

CLEVER CITIES HAMBURG

In the southwest of Hamburg CLEVER Cities implemented over 20 different NbS pilots together with various local stakeholders and communities. The aim was to use locally adapted nature-based solutions (NbS) – add aspects of co-creation to the process of making them – and thus create more socially inclusive and value added urban neighborhoods. This addresses the following urban regeneration challenges: health & well-being, social cohesion & environmental justice, sustainable economies and citizen security.

PROJECT AREA



c. 220 ha
c. 12,000 inhabitants

lower density, high youth unemployment rate, higher rate of elderly and under 18, high car ownership

CLEVER ACTION LABS (CAL)

CAL1: Green Corridor

Small co-created NbS interventions create green stepping stones for urban nature. The corridor meanders between the stations Neugraben and Fischbek and between the old and newly built neighborhoods.

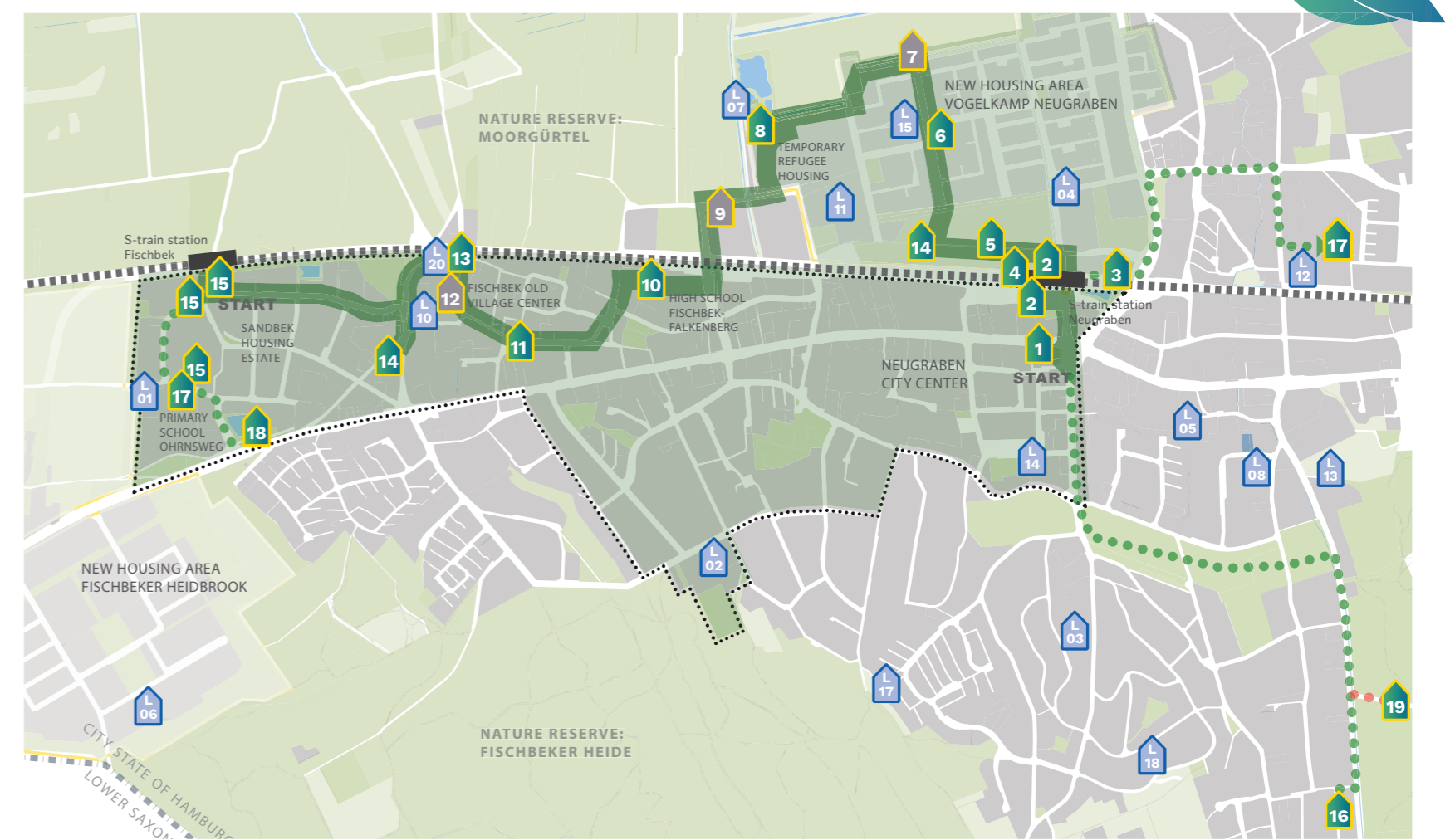
CAL2: Green facades & roofs / Stormwater management

Grey-green NbS pilots test solutions to deal with stormwater events. They include app-controlled green retention roofs, retention roof in cyclepath construction, green infiltration beds and a new drainage simulation model to derive further NbS solutions from.

CAL3: School yards & environmental education

CAL3 (re)connects the younger generation with nature through a permaculture garden, mobile school gardens, mobile aquaponics system and the transformation of monocultural lawns into bee-friendly flower meadows.

CLEVER PARCOURS



1 Bee-friendly qualification of a green roof



2 Connected tree pits / Connected root tunnels



3 Blue roof as drainage for cyclepaths



4 Greening of the noise barrier wall



5 10 new 'climate trees' for the neighborhood park



6 Blue-Green roof controlled by Smart App



7 Cat Protection ditch (not a CLEVER NbS)



8 Temporary gardens at refugee acc.



9 NbS site proposed by residents (Not a CLEVER NbS)



10 Researchers' garden / Mobile Aquaponics-system for schools



11 NbS sign with local history at former fire suppression pond



12 Historic Fischbek sign (Not a CLEVER NbS)



13 Nature Experience playground



14 Art meets nature - sculpture by makers' club & students



15 Green Facade with butterfly motif / Multi-generational bee-friendly shrub beds / Meadow Orchard with early bloomers



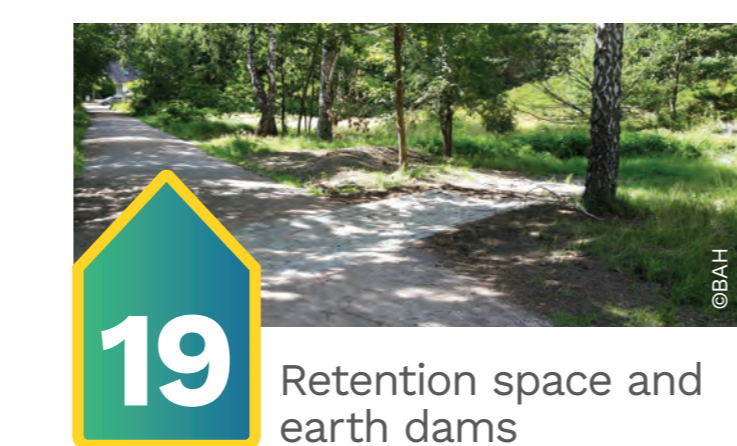
16 Infiltration Planters based on CLEVER Drainage Analysis



17 Mobile School Garden for two primary schools



18 Turn a retention basin into public park



19 Retention space and earth dams



XX Turn your lawn into a flower meadow with bee hotel (20 sites ~ 300 m² in total)

CLEVER CITIES PROJECT

CLEVER Cities Project (CLEVER) primarily aims to regenerate some deprived urban districts by implementing different types of solutions through a co-creation process. **Innovation** is a core element in CLEVER, which is integrated in different activities and steps of the Nature-based Solution (NbS) implementation and co-creation processes. The term *Innovation* is used to broadly refer to **new ideas or methods that are able to be turned into value**.

INNOVATION

The CLEVER framework for innovation aims to capitalise on synergies between the NbS interventions (monitoring, management, methods and materials) and local capacities (place, people, platforms, prosperity). These elements are outlined through a grid, within which new innovations may emerge in the interventions-capacities intersections

As such, CLEVER pursues the idea that **innovation is present both in the technology of the NbS, as well as in their co-creation process**. By bringing these opportunities to light, the framework allows for the identification of those specific actions where innovation may emerge.

The innovation criteria to be evaluated are not always considered 'absolute' (i.e., never previously implemented), but are mostly to be considered 'relative'. Relative innovation may be either a novelty defined against a more conventional solution used until then, or a transfer of the implementation of an idea from a different place, as long as it has never been applied earlier for integration of NBS into urban regeneration.

LIST – THE EVALUATION WEBTOOL

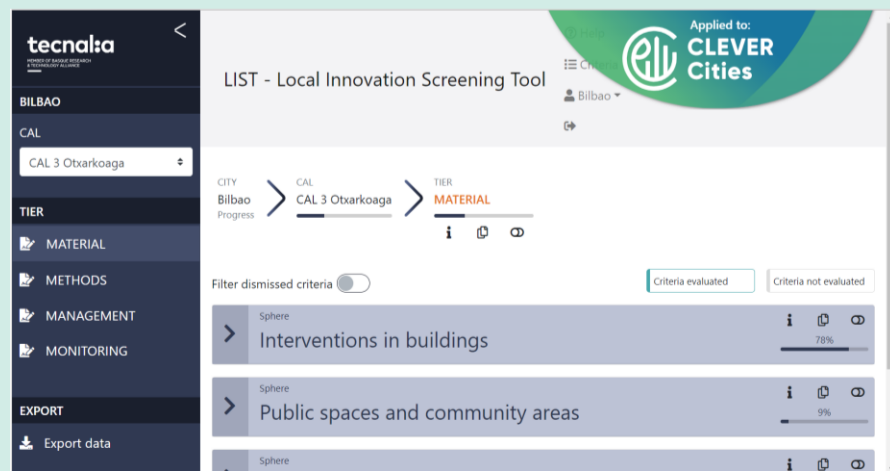
The *Local Innovation Screening Tool* (LIST) is a webtool developed by TECNALIA, adapted and applied to CLEVER, whose goals are twofold:

- to identify the innovation pathway along the timespan of the project in terms of NbS implementation, considering aspects such as Materials, Methods, Monitoring, and Management;
- to provide inspiration and knowledge about different types of innovation along the NbS co-created process for the implementation (i.e., co-creation, co-design, co-implement, co-monitoring, co-maintenance).

In CLEVER, LIST gives support to its Frontrunner-Cities moving towards a new and significantly improved urban regeneration through NbS implementation (London, Milan, Hamburg), that responds to four challenges: Human health and well-being; Sustainable economic prosperity; Social cohesion and Environmental justice; and Citizen security. It also aids Fellow-Cities (Malmo, Madrid, Larissa, Belgrade, Sfântu Gheorghe, Quito) to create value considering innovation in the process of NbS ideation and their future action plans.

LIST is based on an innovation pathway assessment from the technological, economic, social, and legal viability points of view, emerging as result of a reflection process within each city. For that, both Ex-Ante and Ex-Post evaluation are taken place, counting on associated functionalities embedded in the tool. The innovation covers three different evaluations: **Innovation Readiness Level (IRL), the Innovation Model, and the Viability for implementation.**

LIST webtool interface



LOCAL INNOVATION SCREENING TOOL (LIST):

An innovation pathway for the NbS implementation process

CONTENT STRUCTURE

To facilitate the identification of the innovation pathway, LIST is based on a set of **pre-established criteria, organized in four hierarchical levels: Tiers, Spheres, Components, and Criteria**. The almost 150 criteria included were initially elicited from project partners, to be later defined and crystallized by a group of experts, and followed by an in-depth review process supported by different professionals. This innovation framework is indeed the **biggest value of the LIST**.

INNOVATION MODEL

There are four types of innovation models considered in LIST:

- Application of existing innovative solutions or processes/methods into **new context (spatial/ sectoral)**.
- Upgrading for improvement the functionality of existing innovation:** significantly improved NBS (good or service) or implementation process.
- Combination and/or integration of existing innovative solutions** resulting in a new one: significantly improved NBS (good or service) or implementation process.
- Application of **completely new solution or approach**.

INNOVATION VIABILITY

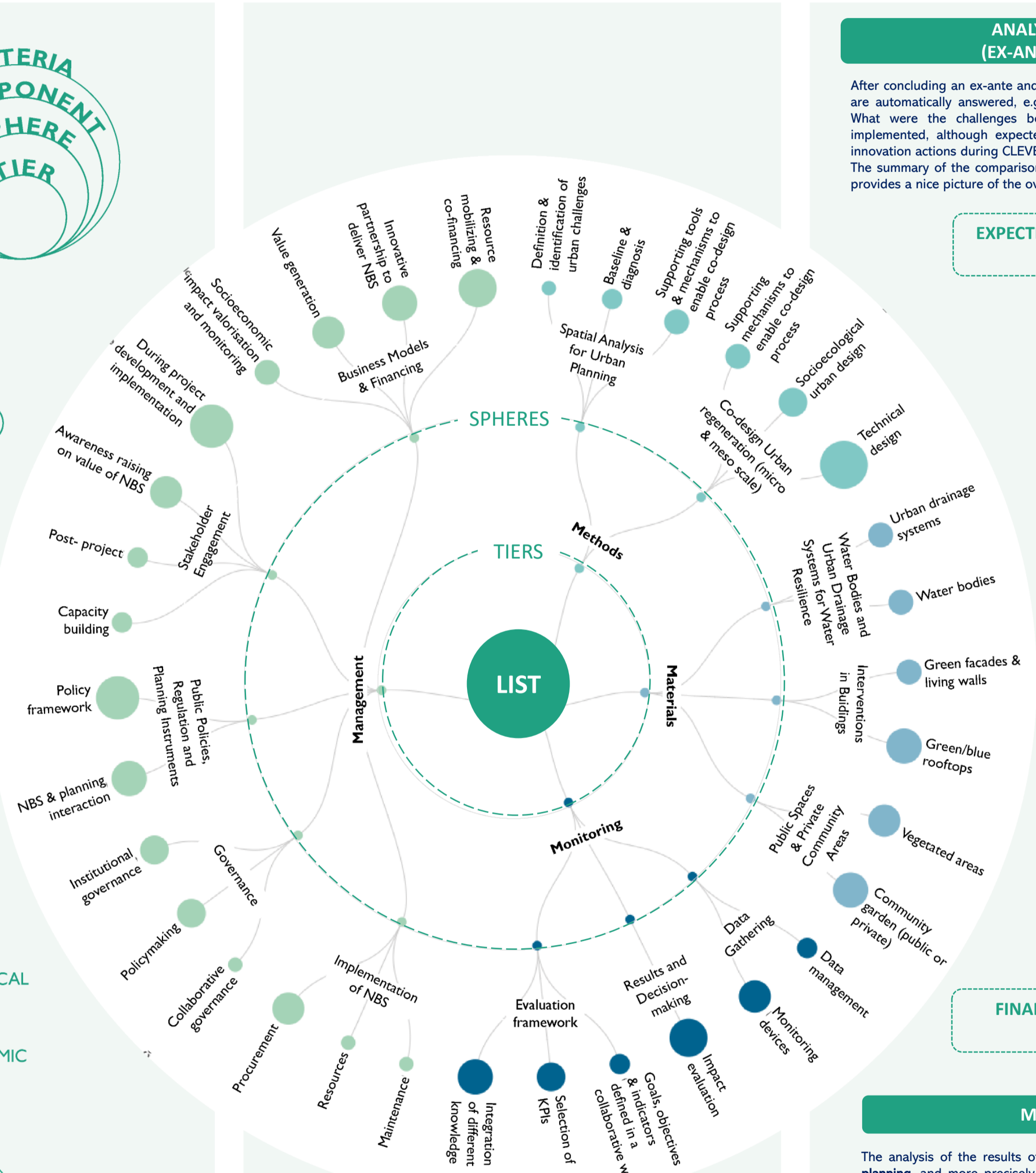
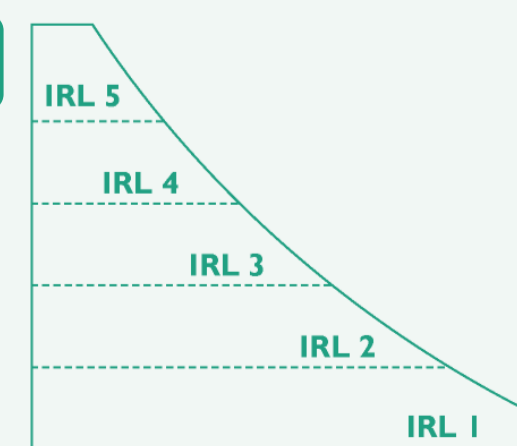
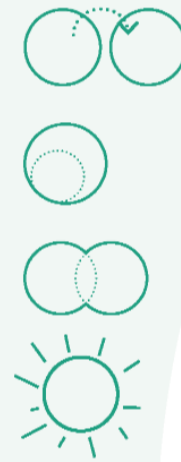
The assessment of the Innovation in terms of viability is important, since an innovation which implementation is not possible, or extremely complicated, does not provide value in itself.

This assessment has been considered at the process level, taking into account **four types of viability: Social, Legal, Technical, and Economic**, and establishing a scale of three levels of viability, low, medium or high.

INNOVATION READINESS LEVEL (IRL)

It refers to the degree of innovation of the solutions, in technological terms, which is summarised in five levels:

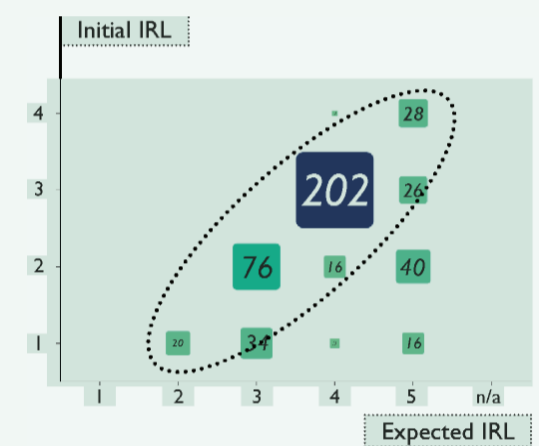
- IRL 5: Operational
- IRL 4: Applied in specific environments
- IRL 3: Demo/pilot
- IRL 2: Conceptual
- IRL 1: Not yet considered



ANALYSIS OF RESULTS (EX-ANTE AND EX-POST)

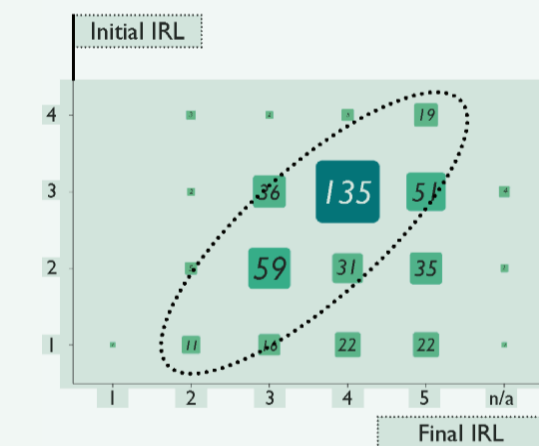
After concluding an ex-ante and an ex-post analysis, some relevant questions are automatically answered, e.g. What kind of innovation was considered?, What were the challenges behind why some innovation could not be implemented, although expected?, Which spheres have pictured the most innovation actions during CLEVER Cities?. The summary of the comparison of the expected and real IRL improvements provides a nice picture of the overall innovation pathway.

EXPECTED IRL IMPROVEMENT (EX-ANTE)



Many of the expected IRL improvement were fulfilled by the end of the CLEVER according to the initial expectations, evolving an average of one or two levels (coherent and realistic given the duration of the project). Some criteria have surpassed the expectations, increasing their IRL by more than two levels. However, results have to be interpreted carefully, since they may be a result of the cities being too cautious on their expectations, that challenges along the project have prevented the innovation to happen (pandemics), maturity of LIST, etc..

FINAL IRL IMPROVEMENT (EX-POST)



MAIN MESSAGES

The analysis of the results offer **valuable insights to directly inform urban planning**, and more precisely, to **contribute to the replication strategy and the development of a more refined NbS action plan**.

Some considerable learnings fostered by LIST are to: **identify the innovation opportunities in advance**, be able to **redesign a more innovative technical proposal**, know options on **how to nurture co-creation**, boost the **benefits of NbS**, **improve policies**, identify **gaps** to complete research agendas, recognize possibilities of **optimising resources**, support the **preservation of the biodiversity and provision of ecosystem services**, among others.

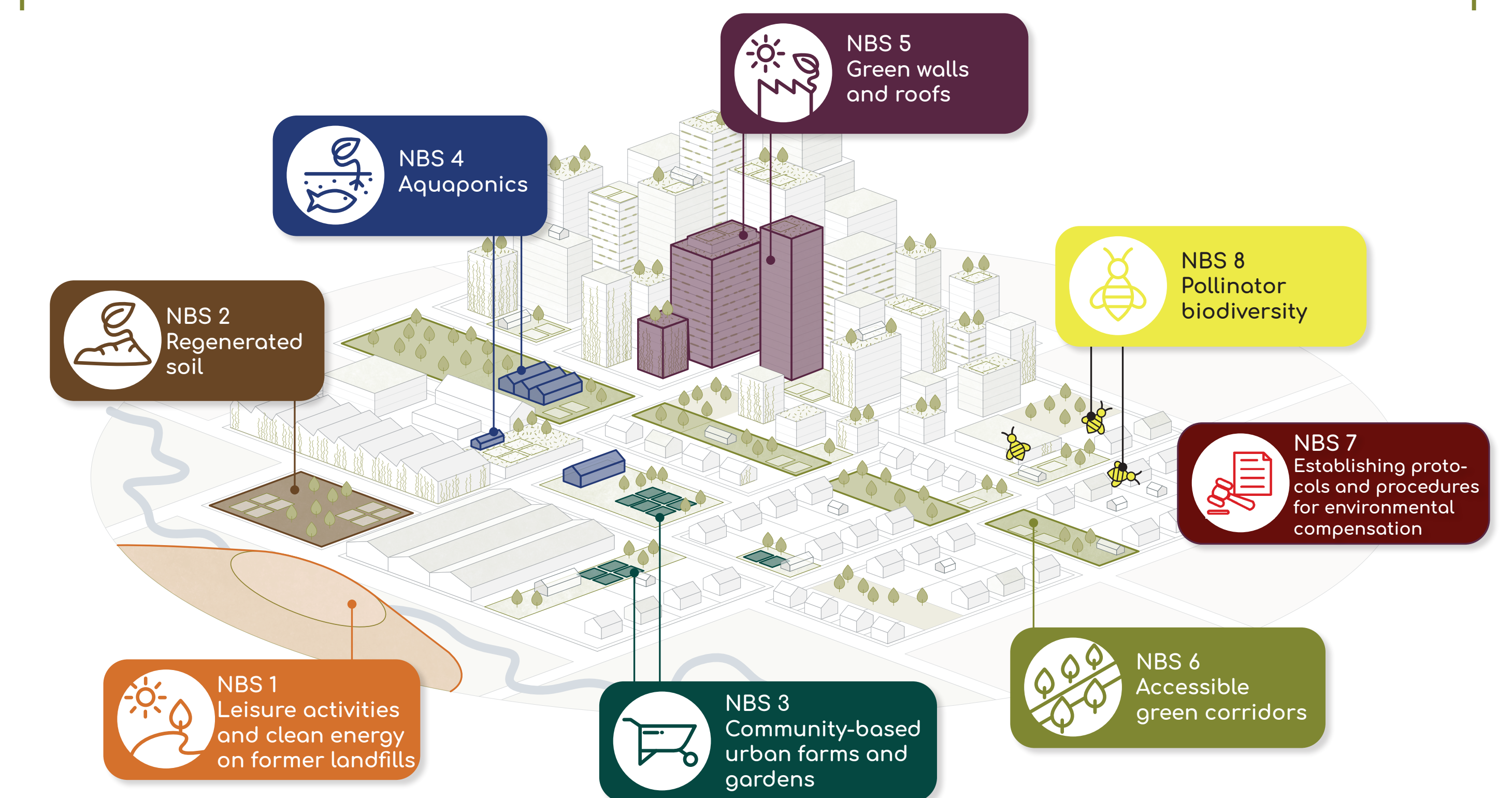
Particularly for CLEVER, these learnings may contribute to **improve the urban regeneration in deprived areas**, promoting a more sustainable societal transformation.



OUR CITIES



OUR EIGHT NBS



28 NBS out of eight different nature-based solutions implemented in post-industrial Living Labs improve productive green infrastructure and living conditions, contribute to reducing climate change effects while providing measurable economic benefits for citizens and entrepreneurs.

