative impact on the environment, led to the development of a series of publications, international treaties and policymaking i.e. Freeways (Halprin, 1966), Design with Nature (McHarg 1969), Brundtland Report (UN 1987), Agenda 21 (UN, 1992) European Landscape Convention (Council of Europe, 2000), Transforming our world: the 2030 Agenda for Sustainable Development, (UN, 2015), New European Bauhaus (European Commission, 2021), etc. influencing the design of contemporary landscapes (Paraskevopoulou, 2022) and gradually enriching by multitude the traditional landscape design process primarily based on the clients' aims, site analysis and site user needs (Reid, 1993) and on visual-spatial information (Dee, 2001).

According to the Landscape Convention (Council of Europe, 2000) "*Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*". The Council of Europe (2016) emphasises the close link and interdependence amongst landscape (defined by the European Landscape Convention, 2000), democracy, human rights and sustainable development. More specifically, the landscape represents the physical, conceptual, natural, and cultural aspects of space perceived by humans and is regarded as a common good that is equally important to human well-being as the environment (Bloemers et al., 2010). Moreover, the landscape creates the sense of "place" and has the power to develop/transform people's perceptions of the world, provide opportunities for interactions between people and nature, and frame people's lives (i.e., quality of life) and identities (Bloemers et al., 2010).

In 2020, the European Commission launched an initiative that connects the European Green Deal to living spaces and experiences and aims to develop places, practices, and experiences based on sustainability, inclusiveness, and aesthetics (European Commission, 2021). The NEB builds on co-design, identifying the need to encourage societal ownership of green solutions, involve people to increase social acceptance of EU's Green Deal policies, and support the behavioral adjustments necessary to achieve EU Green Deal targets. Considering all the above various contemporary design tools and processes are developed, many aiming to develop regenerative landscapes (Ruggeri, 2018; Stibbe and Prescott, 2020; Funck et al., 2023). However regenerative landscapes need to be considered as systems as all living and non-living that compose them are inter- and intra-related and constitute part of the wider Urban ecosystem.

Democratic landscape transformation requires partnership amongst designers and planning practitioners, communities and authorities, to identify landscape injustices, engage all stakeholders concerned and collaborate with multiple disciplines (Fetzer and Ruggeri, 2018). Worldwide, since the Landscape Convention (Council of Europe, 2000) was introduced many academic programmes in landscape architecture and planning continue to be trained according to the beaux-arts and without including subjects on democracy, social justice, and participation (Ruggeri and Fetzer, 2018). Universities overall play a pivotal role in researching and developing new knowledge, training future professionals and potential leaders, promoting civic engagements and influencing policy making (Brenan et al., 2004). The current case study presents the design process followed to democratically transform the landscape of the Elaionas urban area surrounding the campus of the Agricultural University of Athens based on the above.

**Case Study**

The study area comprises a part of Elaionas, Greece and in particular the campus of the Agricultural University of Athens (AUA) and surrounding area within a walking distance (approximately 1.5 km) radius from AUA (Figures 1-2) with distinct emphasis on the adjacent to the AUA Public Damalidokomeio, Public Rabies, and Public Disinfection Centre (Figure 3). This landscape witnessed the genesis of democracy (i.e. democratic government 5c B.C.), and is surrounded by many archaeological sites, such as Dimosios Sima (burial place of the prominent personalities and war dead of ancient Athens), Plato's Academy, etc. Furthermore, the study area is bisected by the Sacred Way which once started from the Sacred Gate of the walls of ancient Athens and ended at Demeter's (goddess of agriculture, earth's fruits and grains) and her daughter's Persephone sanctuary in Eleusis. Every year towards the end of September,


Figure 1: Study Area comprising the surrounding area of the Agricultural University of Athens within approximately 1.5 km radius (Google Earth, Image ©2024 Airbus)

Figure 4: Riparian vegetation along the ravine of Profitis Daniil, Athens.

the Sacred Way hosted the processions of the Eleusinian Mysteries. The Eleusinian Mysteries (7th century BC - 392 AD) were a celebration and secretive ceremony that took place in Eleusis in Attica in honor of the goddess Demeter and Persephone and lasted 9 days, as many days as the goddess Demeter wandered until she found her daughter after being kidnapped by Pluto. The location of the AUA campus once constituted part of the Ancient Olive grove of Athens (i.e. Elaionas) that grew in the area due to the neighboring Kifissos river. Both industrialization and urbanization led to sections or branches of the Kifissos river being buried underground or covered over to end the natural flooding of the flood plain that once supported the growth of the ancient olives trees of Elaionas. The ravine of Profitis Daniil that runs through the study area and reaches Kifissos river is one of the few remaining ravines within the Elaionas area that has not yet been completely buried underground. The ravine of Profitis Daniil though degraded contains sections that support riparian vegetation and constitutes a habitat for wildlife (Figure 4).

Since antiquity the landscape has undergone diverse landscape transformations reflecting the country's turmoil of historical events that gradually led to the development of a complex industrial (Figure 5) and environmentally degraded landscape with a noteworthy environmental quality overlooked by many today. In the post-Byzantine years, many churches were built by the Athenian landowners of the area to protect their families and property, many of which were dedicated to saints and festivities related to agricultural crops. During the Ottoman occupation, Athens was ruled by the voyvoda Hacı Ali Haseki (1774-1795) whose property's fortification walls and house are partially preserved today at AUA's

Figure 3: The former Public Damalidokomeio, Public Rabies, and Public Disinfection Centre, Athens.

Figure 5: Industrial areas in the study area, in transition

campus as well as the only marble Ottoman fountain preserved in Athens (Chronopoulos and Paraskevopoulou, 2004).

Following the recognition of the Hellenic State in 1830, Athens has evolved into a contemporary Metropolis. Small industries (manufacturing e.g. brick, soap, lime, paper, ceramic), olive mills and tanneries began to spread in the area. In 1862, the gasworks were established that led to the gradual decline of olive oil used as a fuel for lighting the city. The area lacked the necessary infrastructure for the provision of clean water and drainage creating serious cleanliness and health problems. In 1882-83 the smallpox epidemic in Greece resulted in hundreds of deaths in Athens and a few years later the Public Damalidokomeio was established for developing the vaccination against the smallpox located adjacent to the AUA (Mandyla-Kousouni, 2009). In 1922, 1.5 million refugees from Asia Minor settled in Greece of which 300,000 settled in Athens, and many of which settled in the studied area (Fotakis, and Gilot, 2013). Larger industries developed in the area accompanied by logistics. In 1995, an urban plan was developed that led to the gradual abandonment of heavy industries. In present the landscape is densely built with few open spaces and industrial uses. Yet as demonstrated above, the study area holds great historical, cultural and economic significance to the region and Hellenic State as well as great potential to restore the degraded environment and regenerate the landscape. A major planning plan of the area by the Municipality of Athens is underway. Thus, to democratically transform the studied landscape into a regenerative landscape system that can sustain itself, the need for local people to be involved in the process and to regain the identity of their place is identified.

**Regenerative Landscapes: How do they work?**

*Democratic/Collective Approach*

Landscape design is site specific therefore the design process is adapted to the particularities of the studied site. In the current study traditional approaches to landscape design such as site analysis (recording the present physical, environmental and cultural characteristics of the studied landscape) that involved on-site visits of the studied landscape and the collection of information including spatial information (e.g. demographic, hydrological, geological, etc.) from various archives (e.g. local libraries, Hellenic National Meteorological Service, Hellenic Statistical Authority, Hellenic Authority of