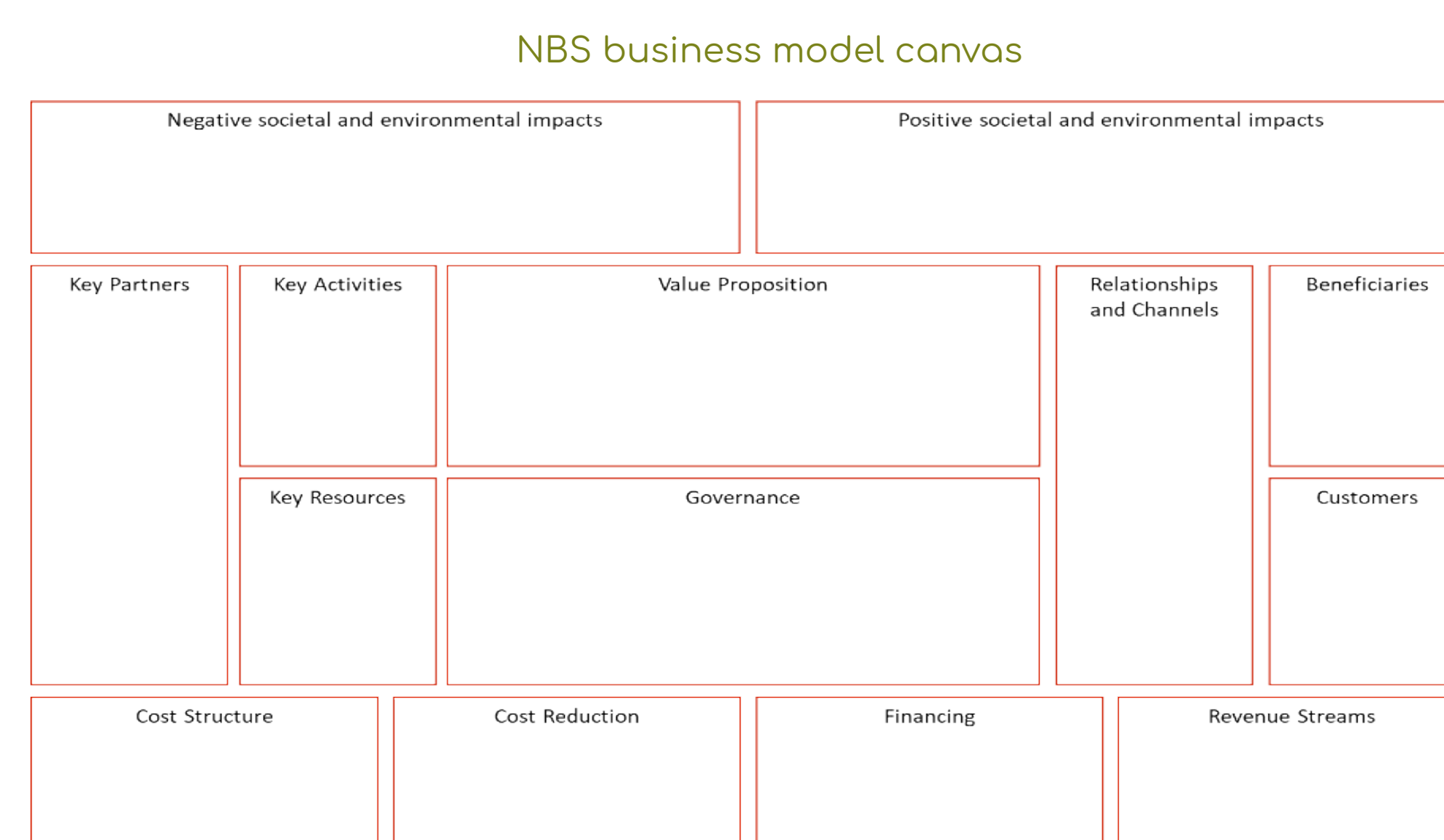
CO-CREATING NBS



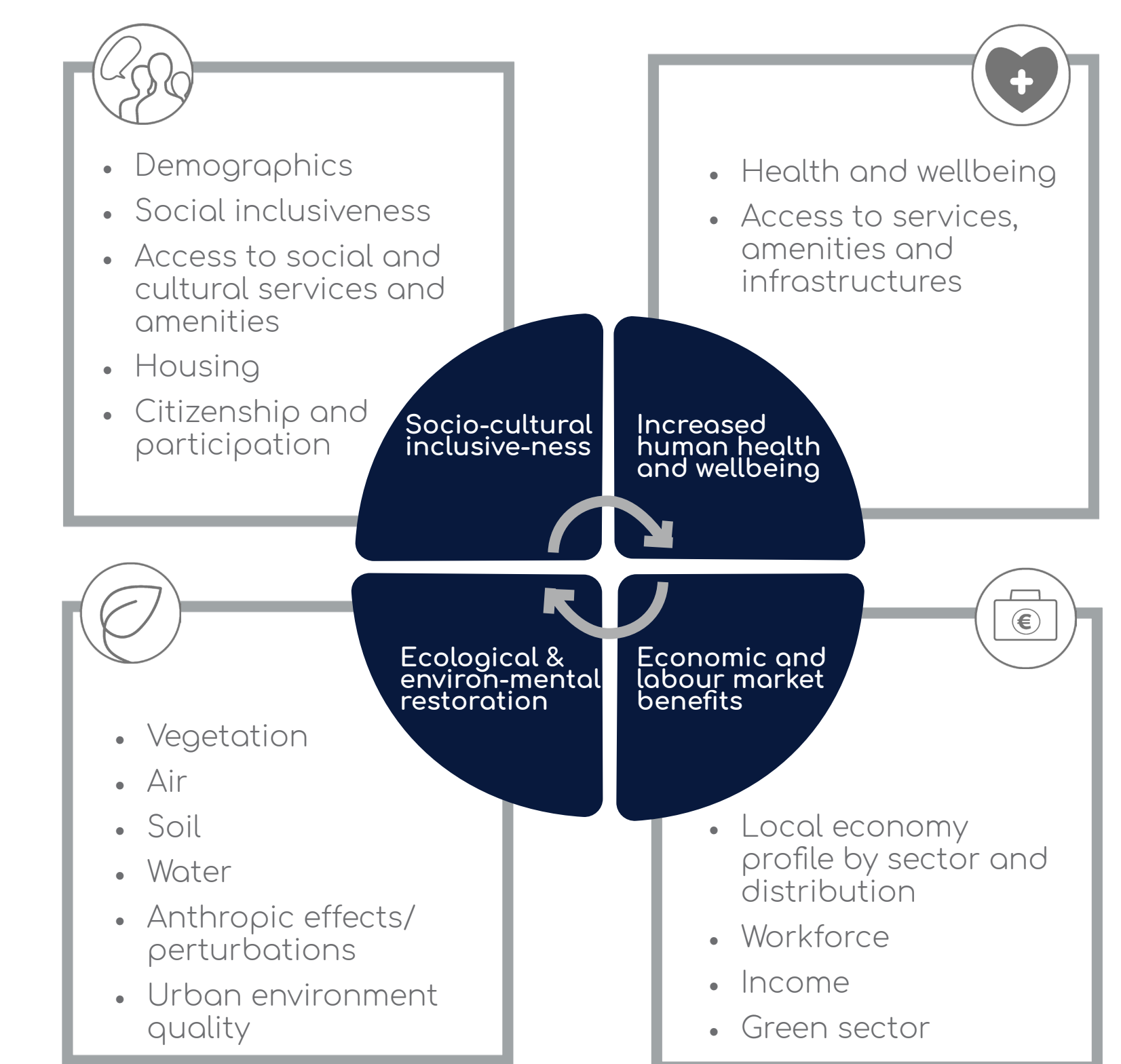
Together, local citizens, governments, businesses, NGOs and universities design nature-based solutions for urban regeneration and make them happen.

NBS BUSINESS MODELS

ProGReg developed self-sustaining business models for nature-based solutions, based on scientific assessment of the multiple benefits for social, ecological and economic regeneration.



ASSESSING NBS BENEFITS



Monitoring indicators pre- and post NBS implementation on four assessment domains generate evidence-based results for decision and policy-making.

34 Partners

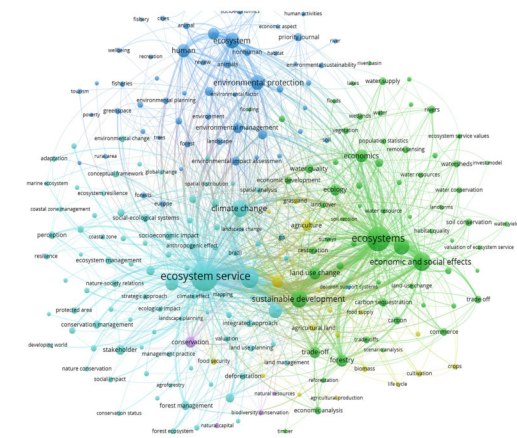
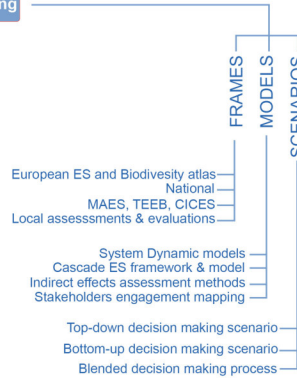


Assessing the social impact and co-benefits of re-naturing measures in cities through the analysis of the ecosystem services provision

SPOKE 5

Task 7.3 Innovative monitoring, indicators, & models to co-design & management

- Section 1. Innovative monitoring
- Section 2. Indicators & models for planning
- Section 3. Co-design & co-management
- Section 4. Making guidelines alive



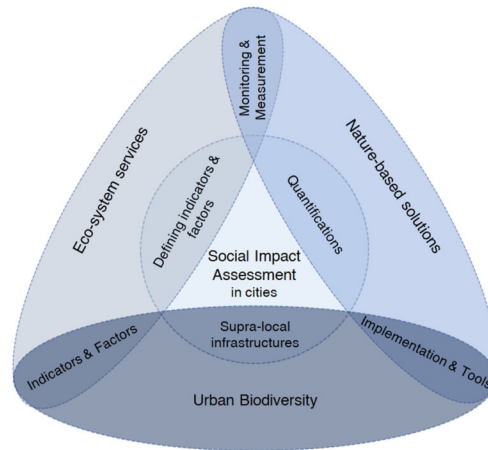
Landscapes, keywords, and connections between published researches on Social Impact of ES on Scopus until 28.06.2023

Social Impact Assessment, Urban biodiversity, and NbS: Link and Connections

To improve and preserve urban biodiversity, re-naturing measures in cities is a key concept that requires enhancements in interactions between society and nature in urban fabrics. In a three-step procedure, this research suggests a social impact assessment framework for measuring re-naturing co-benefits using ecosystem service analysis.

The first step consists of extracting and analyzing ES's leading indicators, factors, and impacts based on a systematic literature review and, secondly, using the extractions to measure direct and indirect social impacts through surveys, observation, remote sensing, and data analysis in the case study (San Faustino in Milan) and test beds (for validation) to provide a basis for the evaluation. Ultimately, SIA, through quantification of data and mapping connections and trade-offs between stakeholders, interventions, impacts, and supra-local infrastructure, to understand the value of services and disservice of nature to provide suggestions in decision-aiding processes and city developments.

This research aims to develop a process for social impact assessment of re-naturing measures in urban areas, which considers the preservation of urban biodiversity in the long term, evaluates results for improvement in the urban decision-aiding process and biodiversity preservation.



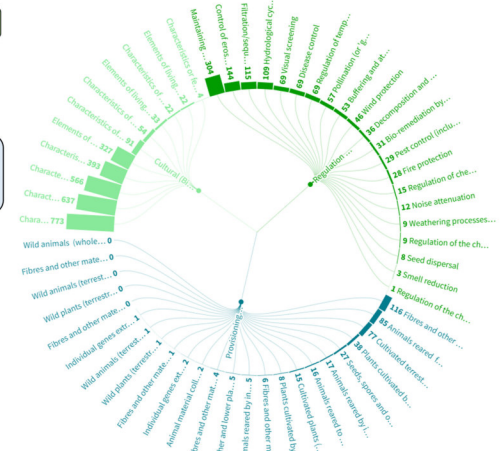
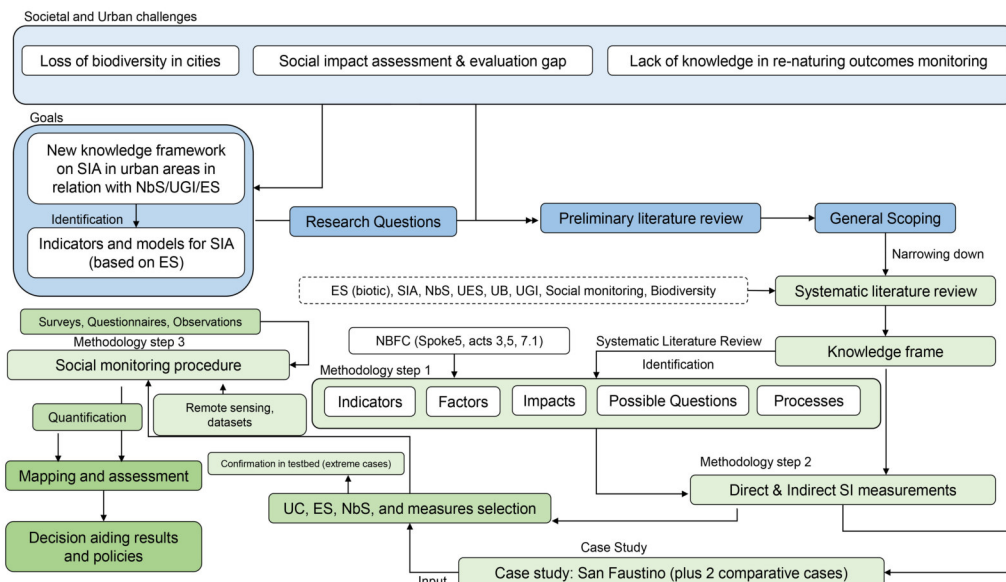
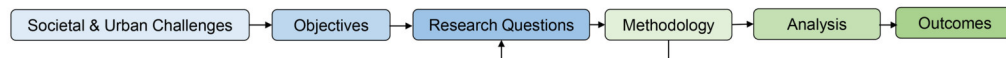
Overview of the relation of Social Impact Assessment to ES, NbS, and Biodiversity

Objectives of the Research Integration of ES and NbS in Assessment

The main objective of the research is connecting ES to SIA of re-naturing measures for improved evaluation and monitoring of urban biodiversity and co-benefits of nature in cities and urban fabrics. To reach this objective and answer the imposed problems and issues listed above, a main imposed question is: • How can ecosystem services influence the social impact assessment of urban biodiversity and re-naturing measures in cities? What are the connections?

Three subsequent questions guide the research to answer the main question. These questions will lead the research in two different phases. These sub-questions facilitate the construction of a framework for answering the main research question.

- Which are each ecosystem service's leading indicators and factors for social impact assessment in urban areas? To what extent are these issues related to urban biodiversity?
- How can these indicators be measured and localized in an urban context? What are the qualities or quantification methods for ecosystem services' social impact measurements?
- How does the social impact assessment of ecosystem services incorporate communities, planned interventions, and local and supra-local infrastructures? What are enhancements and improvements or possible shortcomings? How will indicators and methods change in comparison with short-term assessment?



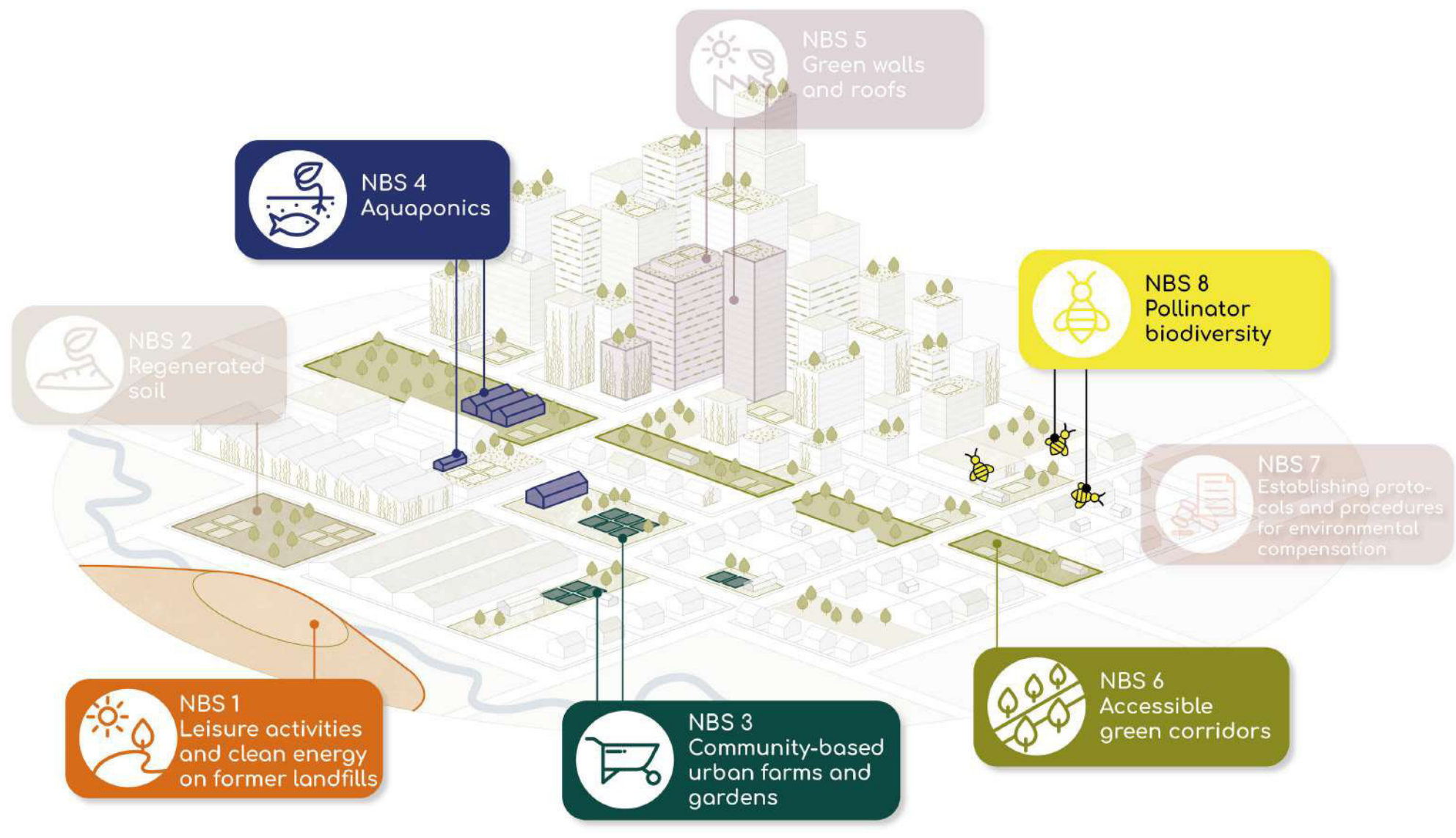
Categorised publications on relation between ES and SIA

National Biodiversity Future Center

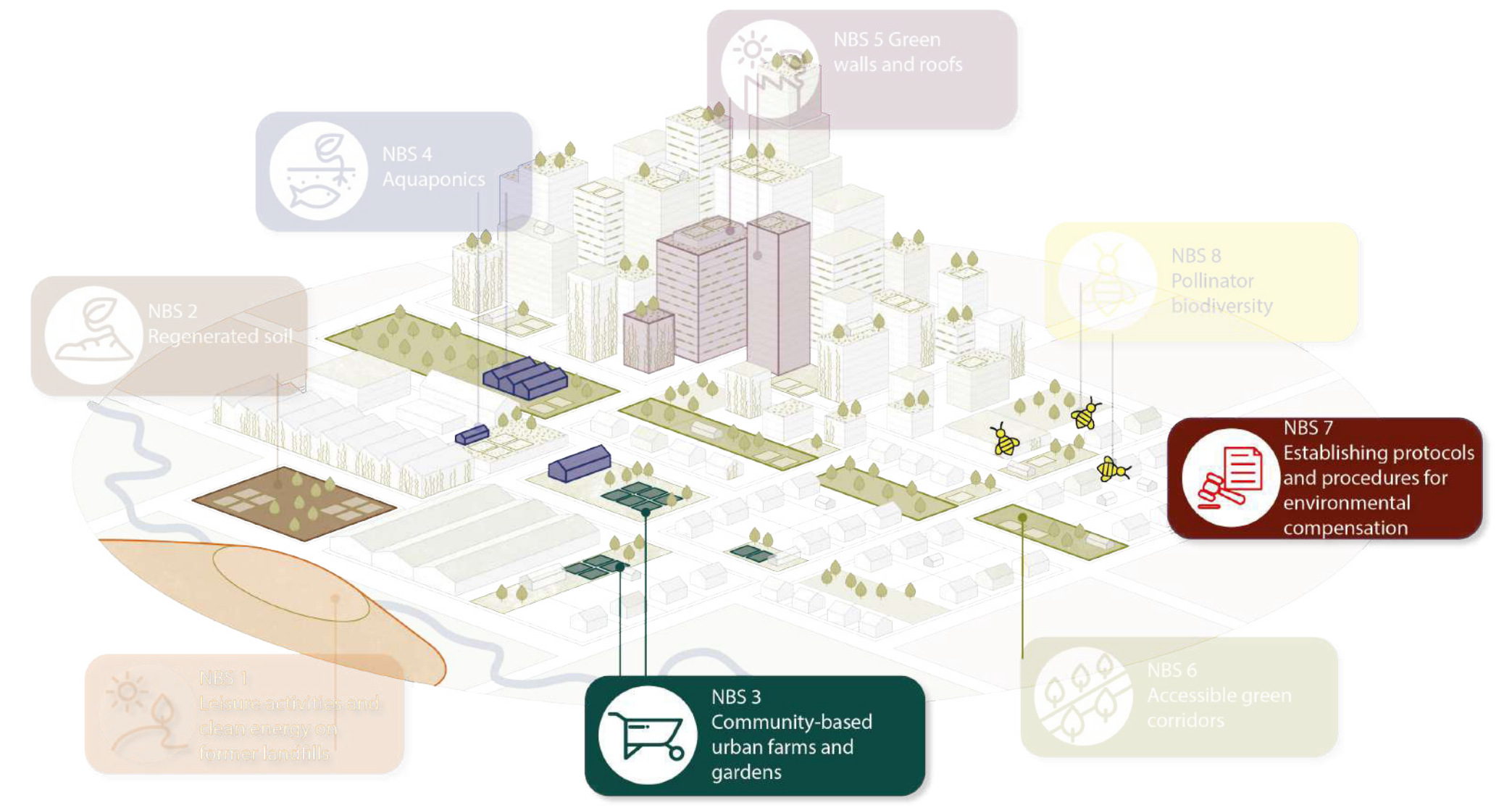
The SPOKE 5 of the NBFC is oriented to examine biodiversity patterns and dynamics in urban contexts. Task 7.3 has at its core the objective to monitor, evaluate, and assess the projects, and policies tackling biodiversity, and bring innovation in analysis by integration of technologies and multidisciplinary concepts with involvement of ecosystem services and NbS.

28 implemented NBS in Front Runner Cities

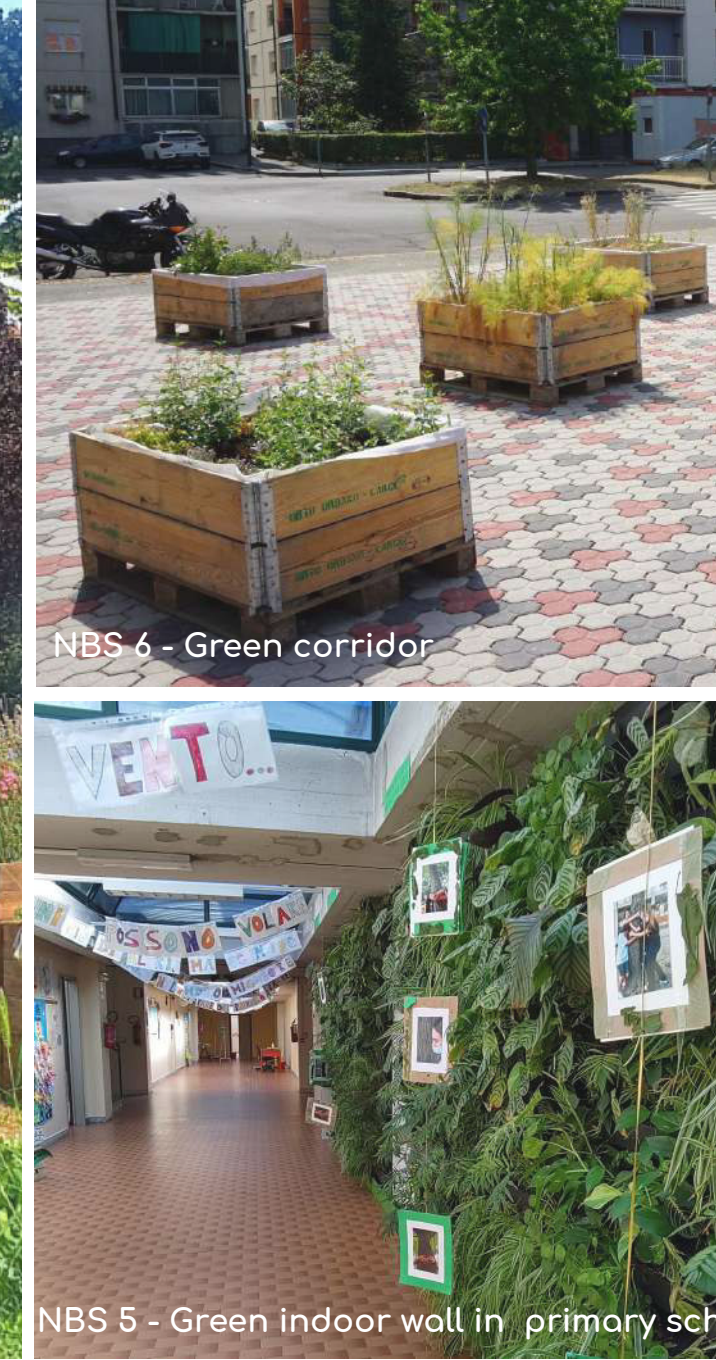
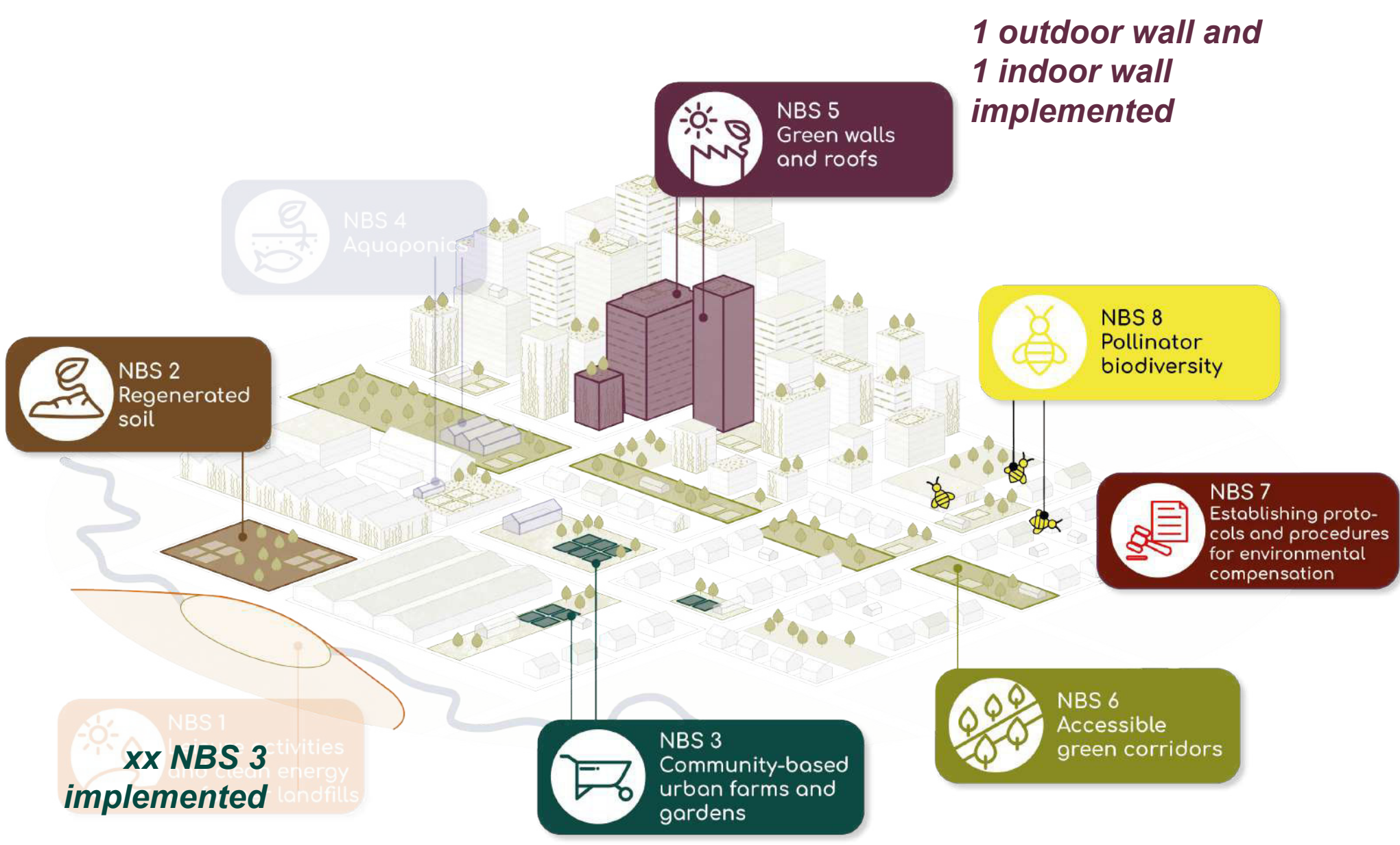
Dortmund 5



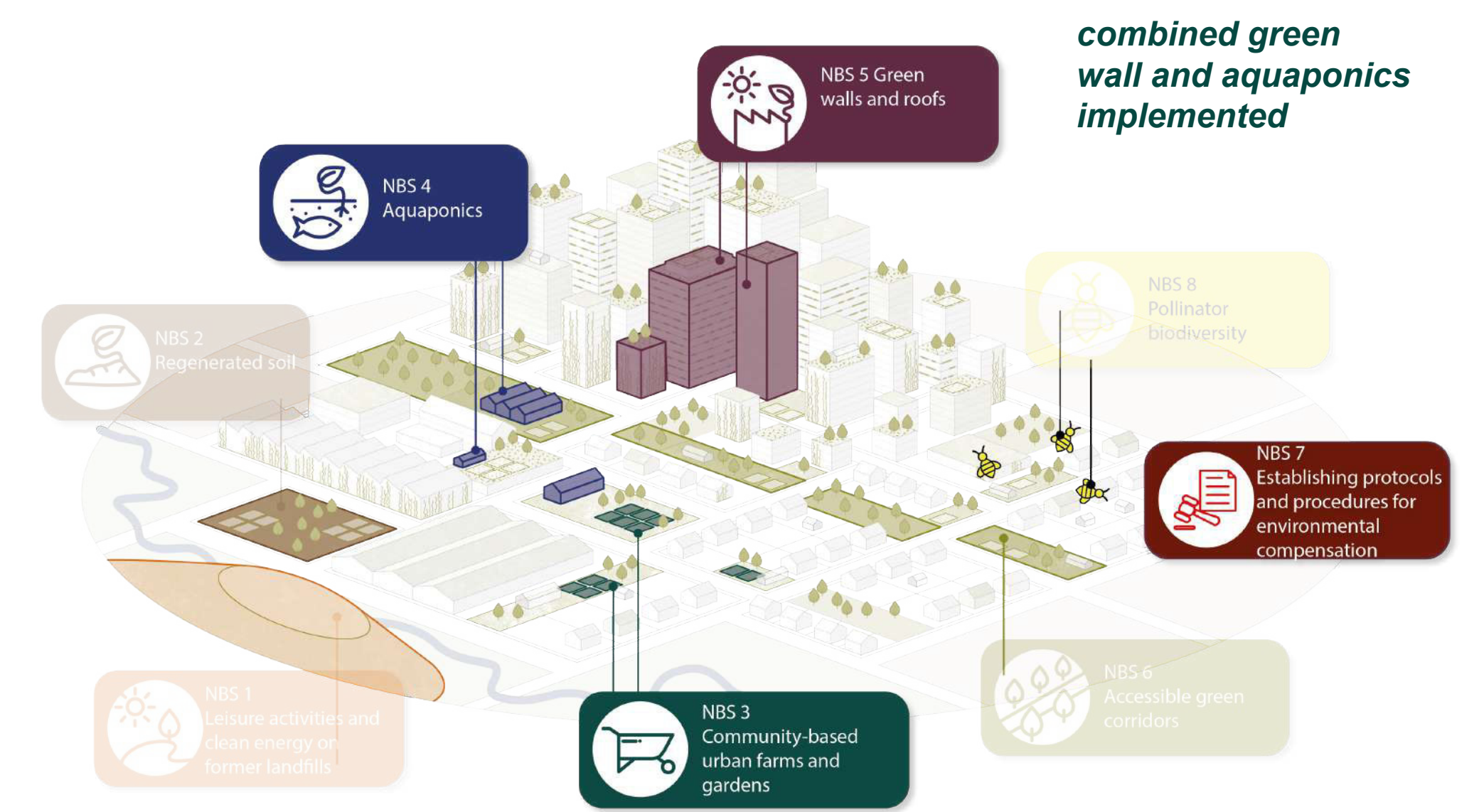
Ningbo 2



Turin 17



Zagreb 4



FIVE CASE-STUDY CITIES



Cities are increasingly vulnerable to climate change related risks, including more frequent and intense heavy rainfall events. In cities without green infrastructure and where wastewater, stormwater and urban runoff are routed together to sewage treatment plants, drainage systems can be flooded. These so-called **combined sewer overflow (CSO)** events lead to the discharge of contaminated water directly into rivers, streams or other nearby water bodies.

The NICHES project (April 2022–March 2025) aims to identify new solutions and increase the knowledge base for urban water management and reduce the burden on both society and aquatic ecosystems by exploring the potential of **nature-based solutions (NBS)** to mitigate CSO events. NICHES will raise awareness and capacities about NBS integration into urban planning. In doing so, the project will protect aquatic biodiversity and the delivery of wider societal and economic benefits.

WHAT DO WE WANT TO ACHIEVE?



Showcase the potential of NBS to safeguard aquatic ecosystems and deliver further environmental benefits.



Determine the social and economic benefits of nature-based solutions for urban dwellers.



Support science-society-policy exchange to design resilient urban water management systems.



Engage with key stakeholders across the five NICHES cities to produce relevant and upscalable results.



Co-develop transition pathways for increasing the integration of nature-based solutions in local policy frameworks.



Provide decision support for the successful selection, design and implementation of urban nature-based solutions to mitigate runoff impacts.



Determine city-specific vulnerabilities and develop spatially specific recommendations.

CO-CREATING SOLUTIONS

NICHES will use five global cities as **co-design arenas** to explore these topics/pursue these activities, namely: **Berlin, Rotterdam, Barcelona and its Metropolitan Area (AMB), Sheffield,** and **Boston**. Working together with key stakeholders (e.g. policy makers, practitioners, NGOs and community groups, private, and sectoral actors), the project will co-create knowledge and develop a shared understanding of nature-based solutions and their potential for reducing stormwater runoff. These efforts will help to overcome policy and planning silos and transition towards greener, more inclusive and resilient urban water management for the benefit of society and biodiversity alike.

PARTNERS

-  Ecologic Institute, Berlin (ECO) – Project Coordinator
-  Institute of Environmental Science and Technology at the Autonomous University of Barcelona (ICTA – UAB)
-  Netherlands Institute of Ecology (NIOO-KNAW)
-  University of Sheffield (USFD)
-  Northeastern University (NU)
-  Pensoft Publishers



This project was funded through the 2020–2021 Biodiversa and Water JPI joint call for research proposals, under the BiodivRestore ERA-Net COFUND programme, and with the funding organisations: German Federal Ministry of Education and Research, Agencia Estatal de Investigación española, Ministry of Agriculture, Nature and Food Quality of the Netherlands. NICHES is coordinated by the Ecologic Institute.

Front Runner City Dortmund :: Living Lab Huckarde



Huckarde connected by nature!



Dortmund is the largest city in Germany's former coal mining and steel industry center. Deindustrialization is driving economic, social and environmental transformation. Large-scale contaminated brownfields, former industrial and transport sites are in need of redeveloping and socio-economic disparities addressed.

NBS activities in the post-industrial Living Lab in Huckarde district focused on improving green corridors, testing food production systems on contaminated soil and community-led urban garden projects.

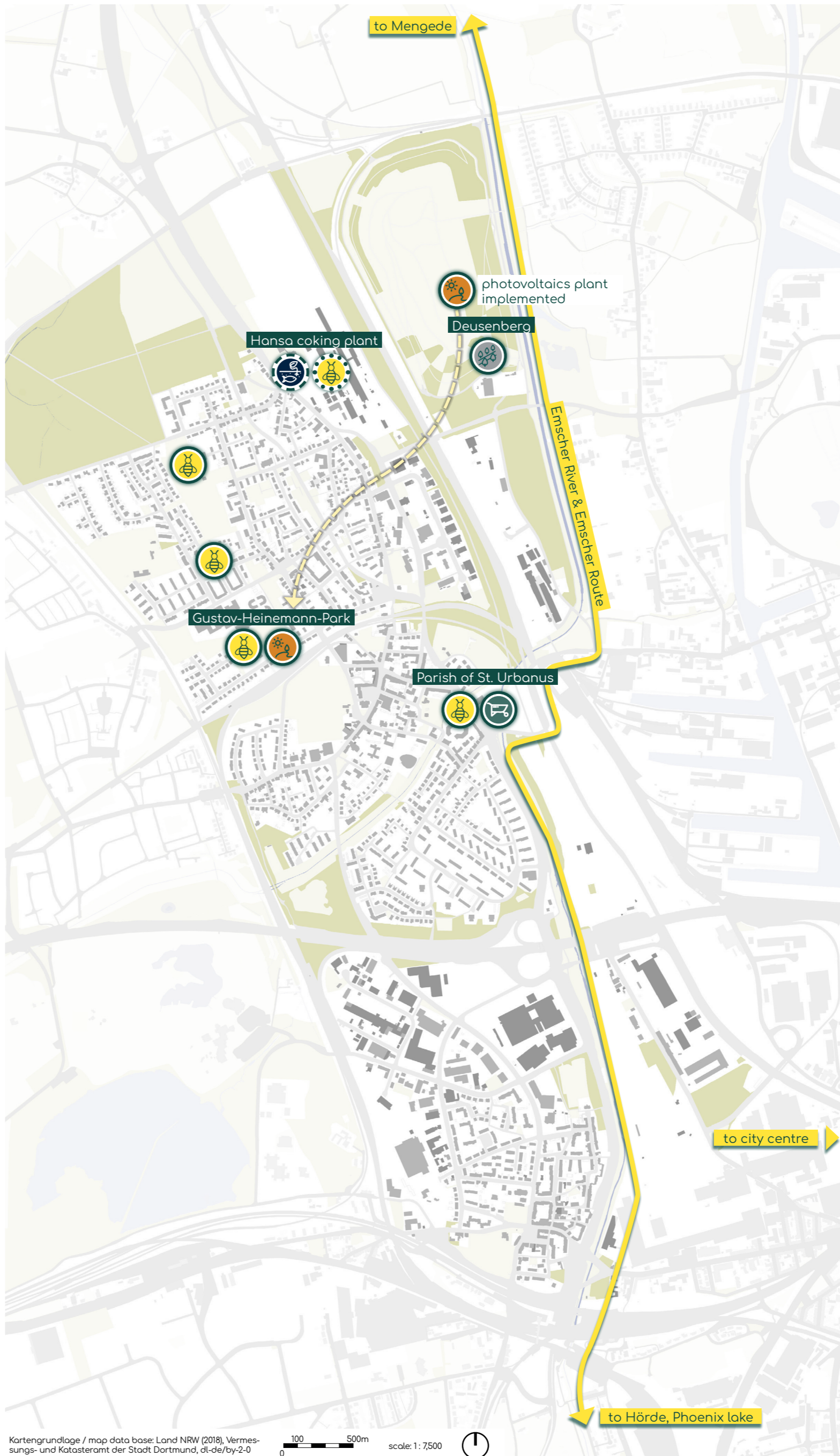
Lage und Umsetzungsstand Huckarde Living Lab, Dortmund Status quo of Huckarde Living Lab, Dortmund

Living Lab Plan | Living Lab Vision map Update: 11 2022

- Ziel 1** Zur Stärkung des sozialen Zusammenhalts und der Identifizierung mit dem Stadtteil sollen in Huckarde neue Grüne Infrastrukturen entstehen und die Angebote an die Bevölkerung sich gärtnerisch zu betätigen, verbessert werden.
Goal1 Implementing Green Infrastructure and gardening activities to improve the social situation and to foster identity within Huckarde.
- Ziel 2** Beteiligung der Bürgerinnen und Bürger bei der Planung und Unterhaltung von „grünen Projekten“.
Goal2 Involving citizens in the design and management of projects with nature based solutions.
- Ziel 3** Beförderung von neuen Geschäftsmodellen, die auf der Idee einer natürlichen Kreislaufwirtschaft beruhen.
Goal3 Promoting new professionalism and business models based on natural solutions of circular economy.

<p>NBS 1 – Sportangebote im Gustav-Heinemann-Park Ort: Gustav-Heinemann-Park, Dortmund Huckarde Beschreibung: Öffentlich zugängliche Bewegungselemente, die Bürger verschiedener Altersgruppen zum spielerischen Gebrauch einladen und die einen gesundheitlich förderlichen Ausgleich zu überwiegend sitzenden Tätigkeiten im Alltag darstellen. Partner: Stadt Dortmund, Amt für Stadterneuerung Weitere Akteure: Grünflächenamt der Stadt Dortmund, Gustav-Heinemann-Gesamtschule, Huckarde Vereine</p>	<p>NBS 1 – Sports infrastructure within Gustav-Heinemann-Park Location: Gustav-Heinemann Park, Dortmund Huckarde Description: Publicly accessible movement elements which invite citizens of different age groups to playfully try out and which offer a health-promoting balance to predominantly sedentary activities in everyday life. Partners: City of Dortmund, Department of Urban Renewal Other stakeholders: City of Dortmund, Department of Green Spaces, Gustav-Heinemann-Schule, Huckarde Associations</p>
<p>NBS 3 – Waldgarten in St. Urbanus Ort: Garten der St. Urbanus-Gemeinde, Dortmund Huckarde Beschreibung: Auf dem Gelände der St. Urbanus-Gemeinde in Huckarde entsteht auf einer Fläche von 3000 m² ein Waldgarten, in dem vorwiegend essbare Pflanzen in mehreren Vegetationsschichten angepflanzt werden. Der Waldgarten ist ein Beispiel, wie Gärten in der Stadt produktiv und umweltgerecht gestaltet werden können. Er wird in mehreren Workshops von der Gemeinde aufgebaut. Partner: Fachhochschule Südwestfalen, die Urbanisten e.V. Weitere Akteure: Kath. Kirchengemeinde St. Urbanus</p>	<p>NBS 3 – Food Forest in St. Urbanus Location: Garden of St. Urbanus parish, Dortmund Huckarde Description: A 3000 m² food forest - a self-sustaining woodland ecosystem designed for food production at the St. Urbanus parish. The food forest of St. Urbanus has been built during workshops with the community and serves as an example of how gardens in the city can be designed in a productive and environmentally friendly way. Partners: South Westphalia University of Applied Science, die Urbanisten e.V. Other stakeholders: the parish of St. Urbanus (Dortmund)</p>
<p>NBS 4 – Aquaponik Ort: Kokerei Hanso, Dortmund Huckarde Beschreibung: Auf einer Fläche des Industriedenkmal Kokerei Hanso entsteht eine wissenschaftliche Versuchsanlage, in der perspektivisch Fisch- und Pflanzenzucht in einem Kreislaufsystem verbunden sind. Aquaponik heißt dieses Kreislaufsystem, welches dazu beitragen kann, die Menschen in der Stadt mit gesünder und umweltchonender produzierter Nahrung zu versorgen. Die Anlage dient zur Optimierung technischer Aspekte und zur Analyse, ob sich aufgrund kontaminierter Böden trotz baulicher Schutzmaßnahmen und bodenfreiem Anbau Schadstoffe in Nahrungsmitteln einlagern. Partner: die Urbanisten e.V., Fachhochschule Südwestfalen, Aquaponik Manufaktur GmbH, Christophorus GmbH Weitere Akteure: Stiftung Industriedenkmalpflege und Geschichtskultur</p>	<p>NBS 4 – Aquaponics Location: Hanso coking plant, Dortmund Huckarde Description: On a site of the old Hanso coking plant two greenhouses are built for scientific purposes in which perspektivisch fish and vegetables will be produced in a circular system (aquaponics). The concept of aquaponics will be advanced technically. As the ground is contaminated constructional protection measures and soilless cultivation will occur. Transfer paths of harmful substances will be examined in the produced food. Partners: die Urbanisten e.V., South Westphalia University of Applied Science, Aquaponik Manufaktur GmbH, Christophorus GmbH Other stakeholders: The Foundation for the Preservation of Industrial Monuments and Historical Culture (Dortmund)</p>
<p>NBS 6 - Verbesserte Zugänglichkeit von Freiflächen Ort: Halde Deusenberg, Dortmund Huckarde Beschreibung: Seit der Einstellung des Betriebs 1992 und der anschließenden Rekultivierung hat sich die ehemalige Mülldeponie Deusenberg zu einem beliebten Naherholungsziel entwickelt. Die Zugänglichkeit auf die Halde besteht fast ausschließlich von Ostern, an den Huckarde Siedlungskörper ist die Halde daher nicht gut angebunden. Seit Jahren besteht der Wunsch der Huckarde Bürger, die Zugänglichkeit auf die Halde zu verbessern. Daher wurde eine barrierefreie Wegeverbindung am südöstlichen Hangfuß gebaut. Partner: Stadt Dortmund, Amt für Stadterneuerung Weitere Akteure: Entsorgung Dortmund GmbH (EDG GmbH; Sachwäter), EmscherGenossenschaft</p>	<p>NBS 6 - Accessible green corridors Location: landfill Deusenberg, Dortmund Huckarde Description: Since the closure of the site in 1992 and its subsequent recultivation, the former Deusenberg landfill site has developed into a popular local recreation destination. The hill is almost exclusively accessible from the east, which means that it is not well connected to the Huckarde settlement. For many years, the citizens of Huckarde have wanted to improve access to the Deusenberg. Therefore, a barrier-free path connection has been built at the south-eastern foot of the slope. Partners: City of Dortmund, Department of Urban Renewal Other stakeholders: Dortmund waste management company (edwactec), EmscherGenossenschaft</p>
<p>NBS 8 - Biodiversität für Bestäuberinsekten Ort: an verschiedenen Orten in Dortmund Huckarde Beschreibung: An den Standorten der NBS 3 und NBS 4 sowie an mehreren Orten in Huckarde werden Pflanzen für Bestäuberinsekten ausgesät. Die einzelnen Standorte sind miteinander verbunden, so dass sich die Insekten einfach zwischen den verschiedenen Grundstücken hin- und her bewegen können. Darüber hinaus profitieren auch die Menschen von der visuellen und ökologischen Aufwertung. Partner: Fachhochschule Südwestfalen, die Urbanisten e.V. Weitere Akteure: Stadt Dortmund, Grünflächenamt, NABU, Kleingartenverein „Glückauf Hanso“</p>	<p>NBS 8 - Pollinator biodiversity Location: at several locations in Dortmund Huckarde Description: At the sites of the NBS 3 and NBS 4 implementations and at several locations in Huckarde, pollinator-friendly plants have been seeded. The selected sites are close to each other to eventually form a biodiversity pathway. This benefits both humans (color, scent, contemplation) but also enhances the biodiversity within the area by allowing insects to migrate easily between the different patches. Partners: South Westphalia University of Applied Science, die Urbanisten e.V. Other stakeholders: City of Dortmund, Department of Green Spaces, NABU (environmental association), allotment association „Glückauf Hanso“</p>

Planerstellung map design | **Projektpartner project partners**



Naturbasierte Lösungen Nature-based solutions

- NBS 1** Freizeitaktivitäten und Produktion regenerativer Energien auf ehemaligen Halde
Leisure activities and clean energy on former landfills
- NBS 3** Gemeinschaftsgärten und urbane Landwirtschaft
Community-based urban farms and gardens
- NBS 4** Aquaponik
Aquaponics
- NBS 6** Verbesserte Zugänglichkeit von Freiflächen
Accessible green corridors
- NBS 8** Biodiversität für Bestäuberinsekten
Pollinator biodiversity

Umsetzungsstand Implementation status

- umgesetzt / in Nutzung implemented
- in Umsetzung in progress
- in Planung in planning

Legende legend

- Gebäude Wohngebiet Residential buildings
- Industrie- / Gewerbenutzung industrial or commercial use
- Grünflächen green spaces
- Wald forests
- Emscher Emscher River
- Emscherweg Emscher Route

Productive Green Infrastructure for post-industrial urban regeneration (proGReg)

Email: proGReg@stadtdo.de
Websites: www.proGReg.eu, www.proGReg.dortmund.de, www.hansoagruen.de

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 776528.

Front Runner City Dortmund :: Living Lab Huckarde

How and what changed your thinking and planning culture in proGReg Living Labs, and NBS development?

Which NBS, processes, procedures etc. proved to be the most challenging?

Realizing Green Infrastructure Projects on post-industrial sites are a greater challenge than assumed.