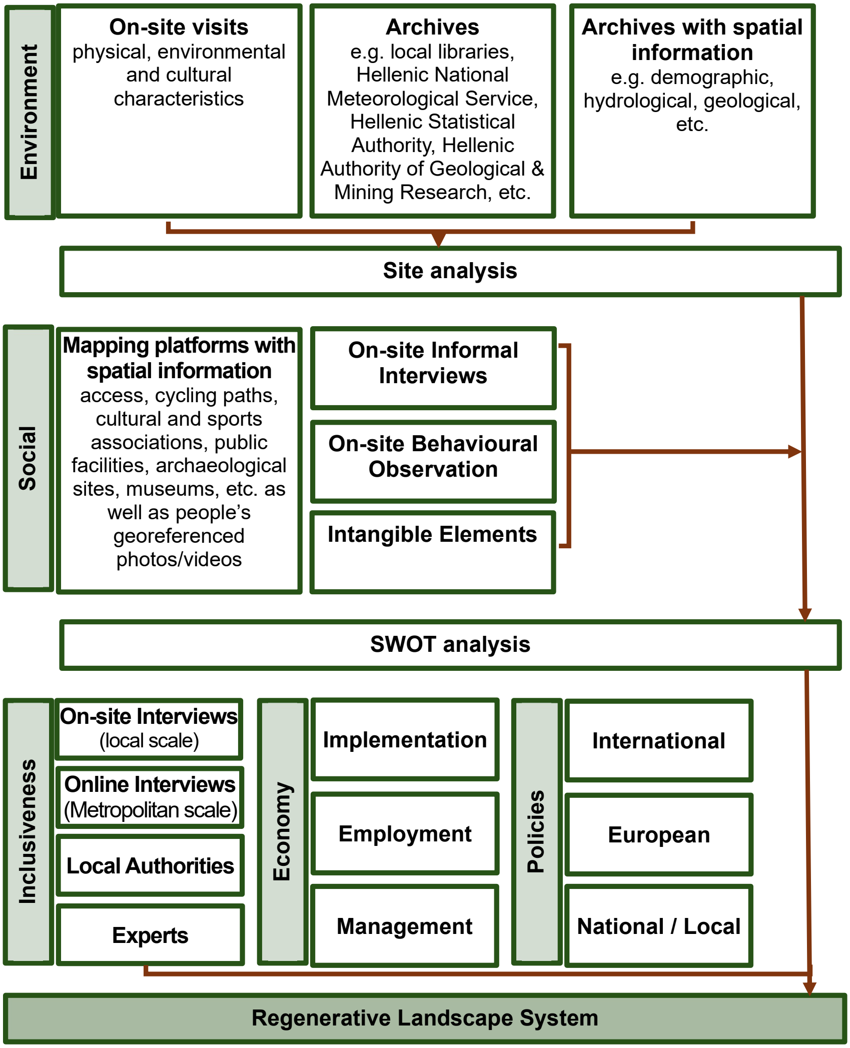


Figure 6: Proposed Democratic / Collective Approach to Regenerative Landscape Systems

Geological & Mining Research, etc.) were enriched with further spatial information provided from various web mapping platforms (i.e. Google Maps, OpenStreet Map) (Figure 6).

The web mapping platforms allows to identify access within as well as to the studied landscape, cycling paths, the presence of local communities such as cultural and sports associations, the location of public facilities i.e. schools, archaeological sites, museums, etc. as well as people's georeferenced photos/videos posted online in the studied area. On-site visits are considered an important part of the design process as it allows the designer to experience the studied landscape, informally engage and communicate with the local people (stakeholders), observe stakeholder's behaviour, as well as detect and comprehend the present character, use and intangible elements (oral traditions and expressions, including language, performing arts and craftsmanship, social practices, festivals, etc.) of the landscape and record them.

All collected information was assessed and integrated into a map illustrating the locations of the identified physical, environmental and cultural characteristics of the studied landscape. Considering all the information above as well as the current design approaches determined mainly by the UN (i.e. SDGs) and EC strategies/directives, a SWOT analysis of the studied area was undertaken. The generated results were used to compose a questionnaire survey addressing the three main pillars of the NEB (sustainability, inclusiveness and aesthetics). The questionnaire survey would be distributed both on-site and online to refine the landscape design strategies and determine the potential to democratically transform the studied landscape into a regenerative landscape system at a metropolitan scale additional to the neighborhood scale. The outcome would be presented to the local authorities for consideration and providing feedback on the proposed regenerative landscape system considering economic and legislative factors. A series of workshops amongst local communities, experts, and local authorities would follow to fine tune the proposed regenerative landscape system.

The design process presented to democratically transform the landscape of the Elaionas breaks the barriers between higher education and the rest of the society and develops students' social and civic competences (European Commission, 2017). Furthermore, students additional to related theories on landscape democracy, obtain empirical knowledge through critical thinking and understanding of related landscape democracy transformation terms such as sustainability, inclusiveness, resilience, stewardship etc., interdisciplinary research experience by integrating knowledge from various disciplines, practical experience through stakeholder engagement, identification of different perceptions and values, and application in the design process while considering economic and legislative related issues. The collective/democratic approach for regenerating the identity of Elaionas develops an informal partnership amongst the university, the local community and authorities and is envisioned to facilitate the development of democratic landscape transformation by educating future landscape architects and concomitantly raising awareness to local communities, authorities, traditional designers and planners. As mentioned above, the approach is adapted to the particularities of the studied site, therefore can gradually be applied to other case studies, and spread further awareness to new local communities, authorities, traditional designers and planners.

**Regenerative Landscapes: Why do they work?**

*Conclusions*

The conceptual framework of our approach is based on landscape planning decisions taken in agreement with local people and involving all the stakeholders in the area concerned. In developing a regenerative landscape system, working "with the people" instead of "for the people" is considered key to success. The proposed approach is inclusive; considers spatially stakeholder information provided in different forms (i.e. online posts, on-site informal interviews, on-site behavioural observation, intangible, on-site and online formal interviews) in relation to the physical, environmental and cultural characteristics of the studied landscape in response to the NEB advocating both people's rights to landscape and the landscape rights and therefore, constitutes a recipe for developing a regenerative landscape system capable of sustaining itself. As mentioned above, landscape design is site specific therefore the proposed approach can be adapted to the particularities of studied sites.

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# Perception and use of urban green spaces by Iranian women before, during, and after the Islamic revolution: A study of gendered spatial injustice

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**Keywords:** Spatial justice, regenerative landscapes, landscape democracy, gender equality

**Introduction**

Mohammad Reza Shah ruled Iran prior to 1979. His main goal was good relations with the United States and westernisation of Iranian society (Iranian Revolution of 1979, 1994). He created opportunities for women to advance in the administration and be involved in decision-making processes. Women could dress as they wished and follow the fashions of the time. The Shah focused on improving levels of higher education and allowed people to behave in a more secular manner. His focus on westernisation sparked opposition and he ignored poorer regions. Anti-western Islamist movements led the revolution in 1979, the establishment of the Islamic Republic and an ultra-conservative religious regime. One of the earliest acts was that women gradually lost their basic rights, with the requirement to be veiled being an early and especially symbolic effect, and that freedom for young people of both sexes to meet became strictly limited, a trend that has continued until now when women are demonstrating for their freedom (Kazmir, 2019).

**The research aims and questions**

Gendered spatial injustice theory is concerned with ensuring that landscapes are fully socially equitable and democratic. Throughout history, Iran has endured different regimes and laws that forced society to change in various ways; the changes since 1979 went in the direction of increasing restrictions on women. The UN reported that women and girls in Iran are treated as second-class citizens both in law and in practice, which increases discrimination against them (Iran: Women and girls treated as second class citizens, reforms urgently needed, says UN expert, 2021). Without focusing on regenerative development and environmental justice, we cannot change the social, cultural, and political factors that contribute to social inequality (Pellow, 2019). In October 2022 the latest demonstration related to restrictions on women's rights was sparked by the death of a young woman arrested for not wearing a hijab. This protest movement adopted the slogan "Women, Life, Freedom'', symbolizing the ongoing struggle of Iranian women to achieve equality in all spheres of life. This study was stimulated by the 2022 protests and by observations of the links between Iranian women's lack of freedom in general and the limits on their use of public spaces. It aims to explore how Iranian women of different generations experience public spaces, with some comparison of the changing situation over time since before the Islamic revolution. The research asks the following questions:

1. How do women of different ages currently use public spaces and what barriers do they experience?
2. What tactics do women use to get around the restrictions placed on them?

**Methodology**

The study employed in-depth interviews, with Iranian women from different generations and ranges of experience, but also some men. Online qualitative interviews were held with 40 participants of different ages and backgrounds. They were asked about their memories of using public spaces when they were growing up and since, which in the case of the oldest respondents was before the Islamic revolution. QSRNVivo was used to analyse the transcripts and to identify different themes in relation to the research questions.

*From memories and experiences to regenerative landscapes*

In the discussion of spatial (in)justice, issues such as urban justice, environment, inequality, etc. are considered, related to the search for justice and democracy . Awareness of space and influencing factors may help in examining how gender socialisation is the result of spatial correspondence and how biological concerns about gender are catalysts (Butt, A. I., Khan, K. U., & Parvez, N., 2020). The key aspect is how space and place contribute to political, social, and cultural consciousness while allowing the individual to move in society according to social norms and public spaces. By focusing on and understanding the issue of spatial injustice in the context of the policies of the Iranian government, we can see how the Iranian people felt this gender injustice strongly after the Islamic Revolution.