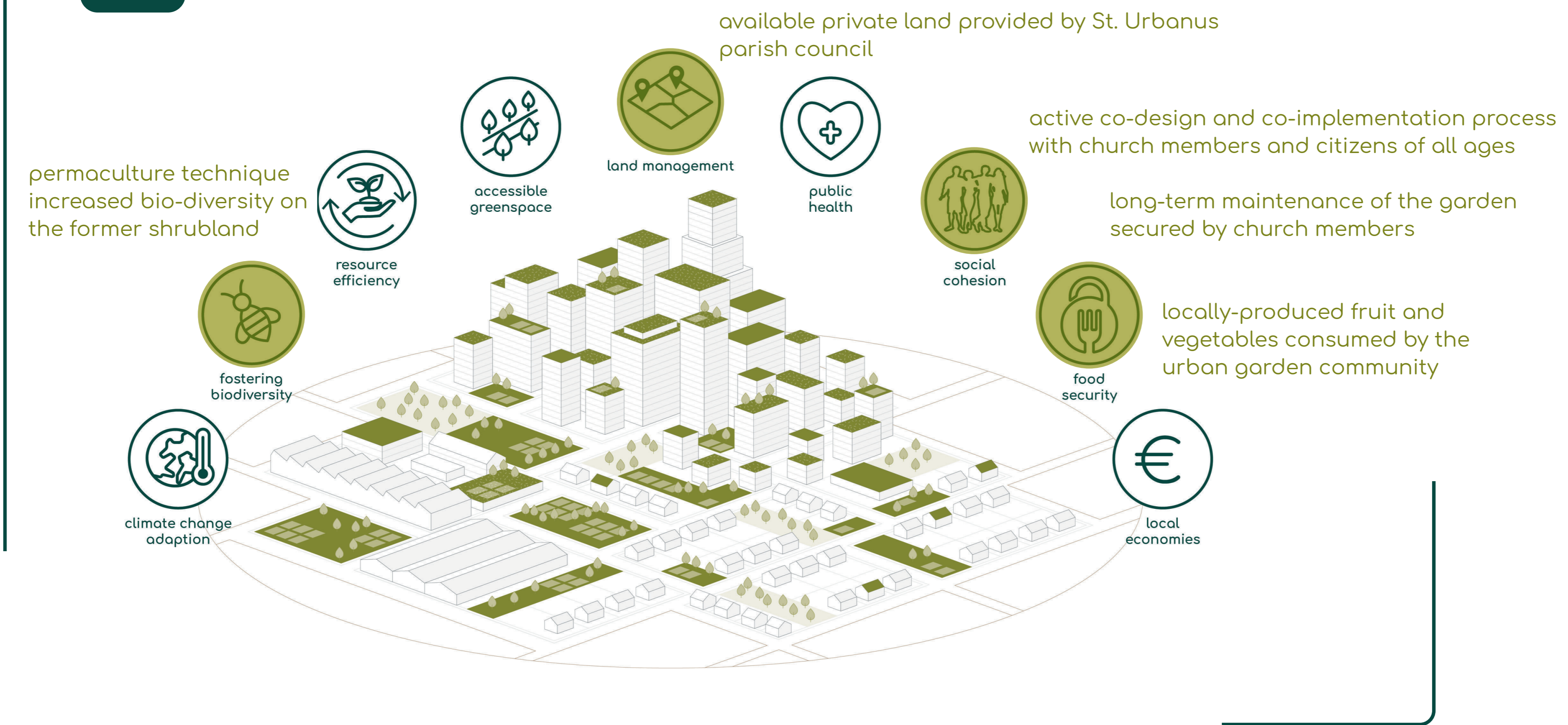
- Identify project sites
- Soil contamination causing extra time and financing
- Construction projects extra time for administrative procedures and approval processes
- Secure financing exceeding proGReg budgets

What is your „favourite“ NBS?

NBS 3: Food Forest and Permaculture Orchard St. Urbanus

NBS 3 Community urban gardening and farming

Why?



Front Runner City Turin ::: Living Lab Mirafiori Sud

NBS revitalising Mirafiori Sud in line with social needs and supported by civic engagement



Turin c. 858,000 (2022)
Living Lab c. 33,600 (2022)



130.2 km²
11.3 km²

The decline of the car manufacturing industry resulted in decreasing population in Mirafiori Sud, socio-economic disparities while leaving many sites empty, disused or abandoned. Located by the river Sangone, the area has high urban regeneration potential building on active local NGOs and strong cultural heritage.

Numerous NBS implementations initiated by proGReg created green corridors, productive and socially inclusive green spaces while fostering changes in administrative procedures required for managing the transition.

Mirafiori Sud Living Lab Torino | Mirafiori Sud Living Lab Turin

Mappa del Living Lab | Living Lab map

Update: DEC, 2022



Obiettivi e vision generale del LL Living Lab goals and overall vision

Rigenerare e valorizzare le aree insicure o abbandonate del quartiere di Mirafiori coinvolgendo i cittadini nella progettazione e gestione di spazi verdi pubblici.
To regenerate and enhance the abandoned or unsafe areas of the Mirafiori district by involving citizens in the design and management of public green spaces.

Promuovere nuove professionalità e modelli di business basati sulle soluzioni naturali.
To promote new professionalism and business models based on natural solutions.

Valorizzare i benefici multipli (sociali, ecologici, economici e per la salute) delle soluzioni naturali inserendole negli strumenti di pianificazione e rigenerazione urbana.
To demonstrate the multiple benefits (social, ecological, economic and health) of nature-based solutions as an integral tool of urban planning and regeneration.

Dettagli sulla NBS 2 | Details on NBS 2

NEW REGENERATED SOIL. THANKS TO BIOTIC COMPOUNDS FOR URBAN FORESTRY AND URBAN FARMING

Prodotto di nuovo suolo rigenerato nel Parco Sangone.
Description: Creation of an area of "urban forest" along the banks of the Sangone through the use of regenerated soil (New Soil), based on aggregates and compost from FORSU and innovative biostimulants.
Partners: Dual, Envipark (Acea e ccs come terze parti), Unito (DISAFA e Dip. Chimica), Città di Torino.

New Soil production in Sangone Park.
Description: Creation of an area of "urban forest" along the banks of the Sangone through the use of regenerated soil (New Soil), based on aggregates and compost from FORSU and innovative biostimulants.
Partners: Dual, Envipark (Acea e ccs as third party), Unito (DISAFA and Dip. Chimica), City of Turin.

Dettagli sulla NBS 3 | Details on NBS 3

COMMUNITY-BASED URBAN FARMS AND GARDENING ON POST-INDUSTRIAL SITES

Recupero rovine Castello di Mirafiori.
Description: Trasformazione paesaggica per valorizzazione area di interesse storico-ambientale.
Partner: Orti Generali - Comitato Borgata Mirafiori

Castello di Mirafiori ruins recovery.
Description: Landscape transformation for enhancement of an area of historical and environmental interest.
Partner: Orti Generali - Comitato Borgata Mirafiori

Orti Generali.
Description: Orti individuali e collettivi assegnati con contributo spese ai singoli cittadini, area didattica comune per attività formative e associative.
Partner: Orti Generali

Gardens in Cascina Piemonte (Orti Generali).
Description: Collective gardens rented to individual citizens, common educational area for training and community activities.
Partner: Orti Generali

Giardini fioriti al WOW.
Description: Giardino in cassone e arnie.
Partners: Orti Alti, Fondazione Mirafiori, Miravolante, Città di Torino.

Pollinator friendly gardens at WOW.
Description: Box gardens and beehives.
Partners: Orti Alti, Fondazione Mirafiori, Miravolante, Città di Torino.

Orto a scuola in cassone.
Description: Realizzazione o integrazione di orti didattici o integrazione di laboratori scientifici rivolti allo scolaro primario e superiore sui temi di proGReg.
Partners: Fondazione Mirafiori, Miravolante, Unito (DBios e DISAFA).

School garden in box.
Description: Realization or integration of educational gardens and scientific laboratories aimed at primary and high schools on the topics of proGReg.
Partners: Fondazione Mirafiori, Miravolante, Unito (DBios e DISAFA).

Ortomobile.
Fornitura di uno stack di cassette per la realizzazione di "micro-orti" e compostiere per le scuole e corso pratico per gli insegnanti.
Partners: Iter, Unito (DBios e DISAFA).

Portable school gardens.
Supply of a stack of wood cassettes for the realization of "micro-garden" and composters for schools and practical course for teachers.
Partners: Iter, Unito (DBios e DISAFA).

Orti comunitari a scuola.
Description: Orto didattico in cassone.
Partners: Iter, Liceo Scientifico Primo Levi, Unito (DBios e DISAFA).

Community school gardens.
Description: Vegetable garden in wood boxes (raised bed).
Partners: Iter, Liceo Scientifico Primo Levi, Unito (DBios e DISAFA).

Orto tra le case.
Description: Poso di cassoni fissi per orticoltura urbana.
Partner: Fond. Mirafiori, Miravolante.

Gardens between houses.
Description: Placing of fixed containers for urban horticulture.
Partners: Fond. Mirafiori, Miravolante.

Dettagli sulla NBS 4 | Details on NBS 4

AQUAPONICS AS SOIL-LESS AGRICULTURE FOR POLLUTED SITES

Test di acquaponica.
Description: Sistemi di acquaponica su piccola e media scala, progettati con la comunità e installati in due edifici del quartiere.
Partner: Città di Torino.

Aquaponics test.
Description: Small and medium scale community - designed aquaponics system, to be set up on two local buildings.
Partner: City of Turin.

Dettagli sulla NBS 5 | Details on NBS 5

CAPILLARY GION WALLS AND ROOFS

Nuovo tetto verde Casa Nel Parco.
Description: Ripristino dell'accesso del tetto verde di Casa Nel Parco.
Partner coinvolto: Città di Torino, Fondazione Mirafiori.

New green roof at Casa nel Parco.
Description: Restoration of the Casa nel Parco green roof access.
Partners: City of Turin, Fondazione Mirafiori.

Parete verde a scuola.
Description: Parete indoor con sistema a vaschette estraibili. Progettazione partecipata e co-gestione per la cura delle pareti con coinvolgimento di studenti e personale scolastico.
Partners: Città di Torino, Politecnico di Torino (DAD e DIAT).

Green Wall at school.
Description: Green indoor wall with removable tray system. Participatory processes and co-management for the maintenance of the green walls with the students and the school staff.
Partners: City of Turin, Politecnico di Torino (DAD and DIAT).

Parete verde dormitorio senzateletto.
Description: Parete verde autopartente esterna, con vaschette rimovibili e telai in ferro. Progettazione partecipata e co-gestione per la cura delle pareti con coinvolgimento degli utenti.
Partners: Città di Torino, Politecnico di Torino (DAD e DIAT).

Green wall at homeless shelter.
Description: Outdoor self-supporting green wall, with removable trays and felt pockets. Participatory design process/co-management for the maintenance together with the users.
Partners: City of Turin, Politecnico di Torino (DAD and DIAT).

Tetto verde al WOW.
Description: Realizzazione di un tetto verde estensivo sull'edificio WOW.
Partners: OrtiAlti, Città di Torino.

Green roof at WOW building.
Description: Realization of an extensive green roof WOW building.
Partners: OrtiAlti, City of Turin.

Dettagli sulla NBS 6 | Details on NBS 6

ACCESSIBLE GREEN CORRIDORS

Corridoio verde.
Description: Realizzazione di un percorso verde e pollinator friendly.
Partner: Città di Torino.

Green corridor.
Description: Creation of a green and pollinator friendly course.
Partner: City of Turin.

Dettagli sulla NBS 6 | Details on NBS 6

ACCESSIBLE GREEN CORRIDORS

Valorizzazione del patrimonio naturalistico nel corridoio verde.
Description: Potenziare la fruizione dell'area naturalistica del corridoio verde e promuovere l'utilizzo della pista ciclabile tramite segnaletica verticale e arredo urbano.
Partner: Fondazione Mirafiori

Local natural heritage enhancement in green corridor.
Description: Enhancement of the naturalistic green corridor and promotion of the cycling path through the creation of vertical signage and street furniture.
Partner: Fondazione Mirafiori

Dettagli sulla NBS 7 | Details on NBS 7

LOCAL ENVIRONMENTAL COMPENSATION PROCESSES

Partnership strategica pubblico-privato per il verde in città.
Description: Identificare, raccogliere e mostrare strumenti e opportunità concrete per permettere all'amministrazione di migliorare il patrimonio verde della città grazie alla collaborazione pubblico-privata.
Partner: Città di Torino.

Strategic public-private partnership for greening the City.
Description: Identify, collect and display tools and concrete opportunities in order to allow the Administration to improve the green assets of the City through public private collaboration.
Partner: City of Torino.

Dettagli sulla NBS 8 | Details on NBS 8

POLLINATOR BIODIVERSITY IMPROVEMENT ACTIVITIES AND CITIZEN SCIENCE PROJECT

Giardino farfalle nelle scuole e presso centri per disabili mentali.
Description: Realizzazione di un corso e di varie attività formative sulla vita delle farfalle. Supporto alla realizzazione del giardino delle farfalle. Biomonitoraggio con il metodo del transetto.
Partners: Unito (DBios) e Unito (DISAFA).

Butterfly gardens in schools and for disadvantaged people.
Description: Realization of training activities on the life of butterflies. Supporting the creation of the butterfly garden. Biomonitoring with the transect method.
Partners: Unito (DBios) and Unito (DISAFA).

- Legenda | Legend**
- Soluzioni nature based
Nature based solutions**
- Rigenerazione di suolo
NBS 2: Regenerating soil
 - Orticoltura di comunità
NBS 3: Community urban gardening and farming
 - Acquaponica
NBS 4: Aquaponics
 - Tetti verdi e verde verticale
NBS 5: Green roofs and vertical gardens
 - Migliorare l'accessibilità ai corridoi verdi
NBS 6: Improving accessibility to green corridors
 - Processi di compensazione ambientale
NBS 7: ICT Tools
 - Insetti impollinatori e biodiversità
NBS 8: Pollinator biodiversity
- Stato di implementazione
Implementation status**
- Realizzato
implemented
 - In corso
in progress
 - Programmato
in planning
- Legenda dei colori
Colour palette**
- Parchi/aree verdi
parks/green spaces
 - Zone boschive
Forest
 - Fiumi/laghi
waterways/lakes
 - Costruito
built up areas
 - Aree industriali
industrial areas
 - Confini del Living Lab
Living Lab area boundary
- Scale: 1: 10000
- Map by Politecnico di Torino, Dep. Architecture and Design
- Productive Green Infrastructure for post-industrial urban regeneration (proGReg)
Email: progreg@la.rwth-aachen.de
Website: www.proGReg.eu
- This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 776528.
- This work was financially supported by the National Key Research and Development Program of China (2017YFE0119000).



Front Runner City Turin :: Living Lab Mirafiori Sud

How and what changed your thinking and planning culture in proGReg Living Labs, and NBS development?

„It's essential to plan, design and manage urban transformations together with private sector, academia and NGOs institutions.“ (City of Turin)

Which NBS, processes, procedures etc. proved to be the most challenging?

- NBS 5 Green roof:
- Abandoned building;
 - Structural deficiencies of the building;
 - Accessibility permit;
 - Public-Private Partnership,
 - securing roof maintenance.

What is your „favourite“ NBS?

NBS 3 Orti Generali benefits for the Living Lab

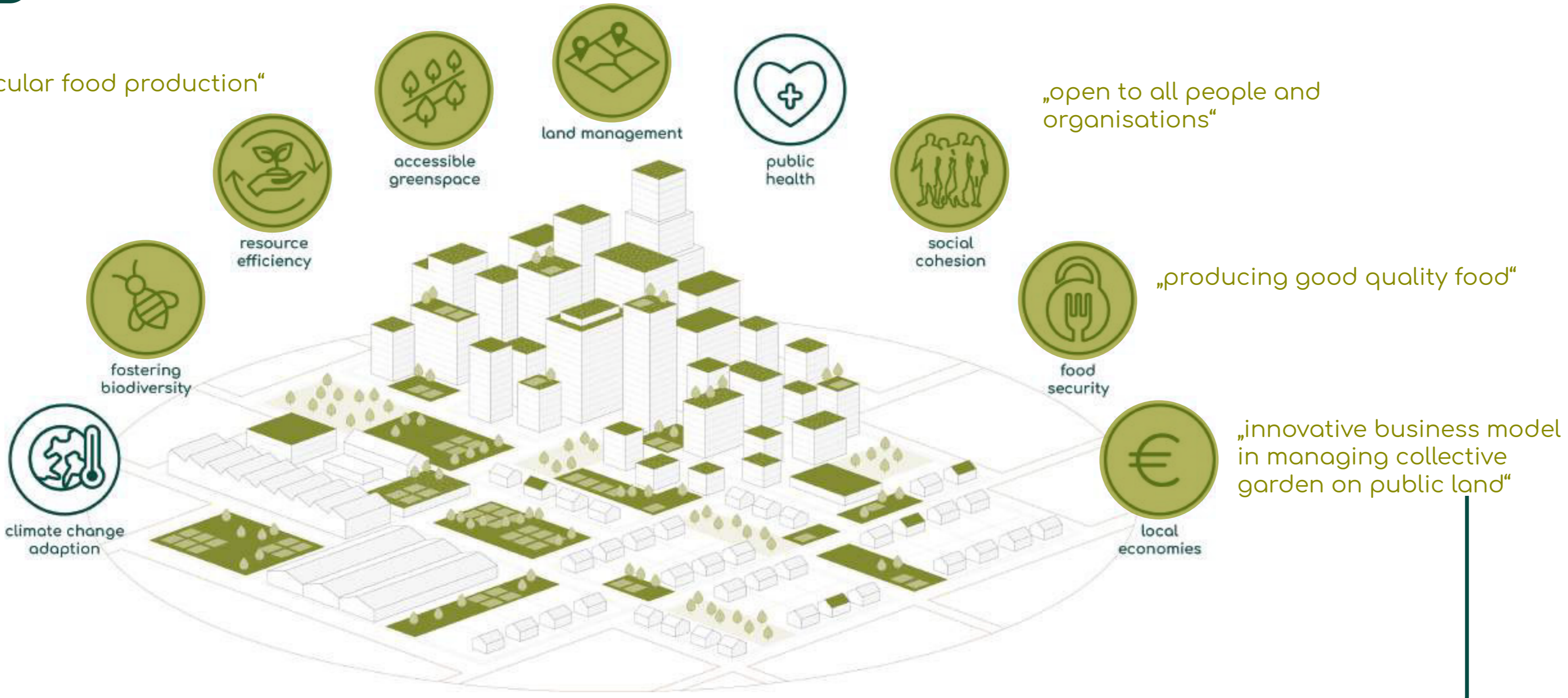
NBS 3 Community urban gardening and farming

Why?

„circular food production“

„attractive green space instead of abandoned land“

„open to all people and organisations“



Scan to watch more videos!



Living Lab



NBS2



NBS3

Common vision: In 2025, the Linear Park will be an attractive, self-sustainable, multi-functional, eco-technological, artistic, research & educational, demonstration polygon, which promotes healthy living, community and cosmopolitanism, via national culture, environmental protection and youth empowerment.

CLEVER CITY BELGRADE

CO-CREATION IN PLANNING

The City of Belgrade, the Capital of Serbia, has recognized the significance of green infrastructure in strategic documents, such as Climate Change Adaptation Action Plan from 2015, and the selected urban regeneration area – the former railway corridor between the Beton Hala and the Pančevo Bridge – was perceived as a zone for re-development from transit into a green space in the Plan of General Regulation of Belgrade from 2016 (4.6 km long, app. 23 ha of new green areas).

The deployment of the Plan of Detailed Regulation (PDR) for the new Linear Park – Belgrade was initiated in September 2018, and the official launch of the Belgrade Urban Innovation Partnership (UIP) was organized in November 2019. UIP gathered experts from 45 institutions across sectors.

The development process was driven by co-creation and is a promising pilot for nature-based solutions (NBS) integration in a Serbian context. The process began with a survey for local residents on urban nature. 570 residents responded, clearly indicating a desire for more pristine natural areas in the city centre. The survey provided essential input for participants in a subsequent Co-Design Contest for Young Trans-Disciplinary Teams, along with specialized focus groups (around 50 participants in total) and a public workshop (120 participants).

In total, 28 teams (145 people) submitted proposals for the Linear Park Co-Design Contest. 10 outstanding teams were invited to submit more detailed proposals, which formed the basis of the city's official strategy for the area. During the Early Public Consultation in May 2020, CEUS organized an online discussion with prior and post Q&A sessions, and during the Public Consultation in May and June 2021, there was a dedicated Exhibition, Open Doors & Open Windows, in-person and online Public Discussion, online crowd-mapping, and a promo video for engaging citizens.



Photo by CEUS: Workshop in Dorćol Platz, February 2020.



Map by CEUS: Analysis of the Results of Co-creation in the Draft Urban Plan of the Linear Park – Belgrade, June 2021.



Map by Belgrade Urban Planning Institute: Land-Use Plan of the Linear park, August 2021.

CO-CREATION UPSCALING

CLEVER Cities project provided a Niche for innovation in the Multi-Level Perspective (MLP) Framework of the sustainability transition, and allowed introduction of novelties in the formal planning procedure for the Linear Park. Citizen engagement from the very initial moment of the plan development, active public participation, careful expectations management, articulation of visions and gradual building of trust make this planning practice the first example of co-creation in Belgrade and have the potential to become a role model for future co-creative NBS and greening strategies.

As a result of the UIP and in coordination with the City of Belgrade, Faculty of Architecture – University of Belgrade, Centre for Promotion of Science, and Nova Iskra, CEUS applied for registration of the BELgrade urban living LAB (BELLAB) in the European Network of Living Labs (EnoLL). Registration was successful, and this Urban Living Lab (ULL) was established in January 2021, as the first ULL in the Western Balkans. In the same year, essential ideas on BELLAB and NBS were integrated into the Action Plan of the Serbian Sustainable Urban Development Strategy.

The process of co-creative plan development, financing, and implementation mapping for the Linear Park was aligned, to the extent possible – with the Draft Guidelines of the European Commission for Urban Greening Plan Development. Replication of this co-creative approach was applied while drafting the new Belgrade General Urban Plan (Masterplan) until 2041, in the form of a new public questionnaire and the preparation of a communicative and well-illustrated publication, mentioning nature-based solutions as an economic opportunity.

After finalization of the CLEVER Cities project, this co-creative development approach will be further replicated for the entire territory of the City of Belgrade, in the process of deployment of the Belgrade Green Infrastructure Strategy (contracted in June 2023). Moreover, during the CLEVER Cities implementation, Belgrade learned from Malmo's Green Space Factor and London's Urban Greening Factor and initiated the work on the Ecological Index, a similar complex urban parameter.

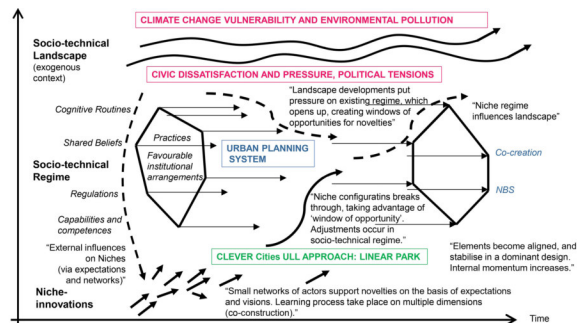
THE LINEAR PARK URBAN PLAN

The Plan was adopted by the City Assembly in August 2021. In November 2021, CEUS also organized an online Public Dialogue, as an ex-post impact evaluation of the co-creative planning process.

For the first time, NBS elements, such as facilities for birds and other animals, ecological habitats, freshness islands, eco-urban furniture, and green sound barriers for transit within the public green space, were included in an official urban planning document. The rules for establishing green areas specify, among others, the requirement to use native plant species that are compatible with the local environment and adaptable to those conditions, to avoid invasive and allergenic species, and to maintain the usability of the green space throughout the year.

This plan's measures for environmental protection and climate change adaptation also include sewage and atmospheric wastewater separation, a sustainable urban drainage system with natural water collection, the utilization of permeable materials, and the use of heat-reflective materials (light colours).

The Linear Park is designed to improve the microclimate within the park, support biodiversity, and ensure co-benefits for public health and resident well-being. The impact of this Plan extends beyond the Park itself – novel for Belgrade, the Plan listed green roofs and green walls as obligatory elements of any new construction adjacent to the park. These changes are worthy of celebration and are expected to have a positive impact on business opportunities in the area. Construction on the Linear Park began in 2022, and completion of the works is planned by the end of 2026.



Graphic by CEUS: Interpretation according to Geels (2011): the Multi-Level Perspective on Sustainability Transition regarding Urban Planning in Belgrade, published in Sustainability, 2021.

At Thamesmead, we are exploring new ways to assess and monitor urban biodiversity which can also encourage more community engagement with our green spaces.

CLEVER CITY LONDON

EXPLORING THE MONITORING AND ASSESSMENT OF URBAN BIODIVERSITY

Thamesmead is a town in South-East London with a population of 47,000 people. Its rich landscape includes 240 ha of parks and green space; 7km of canals; five lakes; 2.5km of river frontage and 53,000 trees. Peabody, one of the oldest not-for-profit housing associations in the UK, is leading the long-term regeneration of this area.

At Thamesmead, the CLEVER Cities project is supporting community outreach and engagement to regenerate the estate by using nature as inspiration. Focusing on nature-based solutions carried out across the site, various forms of technology were trialled to help assess the impact of these improvements for biodiversity. Monitoring the impact of nature-based solutions in an urban environment, for biodiversity, is often not considered for many projects. The time and expense of a regular ecological monitoring programme is often a barrier, but apathy towards observation and collecting useful data is also an issue. To address this at Thamesmead, RSK Wilding are working with CLEVER Cities to test the latest technology to study biodiversity, its effectiveness in urban environments, and how they can be implemented in a low-cost and efficient manner that works for, excites, and encourages community engagement.



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WHAT WE ARE DOING

RSK Wilding are undertaking a wide range of on-the-ground monitoring and desk-based research to explore approaches to the assessment and monitoring of urban biodiversity, including:

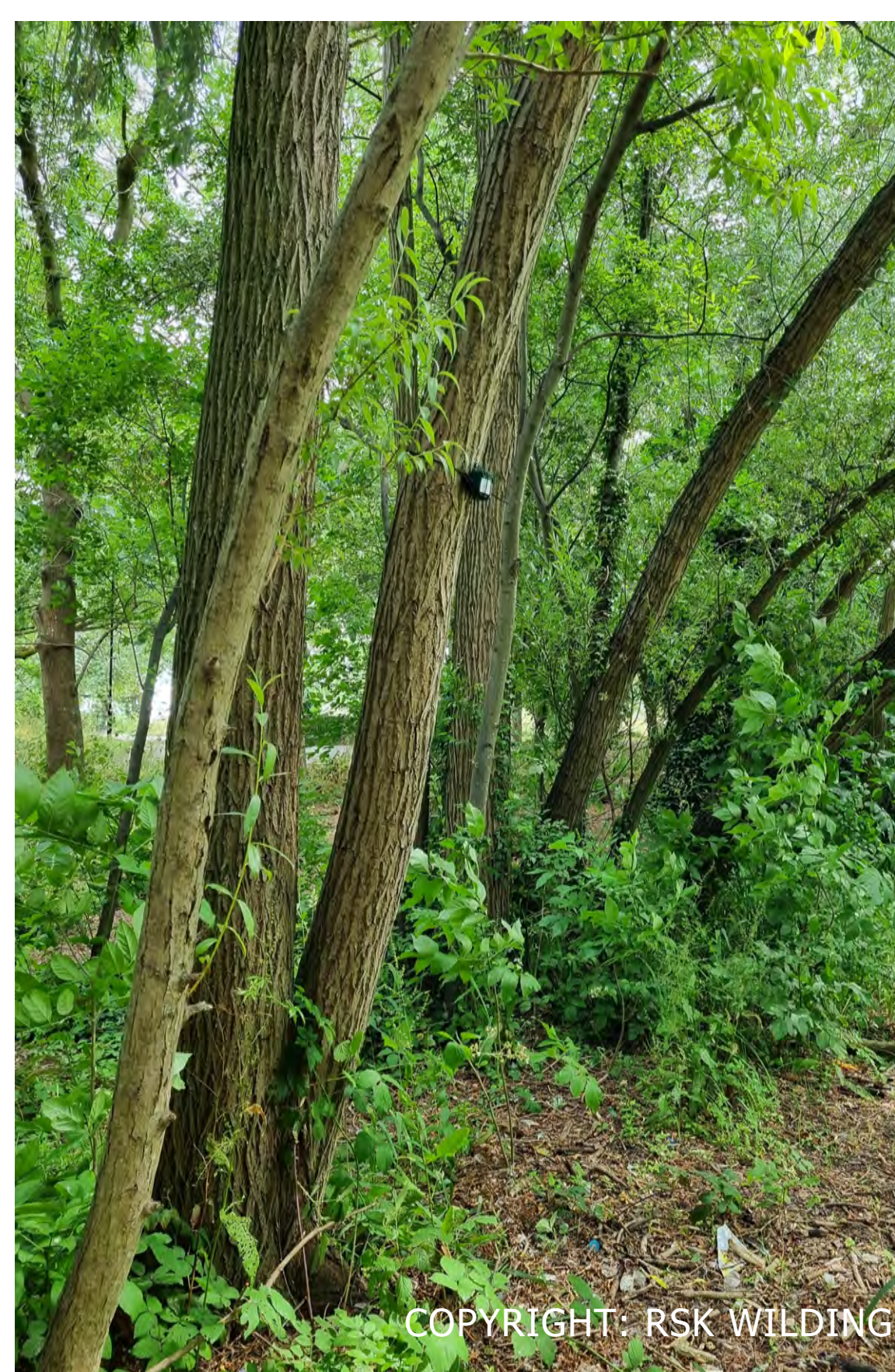
- **Habitats** - In England, the Department for Environment Food & Rural Affairs (DEFRA) developed the Biodiversity Metric to support the delivery of Biodiversity Net Gain (BNG), which has allowed for the consistent assessment of habitat value. However, this approach relies on a natural and semi-natural classification system called UK Habs (<https://ukhab.org/>), which potentially undervalues habitats found in urban environments. RSK Wilding have been undertaking a detailed comparison of the Biodiversity Net Gain Metric and other metrics that could be used in the assessment of urban habitats, including the Urban Greening Factor, which is found in the London Plan, the city's spatial development strategy.

- **Invertebrates** – Invertebrates are ideal indicators of biodiversity and the ecological status of a site. Historically, species identification has been a painstaking and highly specialised process, but at Thamesmead we are using metabarcoding - the latest in DNA analysis methods - to allow the rapid assessment of the species present.

- **Vocalising species** – In recent years acoustic monitoring has become increasingly effective while costs have rapidly decreased. Low-cost acoustic devices, AudioMoths, are being used to monitor a variety of vocalising species - focusing on bats and birds - supported by the use of a range of automated analysis processes to enable species identifications.

- **Monitoring approaches** – Beyond those methods being implemented in the field, RSK Wilding are undertaking a detailed review of available biodiversity monitoring methods, considering the latest in available technologies, cost effectiveness, scalability and opportunities for community engagement and 'citizen science'.

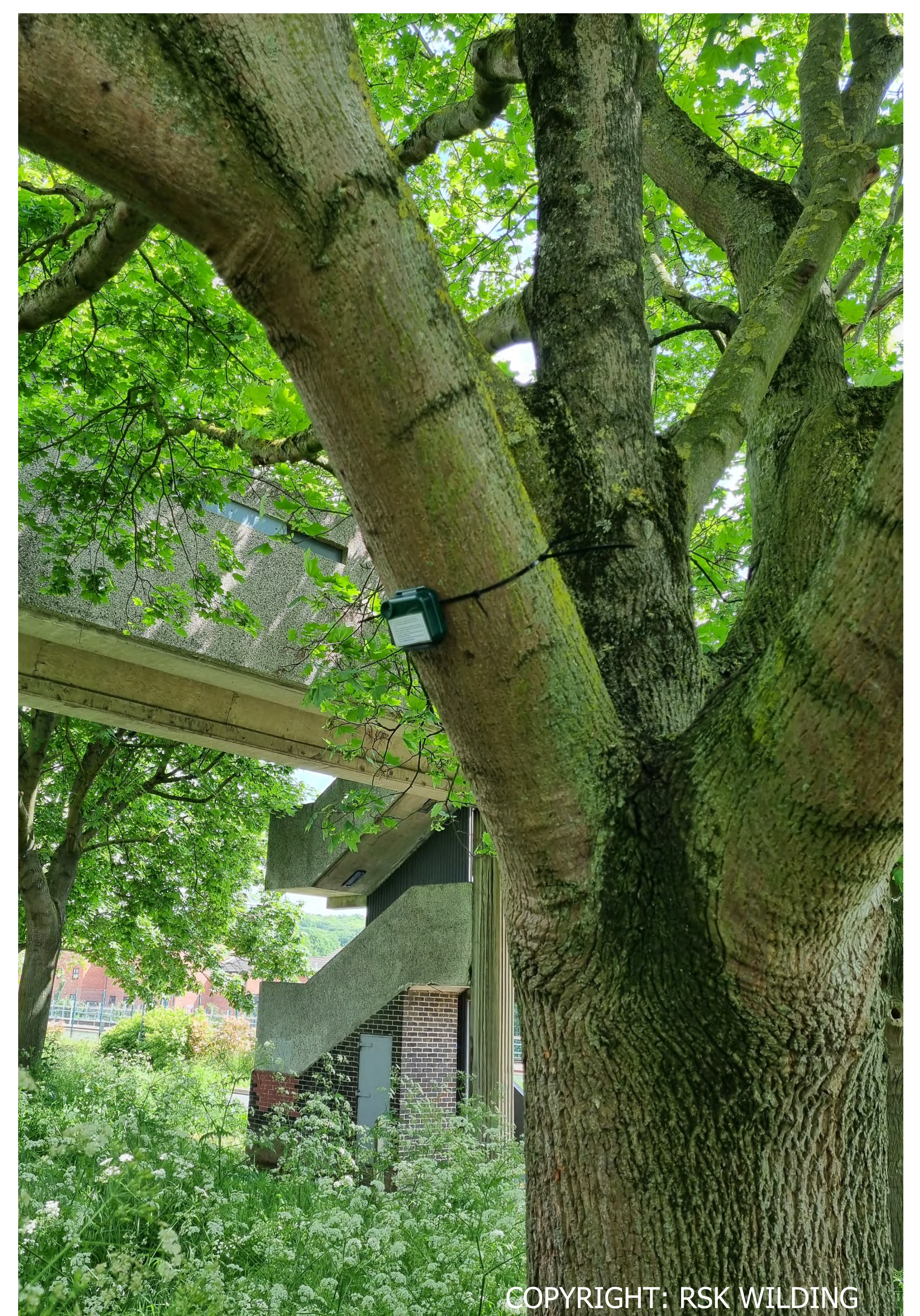
- **Community engagement** – Throughout the project, the local community has been engaged through Nature Forum events, with opportunities to attend guided bird, bat and invertebrate walks and learning sessions on AudioMoth detectors.



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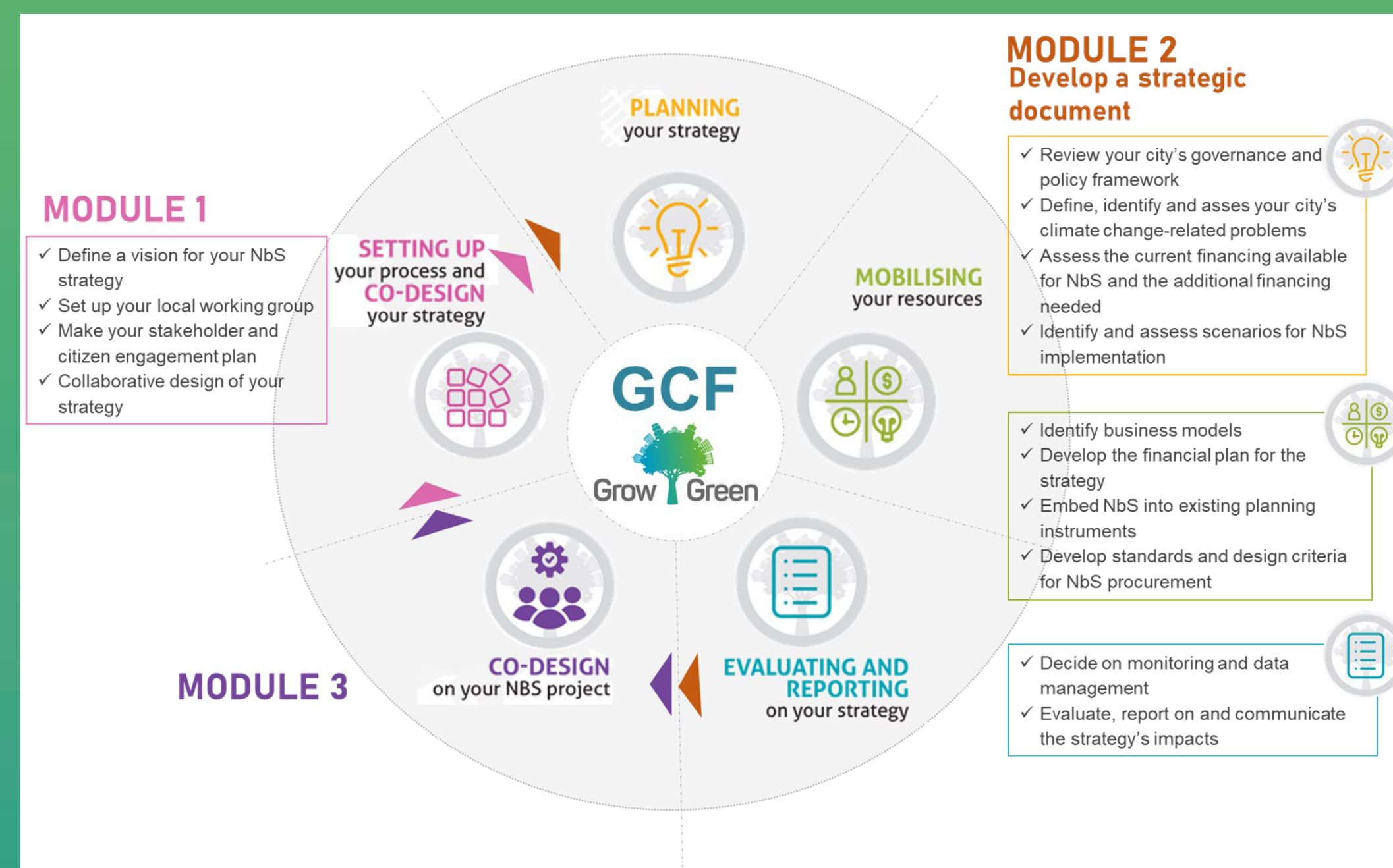
LONG-TERM AIMS

The work being undertaken at Thamesmead should help support the development of broader guidance on the monitoring of urban biodiversity across London. This includes a toolbox of low-cost and efficient monitoring options that are accessible to local communities and land managers which can be used alongside key performance indicators to assess the impact of their ecological interventions. It is hoped that these resources will encourage more engagement with our urban green spaces and offer a consistent and effective means of understanding our urban biodiversity.

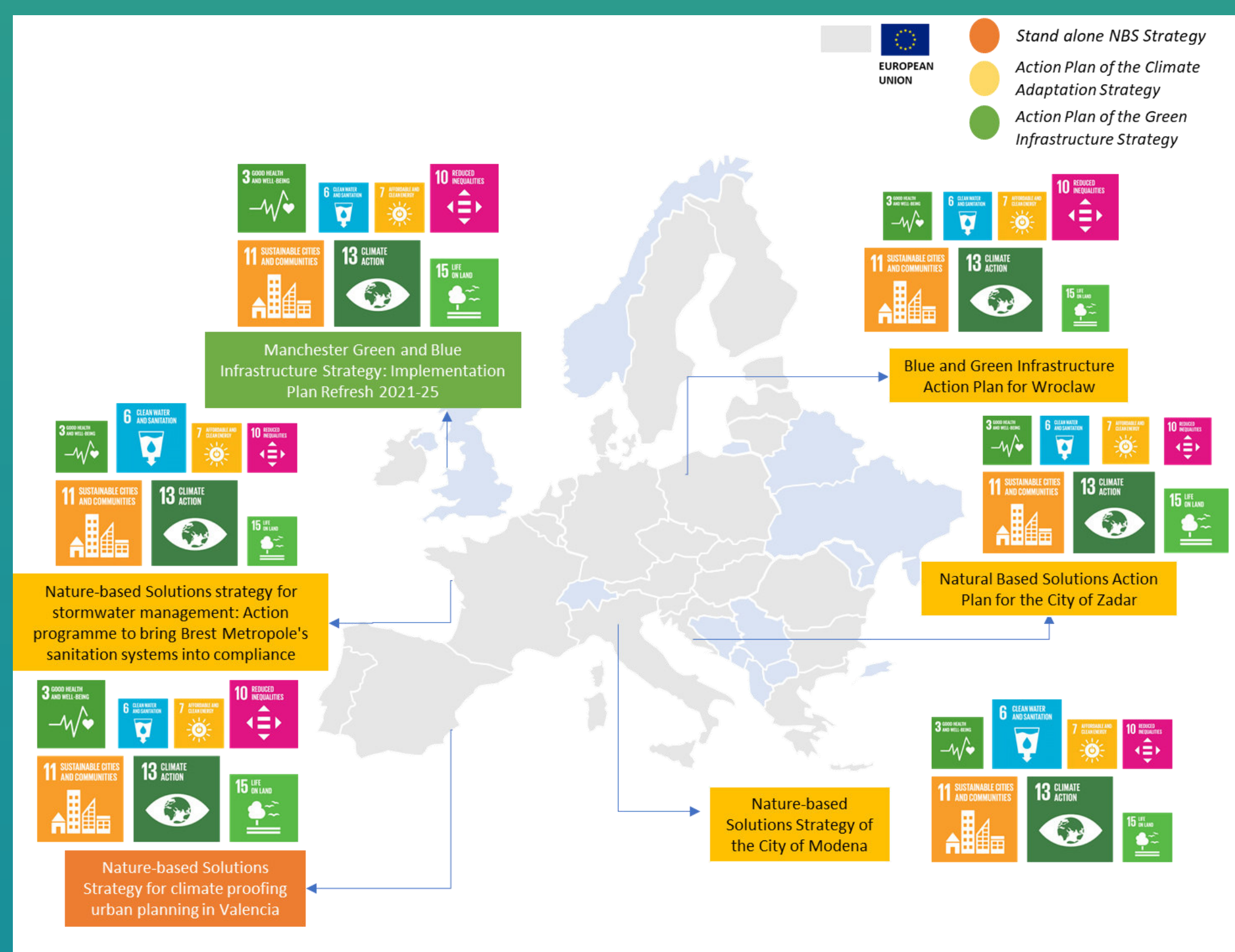
Grow Green

From the Green Cities Framework to NbS local Strategies

The Green Cities Framework is the H2020 GrowGreen project guidance tool for cities facing the challenge of developing and implementing Nature-based Solutions (NbS) local strategies and action plans towards water and climate resilience.



GCF customised and tested in Brest (France), Manchester (UK), Modena (Italy), Valencia (Spain), Wroclaw (Poland), Zadar (Croatia)

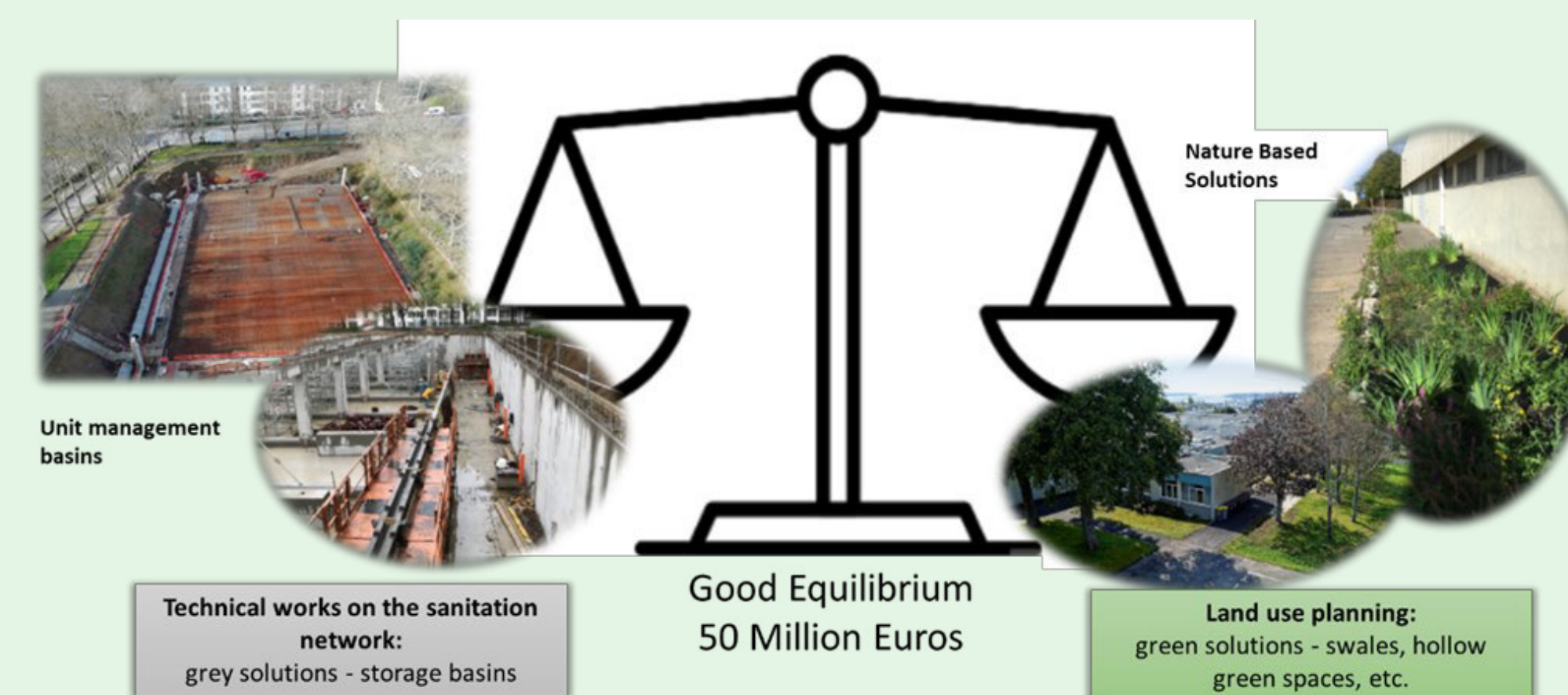


Authors: Gemma Garcia- Blanco, Ángela Matesanz, Efrén Feliú, Igone Garcia TECNALIA, Basque Research and Technology Alliance (BRTA), Dertio, Spain.

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Brest
Innovative feature:
Balancing grey and green solutions to fit sanitation compliance and flood risk mitigation.

Nature-based Solutions strategy for stormwater management has been developed as an Action programme to bring Brest Metropole's sanitation systems into compliance.

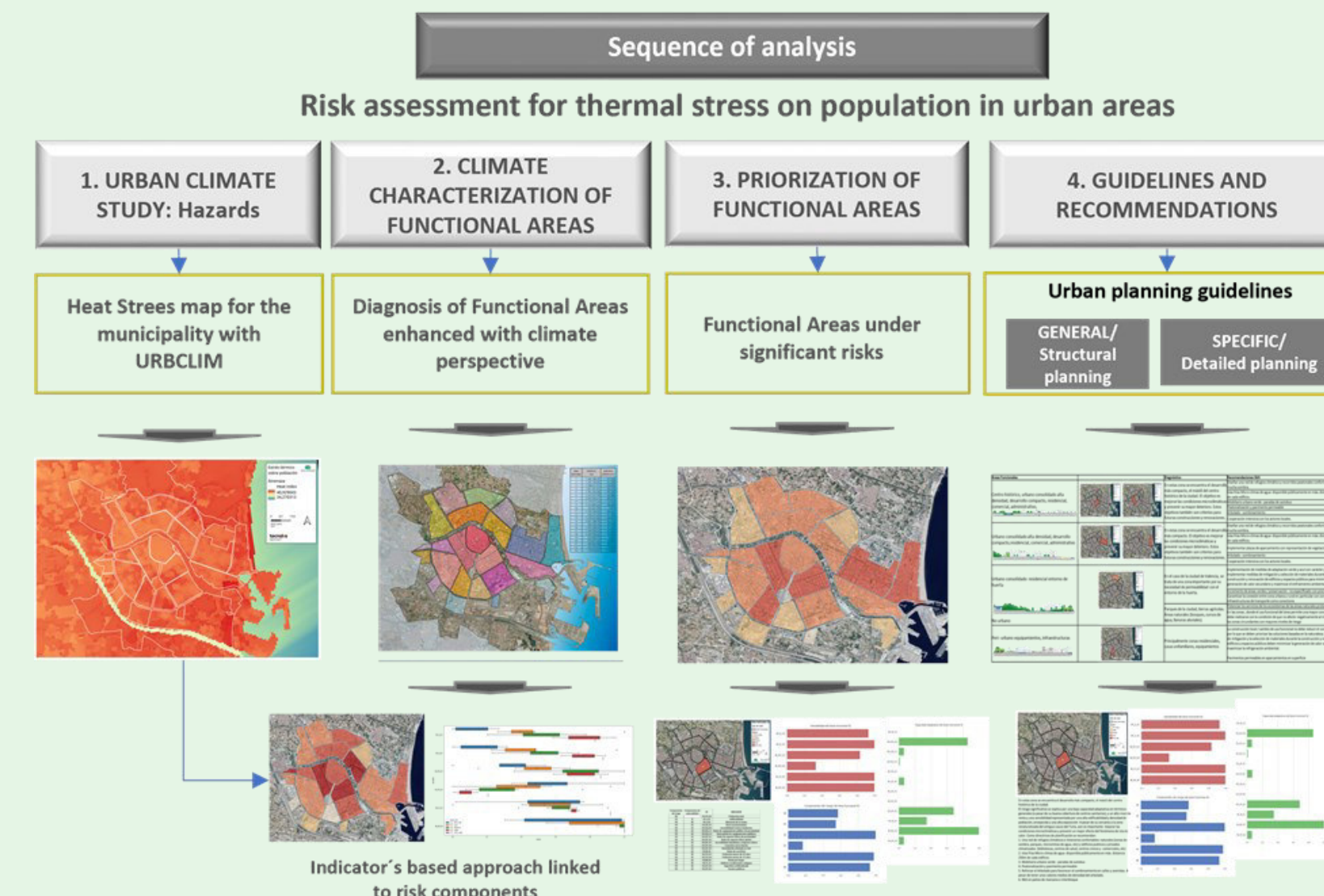


The Plan includes two complementary and articulated axes: the creation of underground structures for the temporary storage of excess water and the reduction of rainwater inflows into the combined sewerage system

Valencia
Innovative feature:
Climate proofing urban planning.