Younger Iranian women see themselves as agents of social change, standing at the forefront of breaking down social boundaries (Salehi et al., 2020). The majority of interviewees from the 20-30 age group expressed concerns about this situation, emphasising the direction in which their generation is moving. Most of these participants don't think about life before the 1979 revolution as they did not experience it. This generation has grown up in the age of social media and has access to the internet for information, they can see the basic spatial rights enjoyed by others and they aspire to have a similar degree of equality in their society. The beliefs of this generation emerged equally among male and female interviewees, which marks a contrast between generations where men historically tended to demand control over and obedience from women. Both young women and men wish to assert their spatial rights and aim to break down the barriers through their protests. This is significant because 60 percent of the Iranian population is aged below 30, and this young population has grown up under conditions where economic and political factors are significantly impacting them and driving the public protest movement (Duke Today, 2022).

In Iran, this young generation is facing a “crisis in the city” where economic factors limit their freedom and force them to spend more time “being in public” - using local public spaces for a range of social and other activities. Thus, they face the consequences of urban mismanagement, as well as the presence of the morality police who enforce - or try to enforce – the dress code for women and to disperse boys and girls who are together, whether in groups or as couples. This results in a further decrease in basic human rights and marginalizes women as full citizen (Hakiminejad, 2022). According to (Mokhles and Sunikka-Blank, 2022) it is important for women to understand the role of public space in their neighbourhoods because, as long as they live in societies where religion is the force, they have to follow cultural norms and practices. This makes access to public spaces difficult or limiting. It often coincides, too, with poor-quality housing, poor-quality urban landscapes, and deteriorating or unsafe public spaces.

Interviewees in their 40s and 50s identified Tehran as a gender-segregated city. While the city was gradually regenerated after the revolution, this was partly to ensure more separation between men and women in society and space. These women explained how everywhere - from public transport to public parks - they are spatially separated from men. The concept of the gender-segregated city design included plans to build around 200 parks with specific designs to ensure gender segregation, for example some only for women and some with women-only areas and the rest for everyone (MEE correspondent, 2022). The middle-aged interviewees mentioned that they observe this segregation, without agreeing with it, while the younger women of the so-called "new generation" explained that they always turn restrictions into opportunities by, for example, running away from the morality police to find hidden places in parks where they can unveil and mix with boys and so assert their rights.

Society is clearly impacted by these changes, and several generations are affected. (Pellow, 2019) claims that political forces are crucial to the success of regenerative development, and addressing power imbalance and social inequality. Incorporating society into decision-making while paying closer attention to the problems faced by particular groups—in this case, Iranian women, is needed but not currently possible. However, as reported by some interviewees, the recent freedom movement was about segregation regulations where in universities students decided to disobey the rules and to sit and eat together (Shahrokni, 2022).

By focusing on experiences, memories, strategies and tactics employed by women in public spaces, the concept of regenerative public spaces can be applied to create more sustainable and equitable landscapes. Now we examine a number of factors which emerged during the interviews, and which relate to the different concepts of regenerative landscapes.

*Economic*

Many of the older respondents had witnessed the economic mismanagement of the Islamic regime and how the economy shrank over the 45 years since the revolution. They observed that the gap between social classes, already wide at the time of the monarchy, actually widened further. Several interviewees noted a change in the nature of activities from "freedom of being in public" to "forced to use certain spaces to feel engaged." Working-class families initially responded to the government's move away from neighbourhood parks by visiting the bigger ones in the central and northern areas of the city where they could enjoy being "first-class citizens." As a result, poor management led to neighbourhood parks being considered unsafe by women. According to (Ghasemi, Behzadfar and Borhani, 2023) the rapid population growth in Tehran has led to increased spatial inequality and more limited access to public facilities, including leisure spaces. This poses significant problems as many people even with an average income cannot afford to use facilities which charge an entry fee or equipment hire.

*Socio-political*

Oppression and discrimination against different social groups are hallmarks of Tehran, as stated by most interviewees. In public areas designated for women, they felt themselves to be subject to structural oppression. They explained that in “ladies' parks” they are not allowed to enjoy the benefits of urban life completely, as there are still rules and restrictions - for instance, they cannot use their phones - although there are more restrictions in so-called "mixed parks". Women-only parks are increasing in Tehran, a trend which is changing the city's planning and design approach and polices. Tehran municipality claims that ladies' parks create a safer place for women, all the while building those parks with high concrete walls to screen them from the male gaze (Sinaiee, 2022).

*Safety*

A recurring theme in the interviews was the safety of public spaces. Participants reported experiencing many issues, from poor lighting meaning they couldn't use public spaces in the evenings, to the economy limiting their activities. Most participants highlighted how safety became a priority over time and restricted their use of the outdoors. For instance, people from poorer parts of the city travel to use parks in wealthier districts and the behaviour of some of these people make local residents uncomfortable. Women also have to be aware of the morality police judging how they are dressed when out in public. This of course is one of the main symbols of the recent demonstrations and some of the younger interviewees explained that they have stopped caring and will go out without a hijab in defiance of the morality police. Interviewees reported that they are constantly at risk of being harassed when what they need is greater protection and recognition.

(Sheehan, 2019) suggests that applying the concept of regenerative social cultural capital could have a positive impact on the life of women. Research by (Hamedanian and Ghadermazi, 2022) and also mentioned by interviewees, shows that women face the same impacts regardless of age or socio-economic class which, however, depend on different factors, whether socio-economic challenges, dysfunctional socialization or crowding in public places. Their study also showed that feeling unsafe emerges from a variety of reasons ranging from relatively small offences, such as being stared at by a man, to more major impacts, such as being stopped by the morality police.

*Use of public space*

Memories of the older interviewees demonstrate how the design of public spaces, ranging from streets to parks, once helped people fulfil their daily routines. According to the senior participants, in pre-revolution Tehran, people came together for a larger variety of activities, using public spaces to bring people together. However, in post-revolution Tehran, they faced a change where many parks were redesigned to comply with the new regulations. The "demonstrative generation", the 20-30 age group, mentioned how they bring new lifestyles to their city, where they can assert what they consider to be their basic rights in public spaces, despite the efforts of the authorities. As David Harvey invited to visit Iran in 2014 said ''Stand by the Oppressed and Say ''NO'' to the Oppressors'' (he was subsequently banned from visiting) (Hakiminejad, 2022).
(Jalili, 2016) has shown that Iranian women still selectively use public spaces and adapt how they use them according to both their needs and their willingness to ignore the regulations. For example, many stated that they prefer to use their neighbourhood parks, even if they are not in good condition because they feel safer and welcomed since users' social class and background tend to be similar. She refers to ''negotiating gender and class" in public spaces and points out women have gradually learned how to avoid barriers. depending on the situation they face, ranging from where they live to places they visit, leading them to use different tactics to maintain their presence in public spaces in such a way that they feel they are reclaiming them.

**Conclusions**

In this paper we have briefly explored a small portion of data from 40 interviews with Iranian women (and men) of different generations spanning the time since the Shah and the establishment of the Islamic Republic to the present day. We have seen how women's use of public space became increasingly restricted in the 45 years since the revolution. However, we have also seen that the younger generation, those in their late teens and twenties, are asserting themselves and what they see as their rights in the face of the daily oppression. Where do concepts and practices of regenerative landscapes feature in this situation? Women yearn for public spaces that can reflect their needs and aspirations. If the regime changes or responds finally to what the people want. such spaces can be regenerated and redefined as inclusive and restorative, equitable and just towards women. In the Iranian situation it is not easy to define a regenerative landscape – these do not exist in the context of female experience. For regenerative public spaces to work, there needs to be a deeper understanding of the specifics of a given situation; in the case of Iran, our research demonstrates that this depends on changes to the political system. Given the importance of memories and past experiences, reconstruction of past conditions can indicate models for recreating socially regenerative landscapes while also adapting to the needs of present and future generations.

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Ana Raquel Cunha is a student of the PhD Program in Landscape Architecture and Urban Ecology (LINK); at ISA/ULisboa. Her study main topic is “Botanic Gardens as Living Museums: revealing the historical and natural heritage of the Ajuda Botanical Garden”; with a FCT scholarship (2020/04824/BD). She was a Research Fellow in two important projects: "LX GARDENS"; and "PORBIOTA".

**Nathalie de Harlez de Deulin**
Garden historian with a Master’s degree in Architecture “Historical Garden and Landscape” (Versailles School of Architecture, 1998) and a PhD in History, Art and Archaeology (University of Liège, 2015). Assistant professor at the Haute Ecole Charlemagne/University of Liège (Gembloux Agro-Bio-Tech) Landscape architecture and Conservation restoration of cultural heritage. Member of the ICOMOS International Committee for Cultural Landscapes, European Institute for Gardens & Landscapes (France), Royal Commission of Monuments, Sites and Excavations for the monitoring of listing, preservation and restoration of historical parks and gardens (Belgium), jury member of the Literary prize René Pechère (Belgium).

**Jeroen de Vries**
Landscape architect, researcher and director at the LE:NOTRE Institute. Researches the design of foodscapes in metropolitan areas, production typologies, and strategies to integrate these in the spatial design of peri-urban areas. Works as a professional practitioner, lecturer, and researcher. His mission is to foster the development of local food systems.

**Sarah de Vries**
Sarah de Vries MSc. is an educational designer at Wageningen UR, specialised in education for professionals, transdisciplinary and interdisciplinary education. She is co-developer of the transdisciplinary mixed classroom courses at WUR. Her PhD research focuses on how specific transdisciplinary competence development can be supported in students and professionals as co-learners within the context of the transdisciplinary mixed classroom.

**Cristina del Pozo**
Cristina del Pozo (BSc, MSc, PhD), Landscape Architect, is Associate Professor and former Program Director (2016-2023) for the Bachelor´s Degree in Landscape Architecture at the Rey Juan Carlos University of Madrid. She is actually involved in several competitive research projects with European and Spanish funding such as The Selina Project (https://project-selina.eu ) and green and blue infrastructure for health and wellbeing in the Madrid Region (C-MAD). She is an expert evaluator in Horizon Europe and New European Bauhaus initiatives and has been invited to numerous international lectures and published several publications

**Marco delli Paoli**
Architect, PhD in Environmental Technology Design. He is currently a postdoctoral researcher at Sapienza University of Rome (Italy), where he is carrying out research activities on Positive Energy Districts (PEDs) and climate-adaptive design strategies, combining them through a holistic approach to cope with the energy transition scenario

**Gaëlle des Déserts**
Gaëlle des Déserts is urban planner and landscape architect, and she is coordinator of collectif PAP.

**Susana Dias**
Susana Dias is a Biologist, with a PhD in Forestry, where one topic was the link between landscape management options and bird species conservation. She is a Professor at the University of Lisbon (ISA/ULisboa) and she is in the Directive Board of the CEABN-InBIO. She has been involved in several research projects, at national and international level, from the past 20 years. Since 2018 Susana was the executive coordinator of 3 protocols with municipalities, aiming at assess the Ecosystem services of street trees for support decision planning.

**Duygu Doğan**
Pamukkale University, Architecture and Design Faculty, Department of Landscape Architecture: Duygu DOĞAN completed her undergraduate education at Ankara University, Faculty of Agriculture, Department of Landscape Architecture in 2009 and received the title of Landscape Architect. She completed her PhD  at Ankara University in 2017 at the, Institute of Science and Technology, Department of Landscape Architecture. Between 2013-2017, she worked as a research assistant at Inonu University, Faculty of Fine Arts and Design, Department of Landscape Architecture. Since 2017, she has been working as a faculty member at Pamukkale University, Faculty of Architecture and Design, Department of Landscape Architecture. Dr. Duygu Doğan's research interests are landscape ecology, landscape planning, geographic information systems.

**Auréline Doreau**
Auréline Doreau is agriculture engineering, she is "energy and territories" project manager at réseau Cler, and member of collectif PAP.

**Beata Dreksler**
Beata Dreksler is a landscape architect and associate professor at the American University of Beirut. She holds a PhD in landscape architecture from Warsaw University of Life Sciences—SGGW, Poland. Beata has over 30 years of professional and academic experience across Europe, Central America, and the Middle East. Her projects have been featured in books and professional magazines and have received awards such as Best Public Space in Poland (2017). Her research explores landscape democracy and digital transformation in landscape planning and design.

**Inês Marques Duarte**
Inês Duarte is a Landscape Architect, Master in Management and Nature Conservation and PhD in Forestry and Natural Resources. She is a researcher in the CEABN-InBIO at ISA/ULisboa, in the topics of landscape ecology, nature conservation and ecosystem services. She has been involved in several research projects, at national and international level. She also lectures Design in cultural and metropolitan landscapes, Environmental Planning and Landscape Architecture in the University of Algarve.

**Rasmus Ejrnæs**
Rasmus Ejrnæs PhD, is Professor in biodiversity at Aarhus University, Department of Ecoscience. Rasmus is a plant ecologist with fundamental scientific interest in mechanisms behind the succession and assembly of ecological communities and their resulting diversity. He has led the development of important habitat condition assessment systems and developed and led the largest research project in Danish biodiversity (Biowide). In collaboration with AKB and others, Rasmus has proposed Ecospace.

**Tímea Erei**
Hungarian University of Agriculture and Life Sciences, Department of Landscape Protection and Reclamation, PhD candidate, landscape architect, landscape protection expert. She has participated in national and international research projects. Her main research topic is the assessment of the role of watercourses in green infrastructure and their potential for restoration, including the involvement of local people.

**Monica Fabian**
Monika Fabian is PhD candidate and an instructor at the American University of Beirut (AUB), Lebanon. She holds her MSc degree in Horticulture sciences from Szent Istvan University, Hungary. Her PhD is to investigate the drivers, motivations, and barriers to implementing extensive native green roofs in the East Mediterranean. She has teaching experience for 15 years covering topics such as Landscape Horticulture, Permaculture, Landscape Ecology, Edible Landscape.

**Sara Favagiotti**
Associate Professor of Landscape Architecture at the University of Trento, Department of Civil, Environmental and Mechanical Engineering. Her research and teaching investigate the multiple identities of the landscape with a research by design approach based on transformation through adaptation and innovation. Since 2018 she is a member of the Directive Board of IASLA. She is co-founder and scientific advisor of RUMA S.r.l. Società Benefit.

**Gina Fehringer**
Gina Fehringer graduated with a master’s in Urbanism at the TU Munich in 2024 with a focus on green corridors and co-productive landscapes in Munich. She has practical experience in landscape architecture offices and collaborated on large research projects, such as the Green City of the Future project and the Centre for Urban Ecology and Climate Adaptation (ZSK).

**Eugenio Ferretti**
Eugenio Ferretti is a PhD student in Landscape Architecture at the University of Florence, Italy. His research focuses on urban forests and their integration into dense urban environments. Ferretti holds a master's degree in Landscape Architecture from the University of Lisbon, obtained in 2023. His thesis used i-Tree to quantify the ecosystem benefits of urban vegetation in Lisbon. Prior to his postgraduate studies, Ferretti earned his bachelor's degree in Ornamental Green and Landscape Protection from the University of Bologna in 2021.

**Ellen Fetzer**
Ellen Fetzer holds a doctoral degree in landscape architecture from Kassel University, Germany. The focus of her work at Nürtingen-Geislingen University is on computer-supported collaborative learning and education for sustainable development in various contexts and settings. She is course director of the international Master programme in landscape architecture. She is immediate past-president of ECLAS (2018 - 2024), the European Council of Landscape Architecture Schools. Ellen has been leading the TELOS ERASMUS Project on Landscape Economy that inspired this ECLAS Conference on Regenerative Landscapes.

**Zsófia Földi**
Hungarian University of Agriculture and Life Sciences, Department of Landscape Protection and Reclamation. PhD, associate professor, landscape architect, landscape protection expert. Her main research topic is the assessment of the settlement expansion and settlement fringe. She has been involved in several landscape protection projects, environmental impact assessments.

**Violaine Forsberg Mussault**
Violaine is a Landscape Architect DPLG, PhD fellow by the Oslo School of Architecture and Design in the frame of NATURACT. She taught at the architecture and landscape architecture school in Lille and was co-founder of the office Les Saprophytes, an

interdisciplinary office specialist in participatory design methods for public spaces.

**Lei Gao**
Lei Gao is an associate professor of history of landscape architecture and garden art at Norwegian University of Life Sciences (NMBU). Lei received her PhD in Landscape Architecture from the University of Sheffield in 2010. Prior to that she studied architecture and landscape architecture in China. Lei has been working at NMBU since 2013. Her research interests include garden history and conservation, cultural, social and spiritual meanings of gardens and designed landscapes, and the management of historical landscapes.

**Vignir Freyr Helgason**
Vignir is an architect and PhD fellow at the Oslo School of Architecture and Design (AHO), Institute of Urbanism and Landscape. He holds a master's degree in architecture from The Royal Academy in Copenhagen (2010) and an executive master's degree in architectural heritage from AHO (2020). His experience spans the private and public sectors, encompassing practical, strategic, and theoretical work across architecture, cultural heritage, and planning.