The Nature-based Solutions strategy for the city of Valencia is under the umbrella of the city's Green and Biodiversity Plan and has fed the new Urban General Development Plan under development).

Mainstreaming NbS into Valencia Urban General Development Plan



Manchester
Innovative feature:
Generating evidence for social impact and build investment confidence.

The Implementation Plan Refresh 2021-25 updates and refines the Manchester's Great Outdoors: A Green Infrastructure Strategy for Manchester (MGO).



The Plan proposes 18 headline actions focused on Nature and Woodlands, Biodiversity, River Valleys, Trees and Woodlands, Gardens, and Health and Ageing. The headline actions are supported by different projects pipeline.

Wroclaw
Innovative feature:
Multiscale deployment of micro Nature-based Solutions.

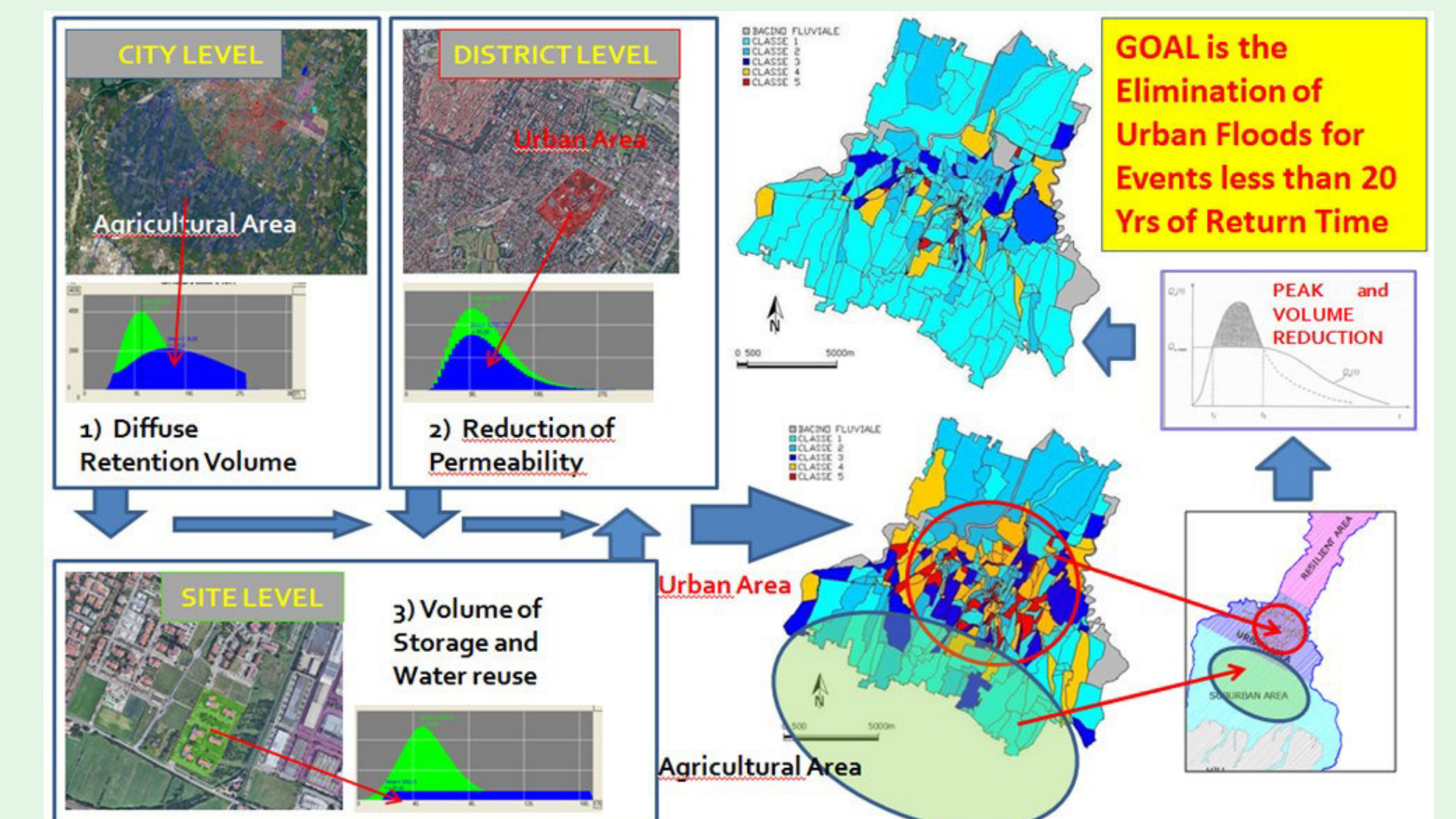
The Blue-Green Infrastructure Action Plan with special emphasis on nature-based solutions (incorporates the NbS into the Municipal Climate Change Adaptation Plan 2030 of the City).

Upscaling NbS deployment for adaptation to pluvial flood risk in Wroclaw-within the Sustainable Energy and Climate Action Plan



Modena
Innovative feature:
Systemic approach and integrated planning.

The Nature-based Solutions Strategy of the City of Modena places at the center the Sustainable Energy and Climate Action Plan 2030, supported by the General Urban Plan, Grow Green, the Sustainable Urban Mobility Plan and the European project Zero Carbon Cities.



The three levels of the NbS Strategy. Source: NbS Strategy of the City of Modena.

Zadar
Innovative feature:
Climate change as an opportunity.

The Natural Based Solutions Action Plan of the City of Zadar, included in the Program for air protection, ozone layer, climate change mitigation, and adaptation in line with the Climate Change Adaptation Strategy for the Republic of Croatia.

Main axes of the NbS Strategy in Zadar



a) Greening -tree planting b) Stormwater drainage systems c) Permeable surfaces

Principles and key ingredients for a successful NbS Strategy

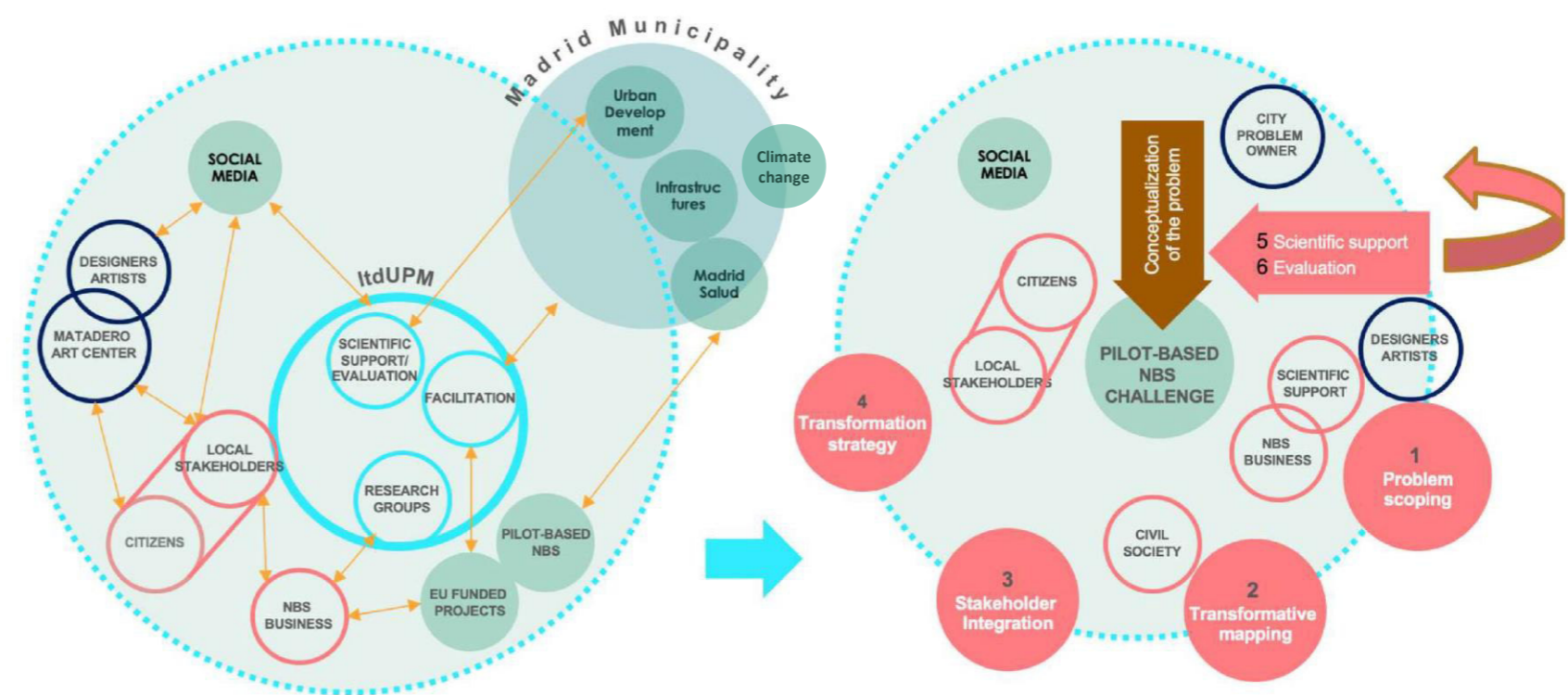
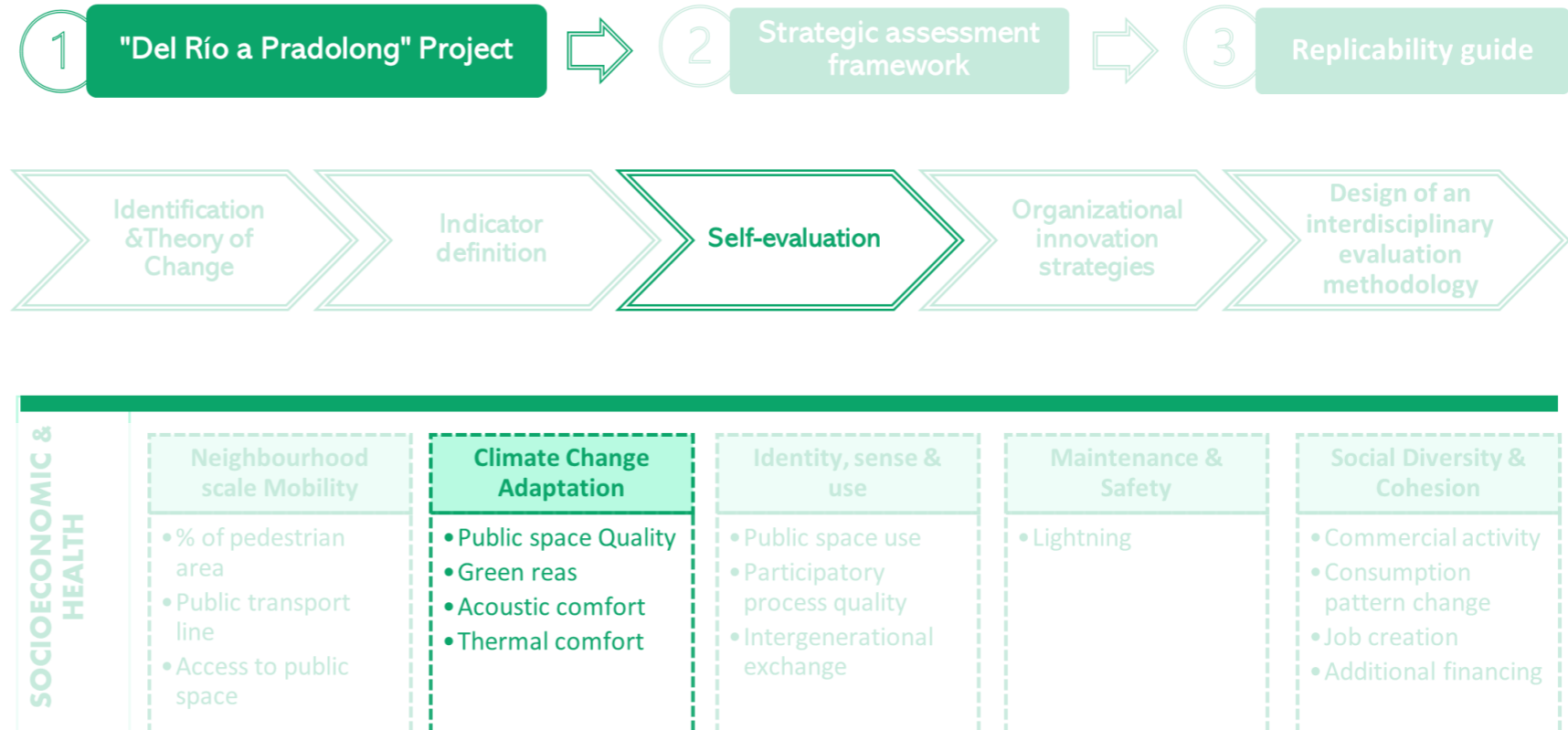
- Applying strategic thinking about planning.
- Looking for a shared city vision - interdepartmental working is vital.
- Using a co-participative, inclusive, multi-stakeholder approach.
- Building a stable working group to guarantee implementation.
- Identifying potential beneficiaries and users- no one left behind.
- Applying a knowledge-based decision making.
- Using evidence built on ground breaking cutting edge research and guidance, means more informed decision making
- Defining clear, achievable and measurable targets and objectives and implementation pathway.
- Aligning your strategy with policy landscape and planning frameworks.
- Mainstreaming blue and green infrastructure and NbS into local agenda, not competing to other priorities.
- Aiming at elaborating a flexible, adaptable and dynamic action plan able to be refreshed regularly to include new priorities in a changing world.
- Defining efficient funding, business model and delivery mechanisms.
- Applying a systematic and long-term reflexive monitoring and reporting.
- Defining city optimised key performance indicators to monitor qualitative and quantitative impact.



A methodology for the assessment of urban regeneration project through Nature-based Solutions

The use of Nature-based Solutions (NbS) in urban regeneration processes has been raising in the last years as a multifunctional solution to increase the resilience of the built environment in order to face the challenges derived from Climate Change. These solutions provide various benefits at the same time, such as reducing the impacts of climatic hazards, improving the environmental quality as well as increasing citizens' socio-economic well-being and health. Measuring and evaluating the impacts of NbS for urban regeneration, can still be challenging due to their multifunctional condition. In the CLEVER Cities project context, the city of Madrid has developed a comprehensive strategic framework for urban regeneration based on NbS implementation.

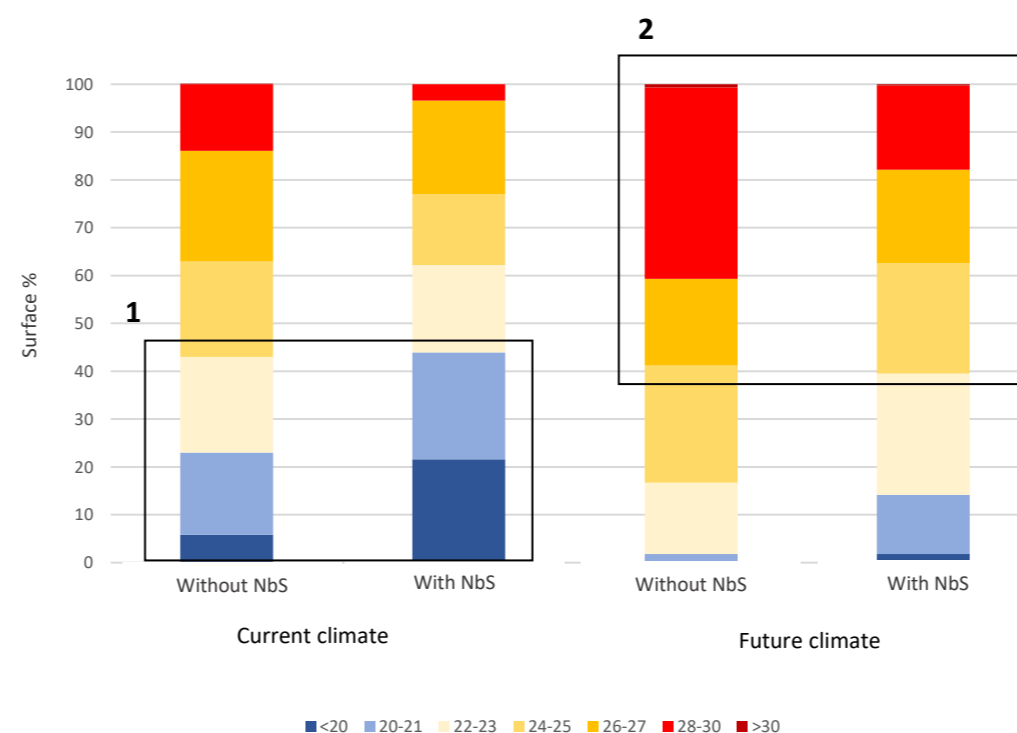
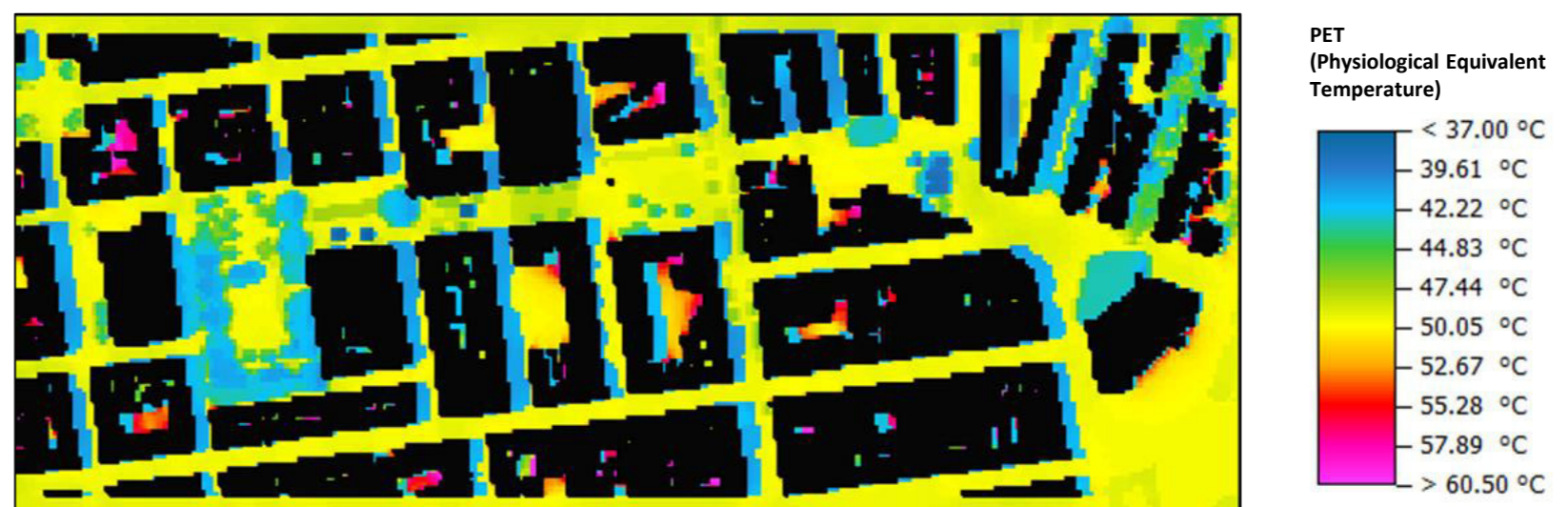
The main goal of this framework is to create a replicability guide from the methodology implemented in a specific project, "Del Río a Pradolongo", to offer a cross-sectional evaluation tool that provides a continuous learning method between parties involved. The proposal is more of an iterative process than a linear methodology, not only due to the involvement of multiple variables but also due to the impacts of the technical, economic, and social spheres of an entire community. The replicability of this assessment framework, therefore, relies also in evaluation of these multi-scalar and multilayered relationships, understanding social innovation as a transversal element to the whole process, and collaborative governance as a management model.



Pradolongo study case application in thermal comfort studies

Nature-Based Solutions thermal effectiveness simulations are tools used to predict and evaluate the impact of these solutions on temperature reduction in urban areas. These simulations are based on numerical models that take into account factors such as solar radiation, humidity, wind speed and the presence of shadows and bodies of water. The simulations allow to identify the most critical areas in terms of thermal stress and evaluate different design and configuration options of nature-based solutions by applying the effectiveness indices.

Overall, simulations are a valuable tool for designers, urban planners, and planners to make informed decisions about implementing NBS in urban areas. Four models are analyzed with a current type day (with and without NbS) and a future type day in RCP 8.5 scenario (with and without NbS). The PET would be the indicator chosen to evaluate the areas with Thermal Stress Indicator (TSI) levels.



1

Proven relevance of the solutions

In the current climate, NBS contribute to increasing from 23% to 44% the surface area of the neighborhood with a TSI of less than 21, that is, in the categories with greater thermal comfort. This means doubling the space with levels of thermal comfort compatible with the passage and the stay.

2

Resilience for the future

In the future climate, NBS have an even more relevant role in terms of lowering the TSI from levels of greater discomfort. Specifically, it would go from 41% of the space with a TSI higher than 28 to 18%. It would be demonstrated, therefore, the relevant role of the NBS especially in the face of an uncertain and unfavorable climate scenario.

Integrating Nature into Municipal Planning

How urban greening can be supported through new cooperation & financing models – Insights from The Nature Conservancy

On Nature in Cities

Renaturing cities and finding new ways to create and maintain green and blue infrastructure is critical to adapting urban areas to the impacts of climate change while protecting the livelihoods of citizens and urban biodiversity. Yet many technical, societal, economic, or governance-related barriers still stand in the way of the uptake and mainstreaming of nature-based solutions (NbS) in current planning processes. The Nature Conservancy's approaches in German cities Stuttgart and Berlin show how NGOs, municipalities, and other stakeholders can join forces to create a greener and more livable city of the future.



TNC is a global conservation organization dedicated to conserving the lands and waters on which all life depends. Guided by science, we create innovative, on-the-ground solutions to our world's toughest challenges so that nature and people can thrive together. Together with our partners we work in 76 countries and territories, we use a collaborative approach that engages local communities, governments, the private sector, and other partners. To learn more, visit www.nature.org.

TNC's Europe Urban Greening Program



In 2020, TNC launched its Europe Urban Greening program to help municipalities in Germany to accelerate urban greening projects. Informed by the individual needs and political contexts of partner municipalities, we provide financial, capacity and knowledge-based support. From parks to green roofs, nature-based solutions can help cities build climate resilience and reduce disaster risk. With our partners from the city of Stuttgart and Berlin's Charlottenburg-Wilmersdorf district, we are doubling down on efforts to clean the air and water, decrease urban temperatures, foster biodiversity, and improve the mental and spiritual well-being of residents and visitors. Our approach is grounded in science and guided by stakeholder input. Best practices and lessons learned will be captured and shared to promote uptake of NbS in other municipalities.

A New Cooperation Model – Berlin Charlottenburg-Wilmersdorf

TNC and Berlin Charlottenburg-Wilmersdorf's Nature Conservation Agency piloted a partnership model in 2020 in which TNC provides much needed technical capacity to help expedite agency processes and operations. Our scientists are developing and managing a district-wide plan for urban green space development. Together with our municipal partner, we identify priority demonstration NbS projects for implementation. Central to this initiative is the increased capacity to facilitate cross-agency cooperation and stakeholder engagement.

A New Financing Model – The Stuttgart Climate Innovation Fund

Since 2022, TNC has supported Stuttgart's Climate Innovation Fund, Europe's largest municipal fund for climate innovation. To spur innovative nature-based solutions, TNC and Stuttgart added Efeu (Ivy) – a new grant enabling organizations to develop, pilot and mainstream green infrastructure across Stuttgart. With a budget of 13 million euros, the Innovation Fund will provide access to technical know-how, promote goal-oriented project management, allow lean administrative processes, and bring nature back in the city.