**Marie Frier Hvejsel**
Marie Frier Hvejsel PhD, is Professor at Aarhus School of Architecture. She is an architect-engineer educated at Aalborg University, and her research focuses at the formulation of transdisciplinary ecological methods and didactics in/for architecture in complex settings and she initated the interdisciplinary collaboration on the Ecospace theory across biology, architecture and sociology. She is president of the Int.Association for Structures and Architecture and chair of the ICSA Conferences.

**Dirk Funck**
Dr. Dirk Funck is professor for Multichannel-Retailing, Sales, Social Innovation and Methodical Basics at Nürtingen-Geislingen University. His interests in research and transfer lie in the topics of "Medium-Sized Retail", "Sustainable Community Development" and "Social Innovation". He is leading the DAAD-funded project "Middle East Productive Landscapes" (MeProLand). After his studies, doctorate, and research activities at the University of Göttingen, Dirk spent eight years in leading positions in medium-sized retail cooperation. In 2011, he was appointed professor at the University in Worms. In 2014, he moved to Nürtingen-Geislingen University. Dirk was elected Chairman of the Advisory Board of the Rid Foundation for Medium-Sized Bavarian Retailers in 2011. He also works for the foundation as a trainer and coach.

**Bruno Futema**
Bruno Futema is a Brazilian architect and urban planner, who graduated from Universidade Presbiteriana Mackenzie (2019). He was awarded for his research through his undergraduate urbanism thesis "Productive Territory: The Urban Context as an Incubator of a Circular Economy," continuing his research through his professional practice.

**Juanjo Galan**
Juanjo Galan is an Associate Professor of the Urban Planning Department of the Polytechnic University of Valencia (Spain). From 2015 to 2020, he served in a similar position at the Department of Architecture of Aalto University (Finland). His teaching and research focus on landscape planning, landscape design, sustainable development, regional and urban planning, and, on a more general level, on the intersections between social and ecological systems. He coordinated the Sierra Calderona Strategic Plan (2013-2014) and the AELCLIC project for the Adaptation of European Landscapes to Climate Change (CLIMATE-KIC 2018-2020). Between 2006 and 2010 Juanjo Galan was the president of the Spanish Association of Landscape Architects (AEP) and from 2017 till 2020 he was the promoter first and Chair of the Landscape Observatory of Finland.

**Aikaterini Gkoltsiou**
Dr Aikaterini Gkoltsiou is assistant professor at the Laboratory of Floriculture and Landscape Architecture, at the Agricultural University of Athens. She is the President of IFLA Europe (2021-2025) and the Vice President of IFLA (2025). She is involved in many working groups and networks in E.C. and Council of Europe. She is participating as project manager, scientific advisor and evaluator in EU research programs.  She has been certified on public participation methods, and she specializes in a wide range of services in landscape architecture.

**Sandra Groll**
Sandra Groll is a systems theorist and design scientist. She studied product design, philosophy and aesthetics as a minor at the University of Design in Karlsruhe and received her doctorate at the University of Design in Offenbach. In addition to questions of design history and design theory, she researches the relationship between design and society, focusing on systems theory. Since 2024, she is an associate professor at Zhejiang Wanli University in Ningbo. From 2016 to 2018, she represented the 'Theory and Practice of Design' professorship at the Kassel University of Art. Since 2024, she is Professor of Design Theory at Brand University of Applied Sciences, Hamburg, Germany.

**Geoffrey Grulois**
Geoffrey Grulois is Professor of Urbanism and coordinator of LoUIsE – Laboratory on Landscape, Urbanism, Infrastructure and Ecologies at the Faculty of Architecture of Université libre de Bruxelles (ULB). He leads interdisciplinary projects linking spatial analysis, planning, and history

**Karin Helms**
Karin Helms is a Landscape Architect DPLG and a professor at the Oslo School of Architecture and Design, Institute of Urbanism and Landscape. She is the originator and founder of the European Master: EMiLA. She received her PhD from RMIT Europe Barcelona, a Practice-Based PhD. Involved for a long time in associations promoting the profession, she has been President of IFLA EUROPE (2019-2021)

**Miguel Hernández Quintanilla**
Miguel Hernández Quintanilla is an assistant professor at the Oslo School of Architecture and Design. He works as a landscape architect at BOGL and Maamito Studio.

**Efrat Hildesheim**
Landscape architect Dr. Efrat Hildesheim is a scholar and a senior lecturer and Assistant Professor at the David Azrieli School of Architecture, Tel Aviv University. Hildesheim's interdisciplinary research builds on conceptualization and ontological inquiry utilizing critical cultural theories. Her areas of expertise encompass landscape theory, landscape architecture, art, garden theories, and critical research on roads highways and borders.

**Victoria Imasaki Affonso**
Landscape designer and architect with a degree from the University of São Paulo (FAU-USP) and a Master's in Landscape Architecture from TU Delft. She graduated with *The River and the Mosaic,* a project on the interplay between drought and monoculture systems, pre-selected for Archiprix 2024. Based in Amsterdam, her work ranges from regional strategies to detailed public space design.

**Cristina Imbroglini**
Cristina Imbroglini is a researcher at Sapienza University of Rome, specializing in urban studies and sustainable development. Her work focuses on participatory planning, public space design, and socio-spatial justice. She contributes to interdisciplinary projects and academic teaching, bridging theory and practice in contemporary urban transformations. Her research promotes inclusive, resilient cities through civic engagement and policy innovation.

**Vera Iváncsic**
Hungarian University of Agriculture and Life Sciences, Department of Landscape Protection and Reclamation, PhD, senior lecturer. Her main motivation is to understand the interaction between natural and urban environments, and how green infrastructure is affected by urban development. She has experience in green infrastructure planning and participates in Hungarian and international research projects.

**Jan-Eelco Jansma**
Making agriculture relevant to social issues is the key to my professional ambition. I aim to build bridges between people and organisations and between the seemingly polar opposites of agriculture and urban life. After all, it's people who shape changes in society. Design, research, organisations and government are instrumental in this evolution.

**Laura Jeschke**
Laura Jeschke is a landscape architect (University of Natural Resources and Life Sciences, Vienna (BOKU), with a Ph.D. in Urbanism from Universidad Politécnica de Madrid (UPM). She wrote her PhD thesis "Potentials of Spontaneous Vegetation. New Design and Management Strategies for Low-Maintenance Public Green Spaces, The German Case" at the Department of Urban and Regional Planning ETSAM, UPM. Lecturer / Assistant Professor in the Landscape Architecture Degree of the Universidad Rey Juan Carlos Madrid, since 2016.

**Vikram Kaushal**
Vikram is a senior lecturer at the Manchester School of Architecture and the founder of Logan & Wilcox, a design studio dedicated to socially engaged art production based in Manchester, UK. Vikram leads the MArch2 cohort within the Infrastructure Space Atelier.

**Andrii Kotliarchuk**
Andrii Kotliarchuk, an architect, preservationist, director of the Tustan State Historical and Cultural Reserve. Field of professional interest: restoration of architectural monuments, vernacular architecture of the Ukrainian Carpathians, local building traditions, preservation of traditional architectural environments and cultural landscapes of mountain villages.

**Ulrike Krippner**
Ulrike Krippner is a senior researcher at the Institute of Landscape Architecture at BOKU Vienna. She holds a PhD in landscape architecture and teaches landscape history. Her research and writings concentrate on the profession's history of the 20th century, with a special focus on women in landscape architecture and on post–World War II landscape architecture. She heads the Archive of Austrian Landscape Architecture.

**Karolina A. Krośnicka**
Karolina A. Krośnicka, (Ph.D., D.Sc., Eng., Arch.) is a professor at the Department of Urban Design and Regional Planning, Faculty of Architecture, Gdańsk University of Technology (Poland). Karolina's research interests focus on port-city spatial relations, Integrated Coastal Zone Management, theory of urban dynamics, and evolution of landscapes. While she was employed at the Faculty of Navigation at Gdynia Maritime University (Poland) she concentrated on seaport and terminal planning. She collaborates with local authorities and companies and has rich educational experience. She is a member of the Society of Polish Town Planners, the International Society of City and Regional Planners, and the World Institute for Engineering and Technology Education

**Elisa Lähde**
Elisa Lähde (PhD, M.Ad. Landscape Architect) works as an Assistant Professor at Aalto University, Finland. She is specialized in urban resilience, ecological design, and the integration of biodiversity into urban environments. With over 20 years of experience in research, teaching, and professional practice, her work focuses on advancing process-based and systemic approaches, as well as fostering ecoliteracy to support sustainable human–nature relationships.

**Myriam Laidet**
As World Heritage Urban planner, Myriam Laidet has extensive professional experience in the protection and enhancement of UNESCO cultural landscapes, especially the Imperial Capital of Huê (Vietnam), Val de Loire Valley site (France) and European network of World Heritage vineyards. Since 2022, she is doing a PhD on inventive ways of conservation of Val de Loire's vinescape, hosted by the laboratory of Ecole Nationale Supérieure du Paysage de Versailles in partnership with Universities laboratories of Tours (CITERES) and Burgundy (ARTEHIS).

**Anna Lambertini**
Anna Lambertini is architect specialized in and PhD in Landscape Architecture. She is associate professor of Landscape Architecture at the University of Florence, where she is currently director of the MSc Program in Landscape Architecture and scientific coordinator of the Research Unit Exploring for Landscape Architecture. Her research and design explorations favour the dimension of ordinary landscapes and everyday open spaces, with particular reference to the themes of the aesthetic perception of places; urban natures and playscapes.

**Anders Larsson**
Anders Larsson (Dr) works as researcher and teacher at the Department of Landscape Architecture, Planning and Management, SLU Alnarp. His main field of interest is within comprehensive planning and planning processes, especially the interface between the urban and rural. Anders has many years of experience within teaching, especially at the Landscape and Sustainable Urban Development programs and is also a fellow member of the Royal Swedish Academy of Agriculture and Forestry (KSLA).

**Stef Leach**
Stef Leach is a Lecturer in Landscape Architecture, Degree Programme Director of the Master of Landscape Architecture and Chartered Landscape Architect with over 12 years's experience in practice. Areas of focus: brownfield ecologies, vibrant matter, and more-than-human printing.

**Alice Lewis**
Dr Alice Lewis is lecturer of Landscape Architecture at RMIT University, Australia. Her research investigates how prosthetic extensions and the human actions it affords shape environments and material relationships, and how technologies and methods can augment actions which contribute to the regeneration of landscapes. She develops pedagogies and future-focused structures for learning that help students contribute to timely conversations, such as those around climate and reconciliation.

**Lilli Lička**
Lilli Lička was professor and head of the Institute of Landscape Architecture at BOKU University Vienna from 2003 until 2025. From 2017 principal of LL-Landscape Architecture, Vienna, Consultant, Jury Member and Activist. Areas of focus: urban development, parks, social justice and heritage.

**Francisca Lima**
Francisca Lima is a lecturer at the University of Edinburgh, where she teaches History and Theory of Landscape Architecture and directs the Master in Landscape Architecture Programme. Francisca's research interests range from perception of landscape, to urban decline and green spaces in relation to community engagement and wellbeing. Since 2005 she has been collaborating in research projects with LEAF Research Center and the Philosophy Research Centre of the University of Lisbon. She is member of the JoLA Editorial Board.

**Luísa Martins**
Luísa Martins is a Brazilian Architect and Urban Planner. She earned a MSc degree in Architecture cum laude from TU Delft (The Netherlands). With previous experience in Architecture practices, she is currently an independent researcher on the topic of operational landscapes in the Global South and a fellow in Climate Action. She believes Architecture holds a significant role both in investigating and transforming a world in collapse. Her work can be found at www.luisafmartins.cargo.site

**Alex Mexi**
Alexandru Mexi is a landscape architect, master and PhD in cultural studies. He is employed as researcher at the Department of World Heritage within the National Institute of Heritage in Romania and holds the position of associate professor at the University of Agronomic Sciences and Veterinary Medicine in Bucharest – Department of Landscape Architecture. At the university, he imparts knowledge on garden and landscape history, conservation, restoration, management, and enhancement of immovable cultural heritage. He is also a certified specialist by the Romanian Ministry of Culture in the field of preservation of historic monuments and cultural landscapes.

**Mark Michaeli**
Mark Michaeli, architect (Dipl.Arch. ETH, ETH Zurich), is since 2010 full professor at the Chair of Sustainable Urbanism (TU Munich). His research focus is on urban development, settlement structure, development and instruments in urban and rural planning, and regional spatial development of rural and peripheral areas. He is a consultant and reviewer for various public planning institutions, academic institutions, national research funding agencies and professional associations.

**Julia Micklewright**
Julia Micklewright, M.A. Architecture, is a research and teaching associate at the Chair of Sustainable Urbanism (TU Munich) since 2022. She graduated from ENSA Montpellier and is currently pursuing a PhD as part of a DFG Research Training Group. Her research focus lies on the integration of private green spaces in urban planning strategies to achieve a continuous urban green infrastructure network and, more generally, on nature-based solutions and regeneration in urban and periurban contexts.

**Angelo Paulo A. Mogul**
Angelo Paulo A. Mogul is a registered and licensed landscape architect and environmental planner in the Philippines. He balances professional practice, academic work, and research. In 2018, he earned his Master’s degree in Tropical Landscape Architecture from the University of the Philippines Diliman. His thesis titled, "The TOD Suitability Index: Establishing a Developmental Framework for Transit-Oriented Developments (TOD)", underscores his interest in urban planning and landscape design. Most of his research focuses on transit-oriented developments and formulation of landscape design frameworks to rationalize landscape design to non-design stakeholders. Professionally, Angelo has been the Principal Landscape Architect at Land & Man Integrated Design since 2015. Angelo is also a permanent Assistant Professor III at Bulacan State University's College of Architecture and Fine Arts – Landscape Architecture Program and serves as its Program Chair

**James Morton Richard**
Richard is a Senior Lecturer in Architecture and Infrastructure Space Atelier Lead at Manchester School of Architecture. Richard spent time in industry, researching and developing digital communications systems, considering the impact of such technologies within remote rural communities. Richard’s research seeks to understand the social, societal and ethical implications of increased machine decision making on our everyday lives, with a particular focus on marginalised groups.

**Eleni Mougiakou**
Eleni Mougiakou is an Agricultural Engineer with a Diploma from Agricultural University of Athens, with specialization in Landscape Architecture. She completed her Master's Degree in Geoinformatics (NTUA) with Distinction and is currently a PhD researcher in the subject of Landscape Planning at AUA. Her research and work are focused on Urban Green Areas Strategic Planning, assessment of vulnerability of Mediterranean Cities to Urban Heat Island effect and Climate Change. She is leading the “Participatory Lab for Climate Change adaptation” initiative on behalf of COMMONSPACE.

**Sabine Müller**
Sabine Müller is a professor at the Oslo School of Architecture and Design (AHO). She is director of SMAQ Architecture, Urbanism and Research in Berlin. Together with Miguel Hernández she teaches the design studio "Hydropolis" at the International Master of Landscape Architecture Program at AHO.

**Daniel Münderlein**
He is a cross-cutting researcher at the chair of landscape architecture at the RTWH Achen University and visiting professor at the chair of open space planning at the University of Kassel. He investigates into the sustainable development of urban landscapes and the integration of productive open space systems as well as interrelationships between landscape, health and well-being.

**Samaneh Nickain**
Samaneh is an Assistant Professor at Wageningen University & Research. Previously, she worked at the Agricultural University of Iceland and Sapienza University of Rome. She worked for several landscape architecture firms, engaging in projects ranging from urban renewal to green infrastructure and water system management across different parts of the globe. She has conducted field research at UPennDesign, University of Pennsylvania (2017), and Université de Liège (2012).

**Martta Nieminen**
She is a doctoral researcher in regenerative organizing and business at Aalto University School of Business, Department of Management Studies, with an academic background in biology and a current focus in sociological environmental science. Her work explores how organizations shape our relationships with nature, and how these relationships can be reimagined through reciprocity.

**Maria Nóbrega Moita Magalhães Dias**
Master´s degree in Landscape Arquitecture by Faculdade de Ciências da Universidade do Porto, 2023. Master's degree internship at the Association of Municipalities of the Serras do Porto Park.

**Aleksandra Nowysz**
Architect and researcher of the Department of Revitalization and Architecture at Warsaw University of Life Sciences. PhD in Architecture and Urban Planning on urban agriculture architecture. The author of photographic projects devoted to vernacular architecture and landscapes. She combines research, teaching and design practice with visual art and social engagements.

**Leónia Nunes**
Leónia Nunes is a Forest Engineer, with a PhD in Forest Sciences. She is a researcher at the CEABN-InBIO at ISA/ULisboa, where she develops research in the silviculture of mixed forests, spatial structure of forest, modelling the growth of ecosystems and National Forest Inventories. She has been involved in several research projects and recently she has been collaborating with municipalities in the estimation of urban environmental benefits. She is a member of the Directive Board of the Forest Stewardship Council (FSC) Portugal and Vice President of the Portuguese Society of Forest Sciences.