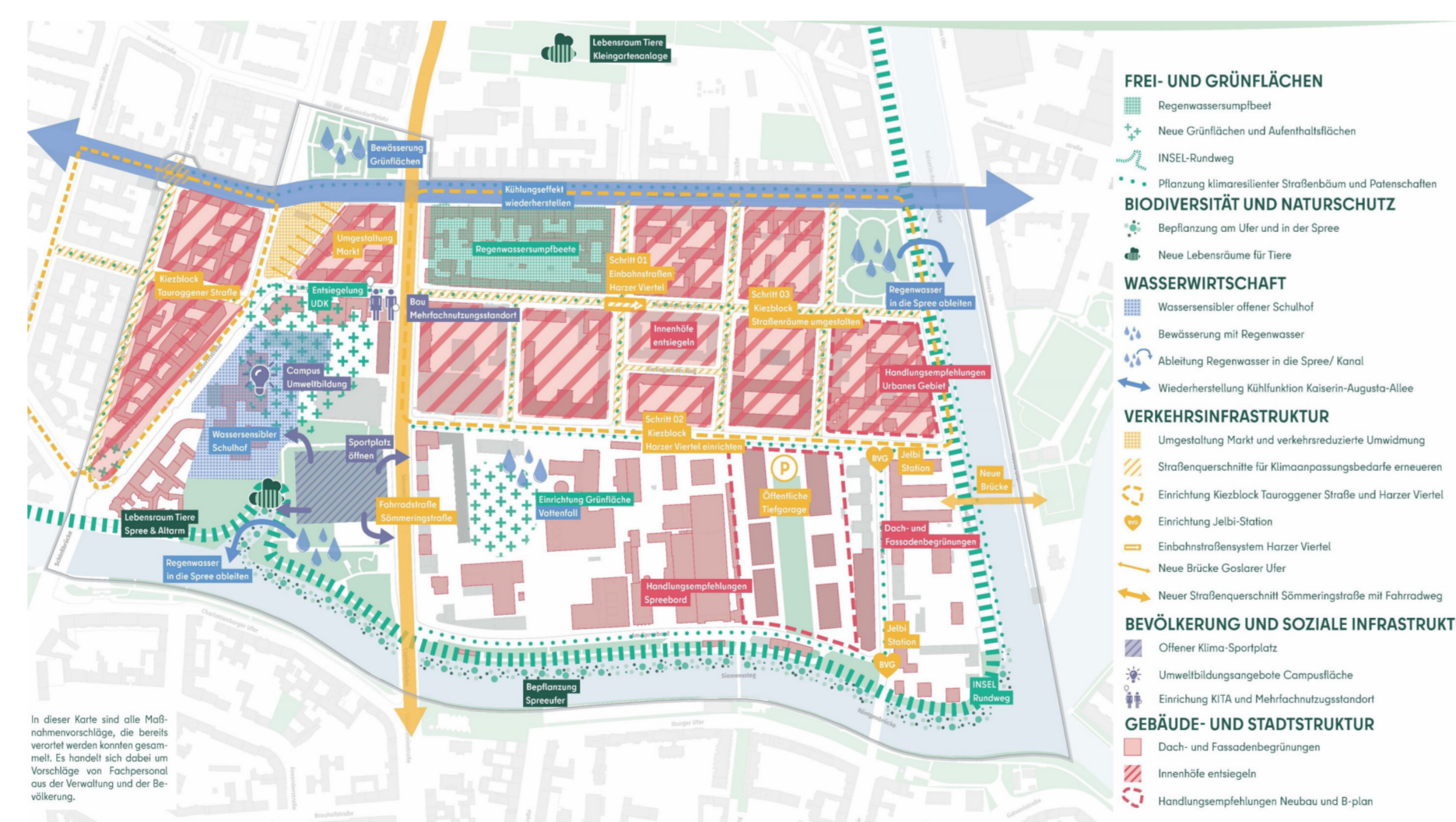
Demonstration Projects in Berlin & Stuttgart



Urban Grazing, Berlin

Project Partners: Berlin Charlottenburg-Wilmersdorf district agencies, Berlin Technical University

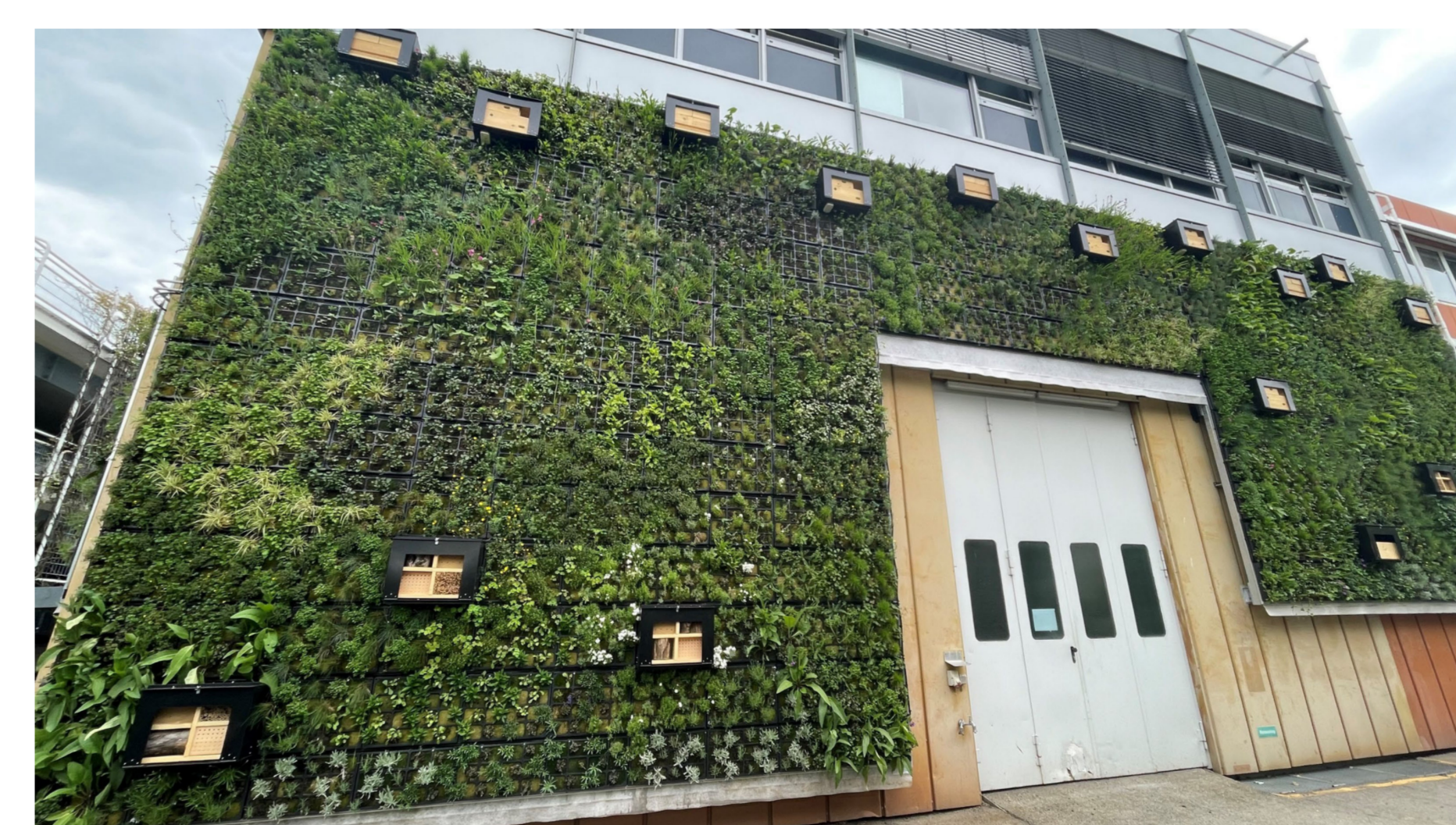
Goal: Utilizing sheep grazing to sustainably manage the disused and rewilded stadium grandstands and to boost plant and insect biodiversity. Serving as testing grounds for climate-adapted plant species, the project also adds an element of delight for users and visitors of the stadium.



Mierendorff-Insel Neighborhood Climate Adaptation Plan, Berlin

Project Partners: Berlin Charlottenburg-Wilmersdorf district agencies, general public, Dorfwerkstatt e.V., plan zwei GbR

Goal: Developing Berlin's first local, neighborhood-scale climate adaptation plan that includes place-based, short-term and long-term strategies. Central to the project is the active engagement and participation of neighborhood residents and workers in decision making.



Die Wilde Klimawand, Stuttgart

Project Partners: University of Stuttgart IABP & ILPÖ, Helix Pflanzensysteme GmbH

Goal: Developing a new, scalable green façade system beyond traditional decorative plantings by piloting heterogeneous species for vertical growth. Integrating habitat structures for local wildlife such as birds, insects, and bats, this project will also monitor and track microclimate and biodiversity benefits.



KlimaOasen, Stuttgart

Project Partners: University of Stuttgart ILPÖ & Green Office

Goal: A participatory and co-creation process to develop governance structures and to integrate NbS in the climate adaptation strategy for the the University of Stuttgart campus. The project centers on NbS implementation, assessing organizational structures, potential barriers, and ensuring long-term upkeep.



Picture Credits (top to bottom; left to right): Jen Guyton; Devan King (TNC); Sebastian Kringel; plan zwei; Sophie Mok; University of Stuttgart

ICLEI on EU-China NbS cooperation, and beyond (I)

A close look at the past five years

Urban by Nature

CLEVER Cities and Connecting Nature have joined forces to bring the UrbanByNature (UbN) programme to China. Tailored to the needs and interests of Chinese local governments and urban stakeholders, UbN China is providing capacity-building and good practice exchange on a variety of topics including stakeholder engagement, technical implementation and monitoring of nature-based solutions.

2, Planning Nature-based Solutions with Citizens and other Stakeholders

- [CASE] Milan: NbS co-creation in urban regeneration
- [CASE] Shenzhen: WeGarden to co-create a biophilic city for all
- [METHOD] Connecting Nature on co-produce NbS

4, Monitoring and Evaluation of Nature-based Solutions

- [METHOD] Effects of NbS in urban regeneration and measurement
- [CASE] London: Applying an NbS Monitoring Framework
- [CASE] Glasgow: NbS impact assessment and place-based approach
- [METHOD] Forest City Studio on Shanghai: Exploration on evaluating NbS in an urbanised area

CLEARING HOUSE-REGREEN – UrbanbyNature China Webinar

- Ecosystem restoration and benefits of forests and urban trees (1/2)
- [METHOD] Forest and Human Health
- [CASE] Beijing: Forest therapy
- [CASE] Hangzhou: Green and cool roofs
- [CASE] Xiamen: Landscape design of Mountain-to-sea trail
- Urban Biodiversity (2/2)



1, Enabling conditions and barriers to implementing Nature-based Solutions

- [METHOD] Rewilding cities in China: challenges and opportunities
- [METHOD] Connecting Nature: Exploring barriers and mobilising resources for NbS
- [METHOD] Enabling conditions and barriers to NbS implementation
- [CASE] Zhuhai: Sponge Cities on enhancing urban resilience
- [CASE] Shanghai: Habitat Garden during urban regeneration era

3, Technical Implementation of Nature-based Solutions

- [METHOD] Turenscape: Nature-based Landscape Design
- [METHOD] Connecting Natur: Financing, Business Models and Entrepreneurship for NbS
- [CASE] Guangzhou: Sustainable urban cooling with NbS planning
- [CASE] Hamburg: Selecting and implementing NbS for urban regeneration

5, Replicating nature-based solutions across the urban fabric

- [CASE] Kunming Lake: From Degradation to Restoration
- [CASE] Tianjin Eco-City: Green Construction:
- [METHOD] CLEVER Cities: The NbS Replication Roadmap
- [METHOD] Connecting Nature: Replicating and Upscaling NbS



This project has received funding from the European Union's Horizon 2020 innovation action programme under grant agreement No 730222 and No 776604.



ICLEI East Asia
Secretariat WeChat



Clever Cities Youtube
Channel

ICLEI on EU-China NbS cooperation, and beyond (II)

A close look at the past five years

REGREEN

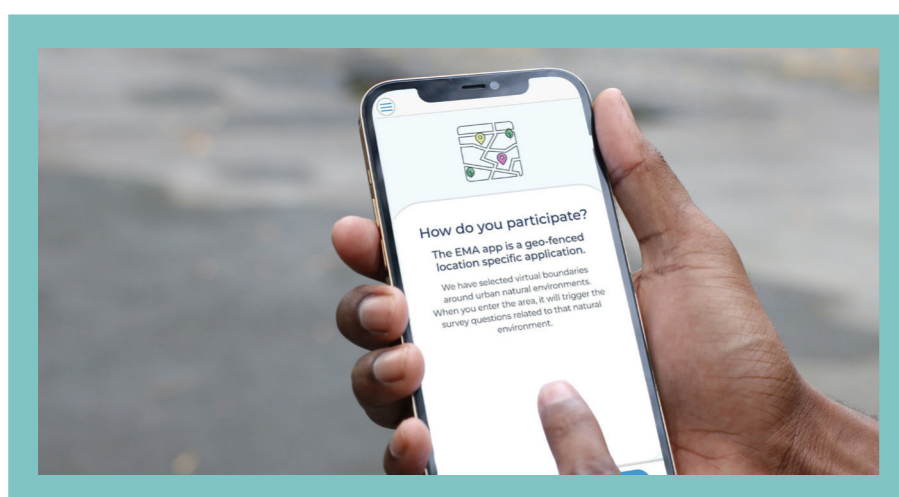
REGREEN works through Urban Living Labs (ULLs) as the central elements of the project, where co-creation of knowledge involves local citizens, schools, businesses, organisations and public administrations enabling new forms of urban innovation.

REGREEN utilises advanced socio-spatial and land-use models in combination with both ecological expertise, to ensure that quantity and quality of solutions are addressed, and big-data derived experiential information to determine best-case solutions for re-greening selected cities.

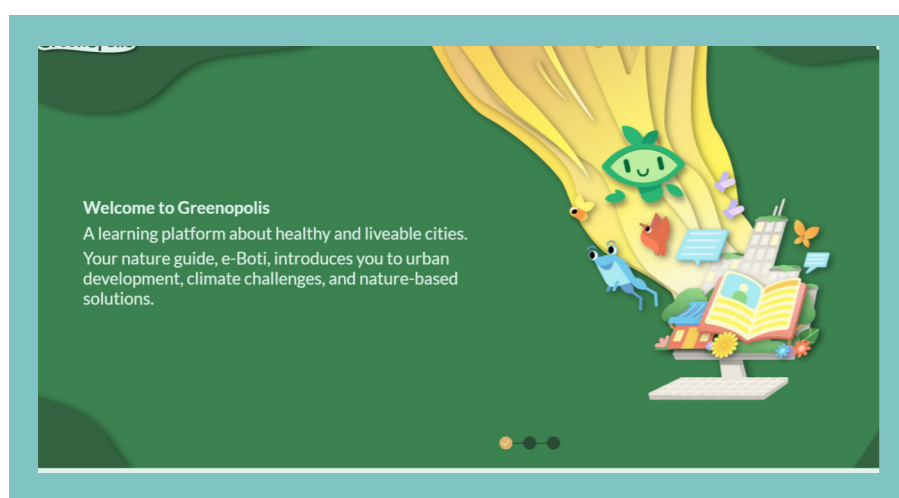


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821016, as well as the National Key R&D Program Intergovernmental Cooperation in International Science and Technology Innovation from Ministry of Science and Technology of China (Grant no. 2021YFE93100).

Innovative tools and methods generated through close collaboration with cities



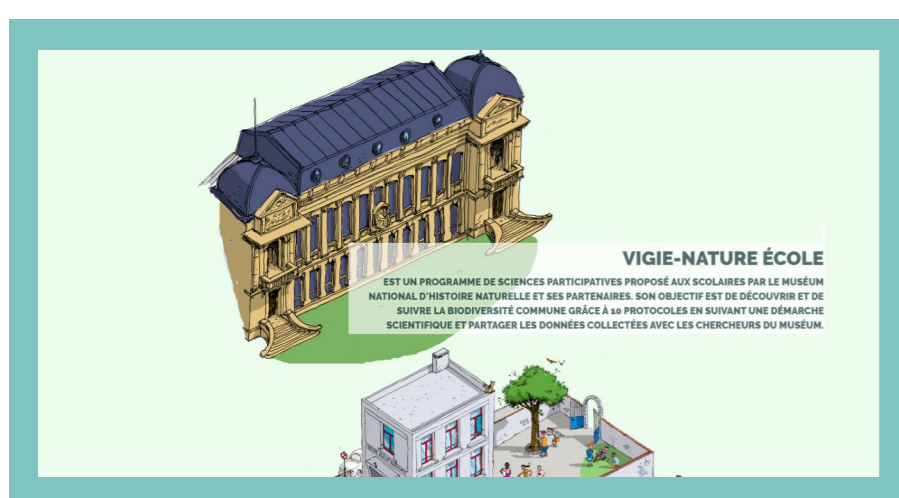
EMMA app to study the effects of urban parks, forests, trees and water bodies on Well-being*.



Greenopolis digital platform to learn about healthy and liveable cities for urban development, climate actions, and NbS



Factsheets to showcase diverse social-ecological impacts through NbS projects



Vigie-Nature École: A document that provides all the keys you need for you and your classes to join this citizen science programme



RENATURER LES VILLES méthode, exemples et préconisations

Regional Highlights: NbS in cities of China

Local actions forge global impacts

CitiesWithNature

Nature provides diverse life-supporting and life-enhancing contributions to people in cities and towns. These gifts from nature make human life both possible and worth living. All cities critically depend on healthy interconnected ecosystems within and around them, so it is essential that nature is fully integrated into urban planning and development. There is a growing urgency for collective and large-scale action to protect the biodiversity in and around cities to prevent irreversible loss and damage to the natural systems we depend on.

CitiesWithNature is a unique initiative that recognizes and enhances the value of nature in and around cities across the world. It provides a shared platform for cities and their partners to engage and connect, working with shared commitment towards a more sustainable urban world.

Wetland Cities

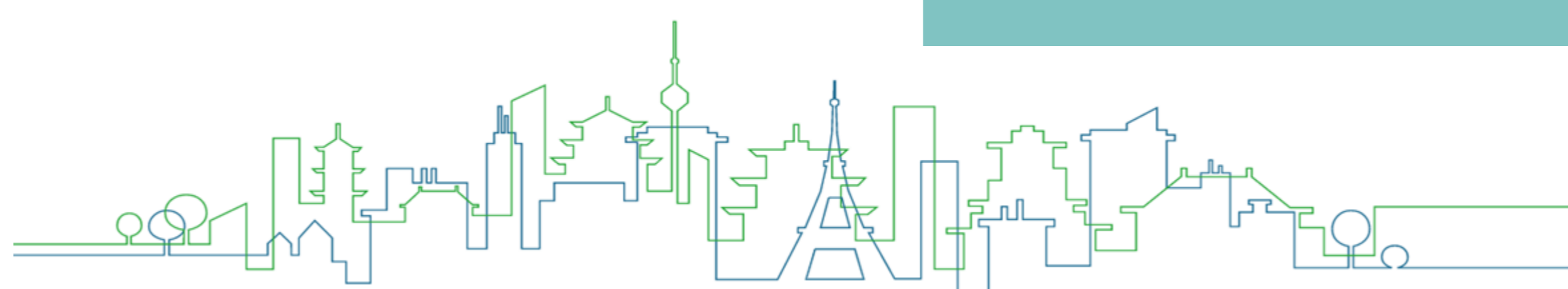
ICLEI serves a role in the Ramsar Wetland City Accreditation as one representation on the Independent Advisory Committee (IAC). ICLEI has undertaken to promote the Wetland City Accreditation of the Ramsar Convention and promote local efforts to gain and maintain its branding. Through ICLEI's city networks and CitiesWithNature platform, it is well positioned to promote the Ramsar Wetland City Accreditation brand.

In China, ICLEI has been exploring synergies among actions corresponding to climate change, urban resilience and biodiversity conservation through the platform of urban wetlands.

Towards urban resilience and biodiversity

INTERACT-Bio

INTERACT-Bio, led by ICLEI, is designed to improve the utilisation and management of nature within fast-growing cities and the regions surrounding them. It aims to provide expanding urban communities in the Global South with nature-based solutions and associated benefits.



Mapping NBS needs and demands to support standardisation

Ángela Matesanz, Saioa Zorita and Efrén Feliu

TECNALIA, Parque Científico y Tecnológico de Bizkaia, Astondo Bidea, Edificio 700, 48160 Derio, Spain

Introduction

How can standardisation help on the of upscaling and uptake of nature-based solutions?

- Standardization can facilitate **knowledge-sharing** among different stakeholders. This can help to build a **common understanding** of the benefits, challenges, and opportunities associated with these solutions.
- Standardization ensures **consistency** in the design, implementation, and monitoring of nature-based solutions. This consistency can help to build **trust among stakeholders** and **increase confidence** in the effectiveness of these solutions.
- Standardization facilitates the **replication of nature-based solutions** across different regions, contexts, and scales. This can help to accelerate the uptake of these solutions and promote their widespread adoption.

Results

Revised standardisable elements/processes

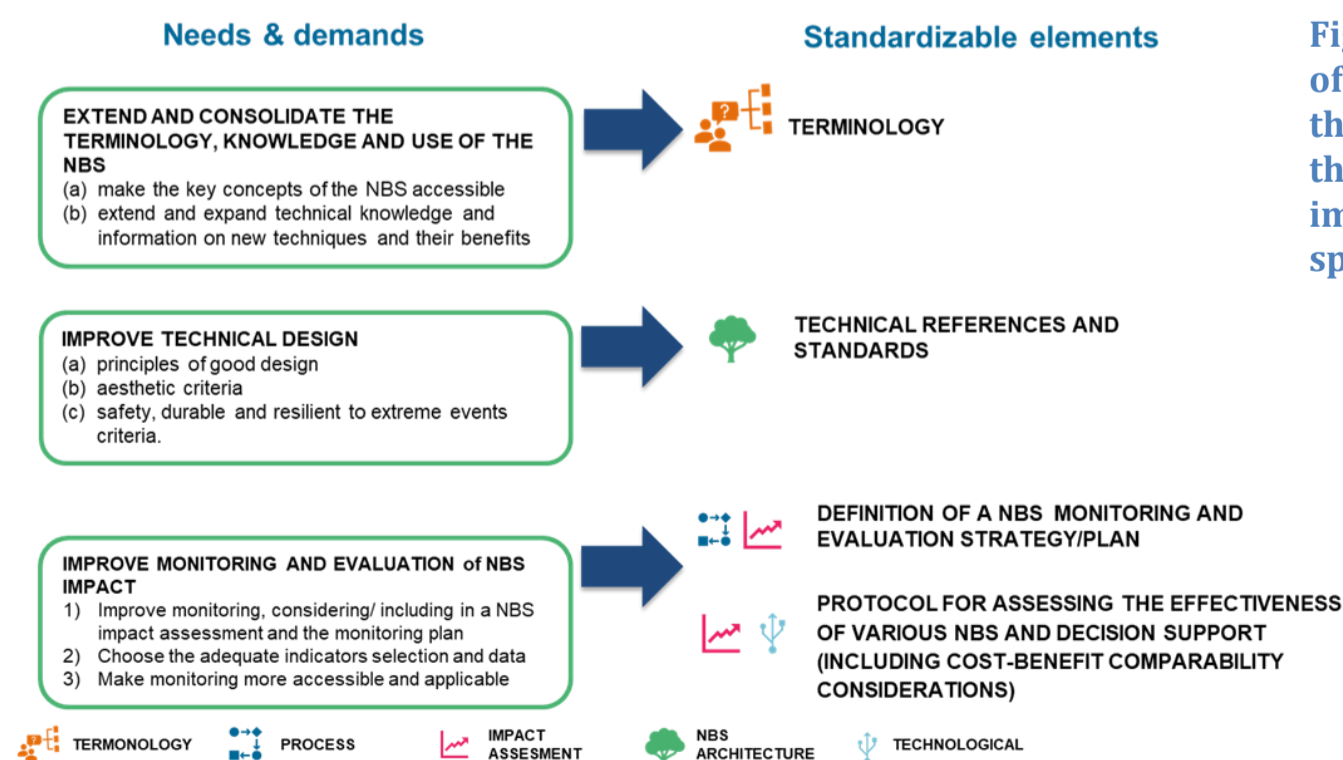


Figure 1. Example of the findings of the desk study in the NBS design & implementation sphere

Methodology

How has CLEVER-Cities supported the standardisation of NbS? By identifying and prioritising the main needs and demands and identify which of those needs may benefit from an standardisation process. A mixed methodology was followed:

- Desk study:** 17 EU NBS publications + outputs from 28 EU NBS projects. Needs were classified around 5 thematic spheres and 5 standardisation categories
- Survey** (NetworkNature): Prioritise the needs



THEMATIC SPHERES	STANDARDISABLE ELEMENTS/ PROCESSES	STANDARDISATION CATEGORY
NBS TECHNICAL DESIGN AND IMPLEMENTATION	★ Terminology	Terminology
	★ Technical references and standards	NBS Architecture
	★ Protocols for assessing the effectiveness of various NBS and decision support (including cost-benefit comparability considerations)	Process
	★ Definition of an NBS monitoring and evaluation strategy/plan (Specificities to consider when assessing the impact of NBS)	Process
	★ Pre-project assessments to understand local needs and existing initiatives first and to set goals	Impact Assessment
NBS PLANNING	★ A planning process on how to take NBS into account in planning to achieve environmental and sustainable objectives	Process
	★ Guidelines on considerations and steps to support scaling up of NBS	Process
POLICY AND GOVERNANCE	★ Process to promote political consensus and commitment that legitimizes NBS	Process
	Process on how to find the best composition of stakeholder groups	Process
	Process for improving horizontal and vertical coordination (administration)	Process
	Process to strengthen collaborative governance	Process
	A process to improve the processes of co-design	Process
NBS FINANCING AND ECONOMIC ACTIVITIES	★ A process to strengthen capacity building	Process
	★ Methodology for assessing the cost-benefit ratio of NBS	Impact Assessment
	★ Methodology on the monetization of the benefits of NBS or ecosystem services	Impact Assessment
	★ Methodology to carry out investment rating	Impact Assessment
COMMUNICATION AND AWARENESS RAISING	★ Process on how to develop (alternative) business and finance opportunities and models for NBS	Process
	A process for developing an effective communication and awareness-raising strategy	Process

★ Priority Incorporated after the review Specific of NBS Non Specific of NBS

Figure 2. Needs that were considered for the survey

Terminology was found to be the most frequently selected need to be standardised (14%) followed by Technical standards (11%) and protocols for assessing the effectiveness of various NBS and decision support.