**Liam O'Malley**
Liam's projects include producing pathogen free fertilizers from abundant organic wastes, which won the Icelandic BISC-E competition in 2024, and made the finals for the Nýsköpurnarverðlaun Forseta Íslands. He has researched self-sustaining succession paradigms that use native extremophiles and nitrogen fixers, and developed functional drone seeding pellets as an inexpensive alternative to planting. He is now using native entomopathogenic fungi to combat introduced arthropod pests

**Veli Ortacesme**
Veli Ortacesme has been trained as a landscape architect. His specialty and research interests include landscape planning, protected areas and urban green spaces. After having worked in private sector for two years, he moved to academia where he has been studying for more than 30 years. Currently, he has been teaching and conducting research at Akdeniz University, Faculty of Architecture, Department of

Landscape Architecture in Antalya, Turkey. Veli has 35 years of experience in professional practice, education and research and published more than 200 articles, conference papers, research reports, book chapters and book

**Gabriele Paolinelli**
Gabriele Paolinelli is architect with PhD in Landscape Design. He is Associate Professor of Landscape Architecture at the University of Florence. His research focuses on design approaches in planning with a special attention to the spatial dimension of the energy transition. Currently he coordinates a the University of Florence the Interreg EU project PACMAN enabling Mediterranean islands to start their transition to climate neutrality. He is vice-president of the Italian Academic Society of Landscape Architecture IASLA.

**Angeliki Paraskevopoulou**
Dr. Angeliki T. Paraskevopoulou is Associate Professor of Landscape Architecture and Ornamental Plants at the Laboratory of Floriculture & Landscape Architecture of the Agricultural University of Athens, originally employed in 2008. She holds a MSc in Vegetal Production from the Agricultural University of Athens, Greece, and both a Ph.D. and MA in Landscape Design, from the Department of Landscape, of The University of Sheffield, UK.

**Dawn Parke**
Dawn is a Senior Lecturer in Landscape Architecture and Programme Lead for the Master of Landscape Architecture at the Manchester School of Architecture. Dawn's multidisciplinary experience in both industry and academia has provided her with a comprehensive understanding of collaborative and interdisciplinary practice and teaching, which underpins her role as Landscape Architecture Lead in the Infrastructure Space Atelier .

**Liubomyr Parkhuts**
Liubomyr Parkhuts, an architect, senior lecturer of the Department of Landscape Architecture, Horticulture and Urban Ecology of the National Forestry University of Ukraine. Field of scientific interest: preservation, restoration and development of cultural landscapes.

**Alina Pasarel**
Alina Pasarel is a PhD candidate at USAMV, Cluj, Romania. Her research interests include agroecology, food justice, and integrated food policies. She is actively involved in local food policy councils and sustainability initiatives.

**Claire Pelgrims**
Pelgrims Claire (PhD) is a researcher in Urbanism and mobility studies at the Gustave Eiffel University, France and teaching at the Université Paris Cité, France and at the Université libre de Bruxelles, Belgium. Her PhD thesis focused on imaginaries of fast and slow mobilities in the evolution of Brussels mobility infrastructure since the middle of the 20th century. Her postdoctoral research now focuses on expanded understanding of mobility infrastructure in relation to gender, aestheticism and functionality. She is working with an European Marie Skłodowska-Curie postdoctoral fellowship on a research project about gender and bicycling aesthetics, looking at gender construction processes across cycling practices, equipment and infrastructure (H2020, SENCyclo 2022-2023).

**Paolo Picchi**
Paolo Picchi, PhD, is agronomist post-graduated in landscape architecture and his practice and research in landscape architecture and landscape ecology focus on the relationship between communities, landscape quality, farming and sustainable energy transition with a specific attention to mapping, participatory and transdisciplinary research methods. He is co-author of the book The Power of Landscape (naio10 Publisher, 2022). He is currently postdoc researcher in landscape architecture at the University of Florence.

**Roberta Pistoni**
Roberta Pistoni, is associate professor at the École nationale supérieure de paysage de Versailles, at the LAREP laboratory and associate researcher at LATTS

and Lab'URBA.  Her research focuses on landscape planning and design in energy transition context in France and the Netherlands. She is part of the collectif Paysages de après-pétrole.

**Ines Prehn**
Ines Prehn (M.Eng.), is research assistant in the project EN ROUTE at Osnabrück University of Applied Sciences. Her research interests lie in transdisciplinary planning processes, target group-specific communication and real-world experiments as a research method.

**Gabriela Rembarz**
Gabriela Rembarz PhD, is adjunct at the Gdansk University of Technology, Poland. She studied architecture, urban planning and environmental protection in Gdansk (GUT), Warsaw (WUT) and at the University Stuttgart (as a DAAD-scholar). She is also MIT_DUSP_SPURS Fellow 2012, recently cooperating with the Fulbright Poland. She is a member of the Society of Polish Town Planners (TUP) and the German Academy for Urban Development and Regional Planning (DASL). Gabriela explores landscape urbanism, combining an academic approach with her practical planning experience, related to the large-scale urban street-network development.

**Magdalena Rembeza**
Magdalena Rembeza is a tenured Assistant Professor at Gdańsk University of Technology, Poland, where she completed her doctorate. She is also a member of the Board of the Revitalization Forum Association. She gained her professional experience in Poland, England, Germany and the United States. She is also a scholarship holder of the Kosciuszko Foundation in 2014. In years 2014-15, she has completed the SPURS Program at the Massachusetts Institute of Technology (MIT), USA. Her research interests and practice focus on widely understood revitalization of contemporary cities and its public space, also with the use of art and culture.

**Silvia Ribot**
Silvia Ribot is an architect and urban planner (MArch) trained at Universidad Europea de Madrid and Anhembi Morumbi University in Brazil. She holds an MA in Landscape Urbanism from the Architectural Association, where she developed her master thesis on water management and flooding landscapes. She teaches Landscape Planning and Urbanism units at URJC and previously co-directed AA Visiting School Terrain Lab. She is currently pursuing a PhD on operational landscapes at ETSAM, Universidad Politécnica de Madrid.

**Emma Rishøj Holm**
Emma Rishøj Holm is a PhD fellow at Aarhus School of Architecture, where she works on interweaving building materials with the landscapes they come from and questions how we can care more for the ecologies we are inherently interdependent on. This necessitates transdisciplinary, trans-scalar, and tangible approaches. Through her previous work in practice, Emma has experience with a wide variety of scales. Most recently, she worked on the exhibition Before and After Sand with Material Cultures.

**Irina Rotaru**
Dr. Irina Rotaru is a senior urban planner at ARCHICALI, PARIS, France. Her expertise lies in urban resilience, participatory planning, and landscape regeneration. She has contributed to several EU-funded projects on sustainable urban development

**Usue Ruiz Arana**
Usue Ruiz Arana is a Senior Lecturer in Landscape Architecture, Thinking Eye editor of the Journal of Landscape Architecture and Chartered Landscape Architect with 20 years' experience in practice. Areas of focus: acoustic ecologies, multispecies reciprocity and design, and creative practice research.

**Henrik Schultz**
Prof. Dr. Henrik Schultz, is landscape architect and co-founder of the consultancies Stein+Schultz and

landschaft3*. He is full professor for landscape planning and regional development at Osnabrück University of Applied Sciences. His research and publications focus on climate-resilient city structures, sustainable mobility, transdisciplinary planning processes and walking as creative practice.

**Stefanie Schur**
Stefanie Schur is a landscape architect and visiting assistant professor at Nürtingen-Geislingen University in Germany. She was also on the faculty of Landscape Architecture at Syracuse University in New York and University of Nevada Las Vegas. She has developed ecosystem and wilderness management plans for several National Forests and National Parks in the U.S., co-wrote national conservation laws to protect Wilderness lands, and designed Scenic Byways programs in several U.S. state

**Alessandra Scognamiglio**
Alessandra Scognamiglio is architect, PhD in "Technologies for Architecture and Environment" at the University of Naples. Since 2000 she is researcher at ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development). For the EUPVSEC (European Photovoltaic Solar Energy Conference) she has been the creator and chairperson of the event "Photovoltaics, Forms, Landscapes. Beauty and power of designed photovoltaics". She is President of the Italian Association sustainable Agrivoltaics AIAS.

**Kelly Shannon**
Kelly Shannon is professor or urbanism at KU Leuven. She received her architecture degree from Carnegie-Mellon University (Pittsburgh), a post-graduate degree at the Berlage Institute (Amsterdam), and a PhD at the University of Leuven, where she focused on landscape to guide urbanization in Vietnam. Together with Bruno De Meulder she has been developing design research in Belgium and Vietnam which focuses on the evolving relation of landscape, infrastructure and urbanization in relation to the contemporary cascade of crises.

**Naomi Shimpo**
Naomi Shimpo is an associate professor at the Graduate School of Landscape Design and Management, University of Hyogo. She received her Ph.D. from the University of Tokyo and has held visiting positions at the Vienna University of Technology and Lincoln University (NZ). Her expertise lies in landscape planning, especially focusing on the roles of urban gardening in addressing various societal and environmental challenges, including social cohesion, disaster recovery, and climate change.

**Elisabeth Sjödahl**
Elisabeth Sjödahl is a Landscape Architect, Architect and Urbanist. She holds a landscape degree from the Technical University of Catalonia (UPC) Barcelona and an architectural degree from the École d'architecture de la ville et des territoires Paris-Est. She is an Associate Professor at AHO and co-founder of the new landscape architecture programme AHO and UIT Tromsø runs together. She recently received her PhD from AHO Oslo, titled Deep Landscape.

**Ana Luísa Soares**
Ana Luísa Soares is a Landscape Architect and Professor at the University of Lisbon (ISA/ULisboa). She is a researcher at the Centre for Applied Ecology "Prof. Baeta Neves" (CEABN-InBIO) and recently she has been appointed Pro-Rector of ULisboa. From 2009 to 2014 she was Vice-president of the Management Board of ISA. She has participated in several research projects and was the coordinator of the project "LX GARDENS: Lisbon's Historic Gardens and Parks". Since 2019 she is the Director of the Botanical Garden of Ajuda, ISA/ULisboa.

**Yael Sofer**
Yael Sofer is a landscape architect and Technion graduate with a master's degree in education systems management and a third degree in historic urban landscapes and regeneration. She is a teacher and researcher in the landscape architecture track at the Faculty of Architecture and Urban Planning at

Technion, Haifa. Her areas of expertise are landscape architecture, historical urban landscape and sustainability, and the history of Israel's urban landscape design from the beginning of the 20th century to the present day.

**Anna Staniewska**
Anna Staniewska, PhD habil. architect, is a researcher and associate professor at the Chair for Landscape Architecture at Cracow University of Technology. She holds a degree in architecture and urban planning and completed a post-graduate studies in heritage conservation. She investigates heritage landscapes and their social perception with special reference to fortified landscape and NGOs, as well as the healing aspect of landscapes of historic psychiatric hospitals. A certified facilitator of Planning for Real, she deals also with social participation in the spatial planning.

**Sven Stremke**
Sven Stremke is Professor for Landscape Architecture at Wageningen University in The Netherlands and founding director of the TwentyOneLandscapes research laboratory. From 2017 until 2022, he was Professor at the Amsterdam University of the Arts. His research focuses on decarbonization with special attention to post-carbon landscape design. He (co)authored more than 40 scientific papers. Sven is a member of the scientific boards for the German Academy for Territorial Development in the Leibnitz Association (ARL) and the Netherlands Energy Research Alliance (NERA), scientific director of the WUR Solar Research Programme and board member of the Dutch Archiprix foundation.

**Mana Taheri**
Mana is an architect from Iran with extensive experience in design and construction. She holds a master's degree in Landscape Architecture from the Estonian University of Life Sciences and has actively contributed to international landscape architecture projects. Her passion lies in collaborative work, particularly within diverse cultural contexts. As a programme coordinator and researcher, Mana plays a role in advancing the Landscape Architecture department, managing both bachelor's and master's programmes, collaborating on research projects, and lecturing. Currently, she is pursuing a PhD focused on urban green spaces and their relationship to spatial justice, with a particular emphasis on Iranian women. Through her experimental research, she aims to drive positive changes in the living environment and advocate for justice in all aspects of life.

**Arati Uttur**
Arati Uttur is a landscape architect practicing in Munich and an academic staff member of HSWT Weihenstephan-Triesdorf in Freising, Germany. Arati supports the Foodscape initiatives of the LE:NOTRE Institute, the Open Landscape Academy and Social Innovation programmes.

**István Valánski**
Hungarian University of Agriculture and Life Sciences, Department of Landscape Protection and Reclamation. István Valánszki, PhD, head of department, associate professor, landscape architect, teacher of engineering, landscape protection expert. He has been involved in several national and international projects and author of more than 200 publications, mainly related to ppGIS, cultural ecosystem services and GI.

**Imke van Hellemondt**
Imke van Hellemondt is architectural historian at Vrije Universiteit Amsterdam. Her research focuses on nature-culture relationships in Dutch landscape design in the 1960s and 1970s. She is co-investigator of the research project 'Uncovering hidden histories in landscape architecture' (funded by AHRC, GB) and participates in the landscape architecture archive project 'Het geheugen van het ontworpen landschap' (The memory of the designed landscape), for HNI (the New Institute, Rotterdam).

**Didier Vancutsem**
Didier Vancutsem holds bachelor and master's degrees in landscape architecture, city and regional planning and regional management. He is Assoc. Prof. at the ULB Brussels, Faculty of Architecture La Cambre Horta since 2009, involved in Landscape Architecture and Urban Planning Master programs as well as research. As director of the planning office "urban scape" Munich since 1992, Didier has gained professional experience worldwide in urban innovation, landscape management, elaboration of national and regional strategies for integrated urban development in Europe and Middle East, Africa, Russia, Asia. He is active as registered expert for the European Commission and URBACT, UN-Habitat and involved in European and international research projects. He was IFLA Europe delegate for Belgium (1994-1998) (2013-2021), Secretary General (2013-2019) of ISOCARP the International Society of City and Regional Planners, and is currently director of the ISOCARP Institute, its research branch. Since October 2021, he is Vice-President Professional Practice of the International Federation of Landscape Architects Europe.

**Nina Vogel**
Nina Vogel is Researcher & Programme Director for the SLU Urban Futures research platform at the Swedish University of Agricultural Sciences. Her work explores participatory processes, spatial justice, and sustainable transitions.

**Ursula Wieser Benedetti**
Ursula Wieser Benedetti is a curator for Landscape Architecture at CIVA Brussels, an archive centre and museum for Landscape Architecture and Architecture. She holds degrees in Landscape Architecture, Japanese Studies and Landscape architectural history (EHESS, Paris). Her research focuses on the history of landscape architecture in Belgium, and on Japanese gardens in Japan and in the West. She practiced as a landscape architect in France, Austria and Italy for more than 20 years.
**Dorota Wojtowicz-Jankowska**
Dorota Wojtowicz-Jankowska is a Professor at the Faculty of Architecture of the Gdańsk University of Technology. She is employed at the Department of Environmental Design. She is a promoter of many diplomas on bachelor's and master's levels. In her research work, she is concerned about the problems related to exposition spaces and shaping the city's landscape. Among her research interests are problems of creating cultural spaces such as museums, galleries, and urban areas used for various forms of presentation. She popularizes scientific experience in cooperation with local governments and public institutions.

**Merve Yildiz**
The National Botanical Garden of Turkey, General Directorate of Agricultural Research and Policies of the Ministry of Agriculture and Forestry of the Republic of Turkey: Dr. Merve Yıldız completed her undergraduate education at Ankara University, Faculty of Agriculture, Department of Landscape Architecture between 2005-2009 and received the title of Landscape Architect. After completing her undergraduate education, Dr. Yıldız received her PhD degree from Ankara University Institute of Science and Technology, Department of Landscape Architecture in 2021. Dr. Yıldız has been working as a landscape architect in the National Botanical Garden of Turkey, General Directorate of Agricultural Research and Policies of the Ministry of Agriculture and Forestry of the Republic of Turkey since June 2013.

**Ibrahim Yilmaz**
Ibrahim Yilmaz is specialized in agricultural economics. His specialty and research interests include farm management and farm economics, agricultural cooperatives, rural development and agricultural marketing. After graduations he started to academia where he has been studying for more than 35 years. Currently, he has been teaching and conducting research at Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics in Antalya, Turkey.

**Zielonko-Jung Katarzyna**
Katarzyna Zielonko-Jung – an architect, academic lecturer, scientist, professor at Gdańsk University of Technology at the Department of Environmental Design. She has co-created the program for postgraduate studies in Ecological Architecture and Construction and is a lecturer there. She has authored numerous Polish and foreign publications related to ecological architecture issues, in particular their relationship with microclimatic phenomena in the urban environment. She participated in research projects focused on sustainable architecture and improving the quality of city climate. She is a member of Gdańsk Architecture Council, UN Global Poland Climate Council, Mazovian District Chamber of Architects, and Association of Polish Architects.