Source: CLEVER D5.7 Standardisation Roadmap

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IPVC Learning Service Project

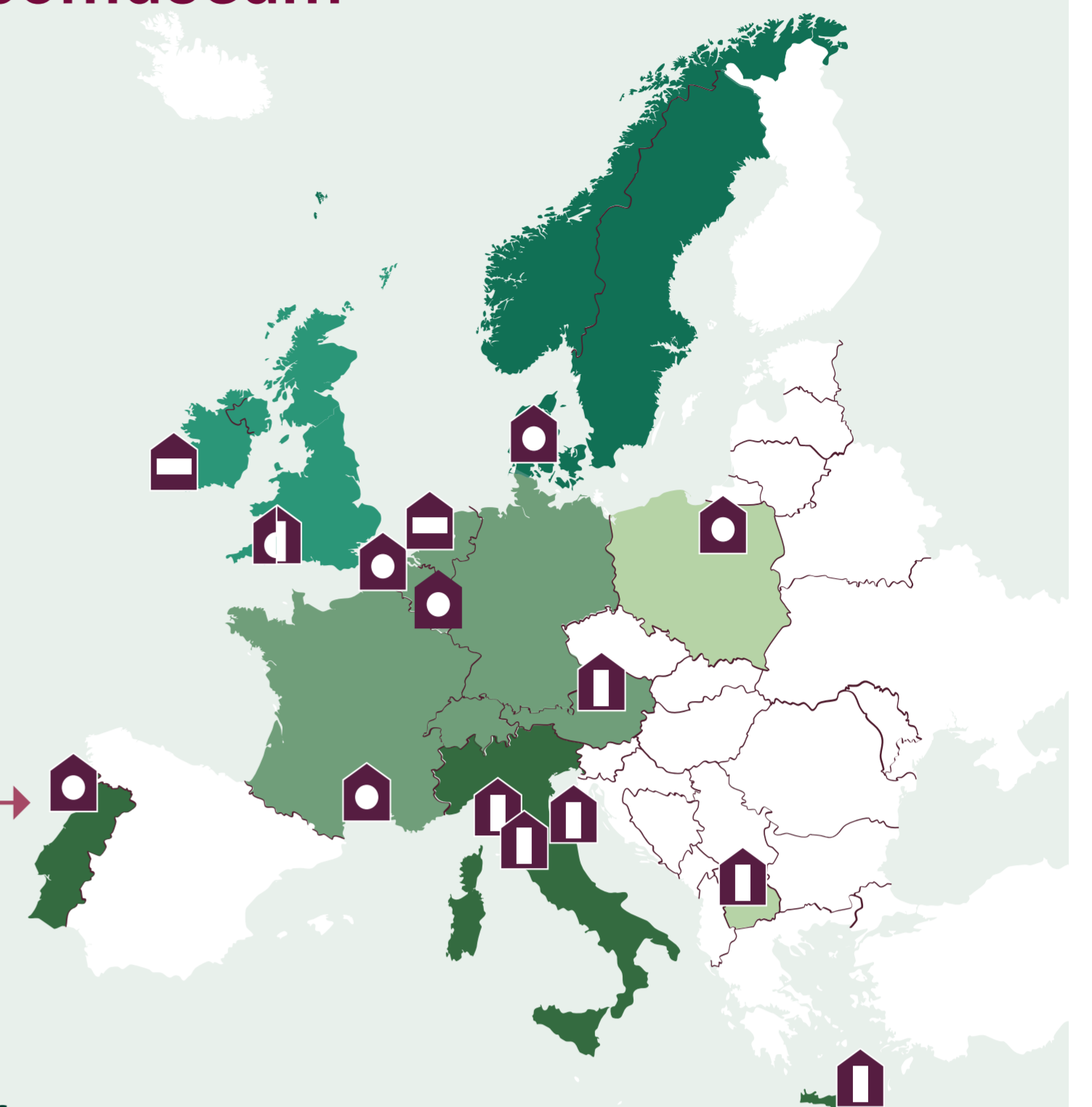
Village Cultural and Natural Ecomuseum



ESA-IPVC

Living Lab Alto Minho

15 countries
35 partners
13 living labs



Living Lab Alto Minho aims to drive a new kind of nature-based school transformation for sustainable and healthy diets. Higher Education Institutions (HEIs) can have an impact on food systems, through research, innovation, education, and community development. Social and Therapeutic Gardens developed at IPVC Inclusive School project improved relevant social-emotional, cognitive and behavioral skills, and thus increase interest in healthy eating and sustainable consumption.

The Living Lab Alto Minho aims to promote the co-creation of innovative solutions in real world scenarios and involve the participation of end users, bringing together their real world and local knowledge. It aims to build a new way of life, centered on the concept of community, an inclusive social model to help promote prosocial and individual behaviors with more sustainable living standards in relation to food and food systems, using a multisectoral approach, involving all actors in the value chain, taking advantage of their synergies to promote a healthy, local and sustainable standard of living and eating.



Alto Minho rural communities, some of them facing depopulation and demographic aging as well as agricultural abandonment, are becoming more proactive in finding ways to restore abandoned farming areas, and to preserve local knowledge related to traditional nature-based activities. This is the case of Labruja village, and the local community natural and cultural Eco museum project. The Agrarian School was invited by the chairman of the parish council to collaborate in the project implementation, by developing contents about local biodiversity. This task was performed in the context of learning-service activity. Scientific knowledge about habitats and species was incorporated, but the adopted methodology also included a close interaction with local people. This was very stimulating for both students and the local community. For the students was an opportunity to mobilize knowledge and to apply it to a real natural and social context.

IPVC Inclusive School is a service learning project, developed by professors and students that are community oriented. In this project relevant community solutions are developed aimed at serving the academic community, and other publics, such as children, seniors, and people with disabilities. The garden is cultivated by students and professors, integrated in the courses curriculum and according to the principles of organic agriculture and service learning.



IPVC Social and Therapeutic Garden is a space for experimentation, an open-air laboratory, a tool to educate future generations about the importance of preserving the environment and, in particular, sustainable agricultural and food production (Dias, G., 2022). It also can have a relevant role in human development considering its potential working with people with less incomes and disabilities. Each year activities are planned with the region's school groups and social institutions, always seeking to associate sustainable production with healthy eating and the promotion of endogenous products.

Download this poster



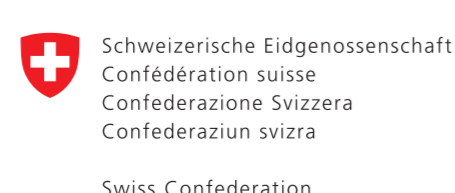
The community was clearly motivated and proud to see their knowledge valued and incorporated in a contemporary project. Reconnecting people and nature, by valuing and mobilizing traditional knowledge from peasant communities, is part of a wider tendency which sustains nature conservation should focus more on biocultural diversity and less in a strict approach to wildlife conservation (Agnoletti, 2014).

www.feast2030.eu



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Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Education, Research and Innovation SERI



Innovate UK

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Reference: Agnoletti, M. (2014). Rural landscape, nature conservation and culture: Some notes on research trends and management approaches from a (southern) European perspective. *Landscape and Urban Planning*, 126 (2014) 66-73





URBINAT

HEALTHY CORRIDORS AS DRIVERS OF SOCIAL HOUSING NEIGHBOURHOODS FOR THE CO-CREATION OF SOCIAL, ENVIRONMENTAL AND MARKETABLE NBS

URBINAT is a 5-year project (2018 to 2023), funded by the EU H2020 Programme, focused on the regeneration of under-served urban neighbourhoods through the co-creation of Nature-Based Solutions (NBS). NBS are implemented together to form Healthy Corridors which act as drivers in the transformation of social housing neighbourhoods, and the wellbeing of residents.

URBINAT has three Frontrunner cities, Porto, Nantes and Sofia, based on their innovative use of public space through nature-based solutions (NBS), and four Follower cities, Siena, Nova Gorica, Brussels and Høje-Taastrup, sharing their knowledge and replicating URBINAT concepts and methodologies.

The project also consists of an international network of Observer Cities and Institutes, Khorramabad City (Iran), URBEM(Brazil), CEMPA (Brazil), Delft University (Netherlands), Cyprus Institute (Cyprus), Setsuan University(Japan), Nanahi City(China).



URBINAT CoP map, infographic by CES

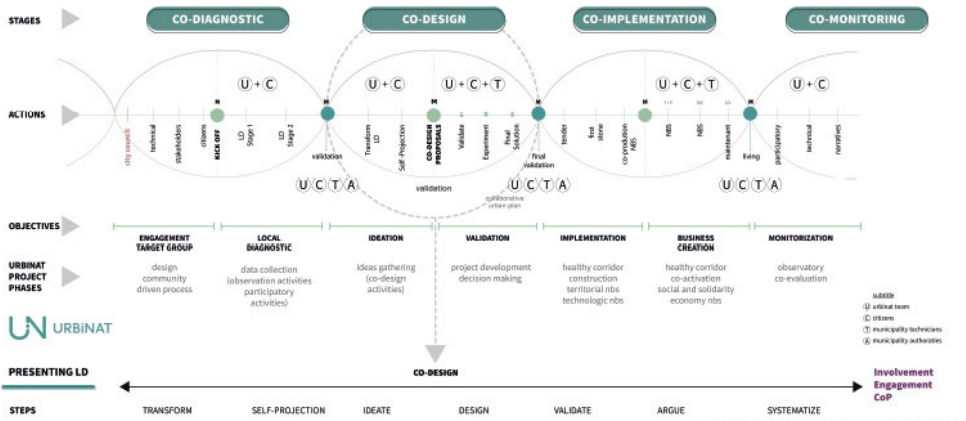
CO-CREATION ACTORS



Co-creation processes, infographics by CES

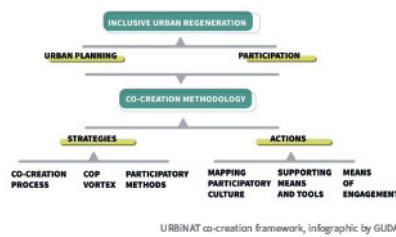


CO-CREATION PROCESS



URBINAT co-creation process diagram, infographic by GUIDA

REFERENTIAL FRAMEWORK FOR AN INCLUSIVE URBAN REGENERATION



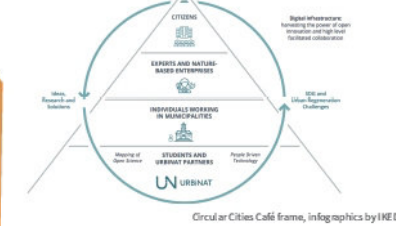
URBINAT co-creation framework, infographic by GUIDA

PARTICIPATORY APPROACHES, METHODS AND TOOLS

METHODS AND TOOLS	PARTICIPATORY APPROACHES				CO-CREATION	CO-DESIGN
	Cultural Mapping	Motivational Interviewing	Critical Proximity	Participatory Design		
Walkthrough		X	X	X	X	X
Photovoice	X	X			X	X
Mapping	X	X		X	X	X
NBS Cards Game	X				X	X
NBS Mini Catalogue				X		X
New NBS			X			X
Experiments	X		X	X		X
Superbarrio						X
Digital Games				X		X

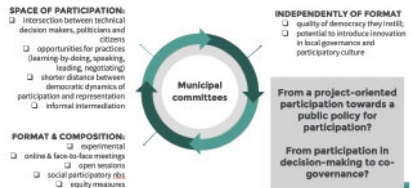
Relationship between methods/tools, participatory approaches, and co-creation stages, infographics by GUIDA

COMMUNITY OF PRACTICE IN THE CIRCULAR CITIES CAFÉ



Circular Cities Café frame, infographics by IHE D

CO-GOVERNANCE ACHIEVEMENTS: ADVISORY BOARDS AND MUNICIPAL COMMITTEES



URBINAT Co-governance achievements, infographic by CES

HEALTHY CORRIDOR | STRATEGY_FRONT RUNNERS



HEALTHY CORRIDOR | STRATEGY_FOLLOWERS



NBS FOR HEALTHY CORRIDOR PORTO; NANTES AND SOFIA



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776783

"NATURE FOR INNOVATIVE AND INCLUSIVE URBAN REGENERATION"

EXPLORE THE URBINAT NBS CATALOGUE

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Strengthening urban ecosystem restoration in Europe and Latin America

About the INTERLACE project

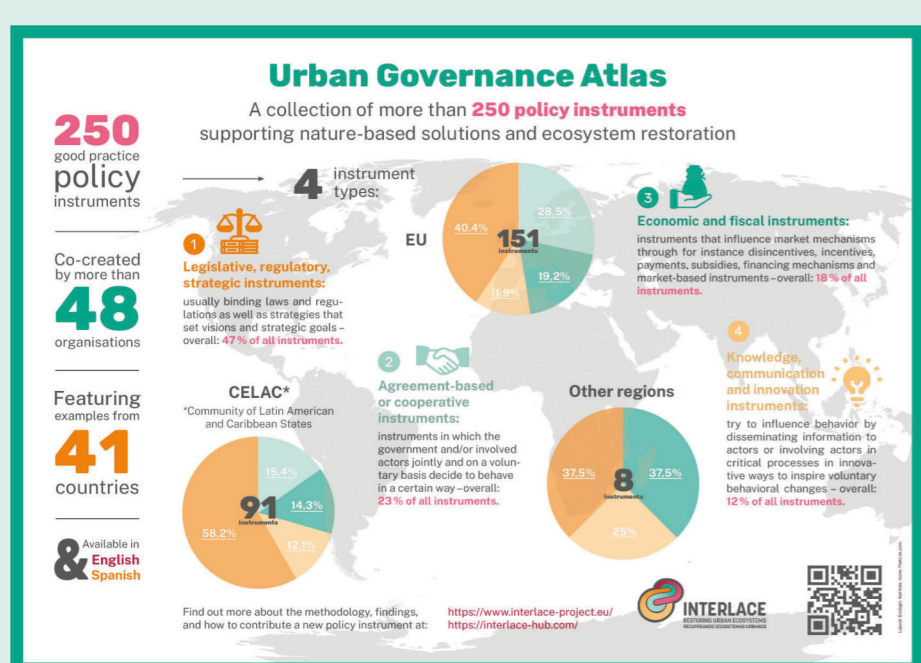
The INTERLACE project aims to support European and Latin American cities in restoring their (peri)urban ecosystems through nature-based solutions to become more livable, resilient and inclusive. The project develops its activities in cooperation with six small and medium-sized cities in Europe and Latin America: Granollers, Spain; Envigado, Colombia; Portoviejo, Ecuador; Chemnitz, Germany; Metropolia Krakowska, Poland; and the Corredor Biológico Interurbano Río María Aguilar-San José, Costa Rica.

interlace@ecologic.eu

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<https://youtube.com/interlaceproject4937>

KEY PRODUCTS...

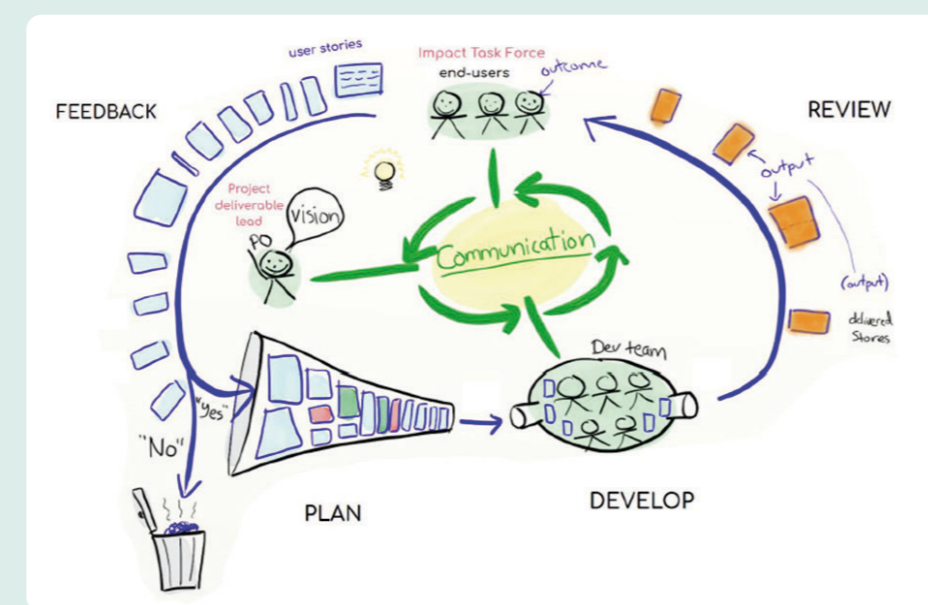


Urban Governance Atlas

The Urban Governance Atlas (UGA) is an interactive online database featuring 250 good practice policy instruments supporting nature-based solutions and ecosystem restoration. The first of its kind, the Atlas allows users to explore instruments from around the world and what has made them successful, lessons learned in their design and implementation, and their approaches to governance. Whether you're a policymaker, urban planner, or citizen – we invite you to visit the UGA and be inspired by the amazing work being done in over 41 countries!

Agile workflow/guidance

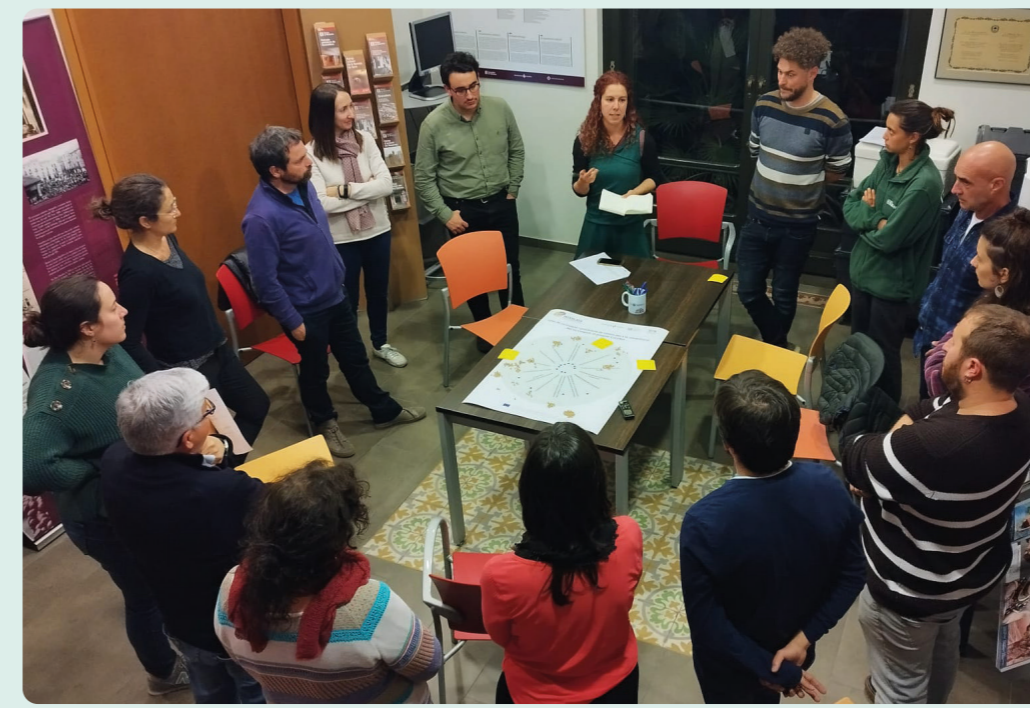
The INTERLACE consortium is experimenting with an agile workflow, to develop more user-oriented deliverables. This is innovative in the sense that the focus is on end-user needs: the research design is adapted to the local needs and embraces changing requirements. The approach rests on a set of core values and principles, that favours an iterative workflow where feedback is collected regularly and integrated into the deliverable. Check out the "Agile Guidance" to learn more: it provides theoretical and practical guidance on how to get started, and first lessons learnt. This living document will be updated as more details on successes and challenges become clear via our monitoring and evaluation.



Source: Agile Product Ownership in a nutshell by Henrik Kniberg <http://tinyurl.com/ponutshell>

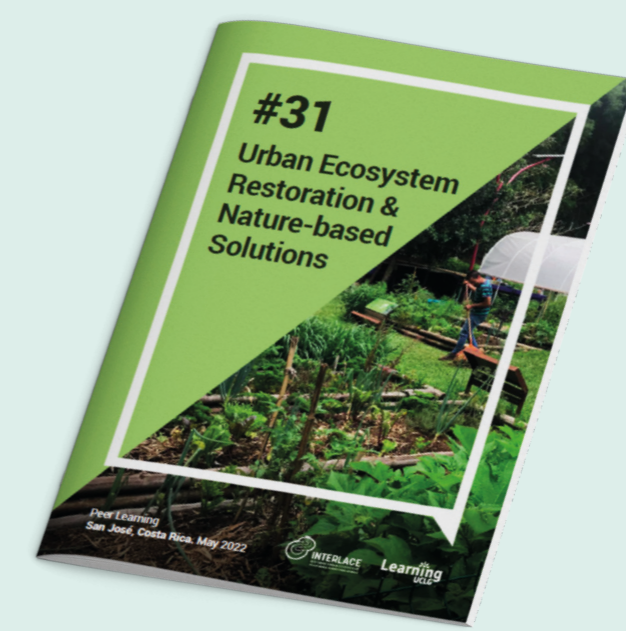
NBS Assessment framework

The INTERLACE Assessment Framework is envisioned to help users evaluate nature-based urban solutions in a participatory way. It can be used to formulate and design solutions specific to the context of each place or city, and monitor and evaluate the impact of a given NBS. It consists of five modules and several sub-modules. The first set of modules are fixed: **Framing & Co-creation**, and the four following modules can be chosen according to users needs: **Spatial screening** to diagnose and prioritise NBS intervention areas, **Design Solutions & Comparison of Alternatives** to help users in the previous phases to implementation, and **Monitoring** to evaluate the effectiveness of a NBS.



Peer Learning Note "Urban ecosystem restoration and NBS"

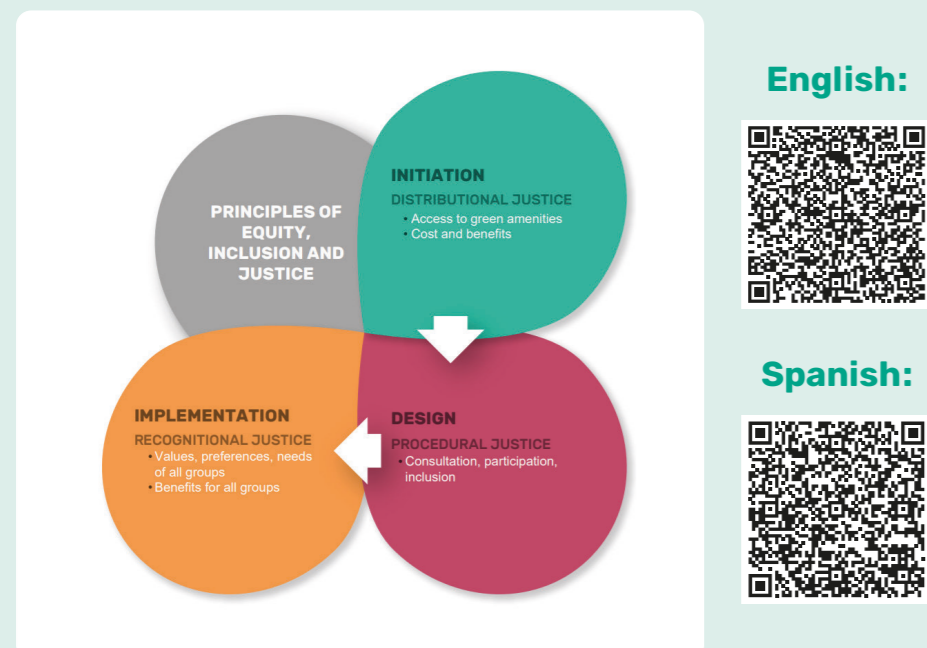
This Peer Learning Note highlights city practices and key lessons from INTERLACE's consortium meeting and first in-person "Cities Talk Nature" engagement event which took place from May 9–13, 2022 in Costa Rica. From the Maria Aguilar Interurban Biological Corridor (CBIMA) in San Jose metropolitan area, spanning over 39 km² across five municipalities, to the recovery of the Congost River in Granollers, it documents 4 cases by local governments in Latin America and Europe, providing key recommendations for cities and other stakeholders to foster the multiple benefits of nature-based solutions while restoring urban ecosystems.



English:



Spanish:



English:



Spanish:



Gender and cultural guidance for participation processes

This guidance supports practitioners, from the INTERLACE project and beyond, who are implementing activities related to ecosystem restoration and need to ensure inclusive, transparent and fair stakeholder participation. Therewith, this document provides clear guidance to facilitate inclusive approaches and explains a set of key topics which allow to better understand and control the cultural, gender and ethical concerns. While there is a large body of research on this topic, this guidance will synthesize existing knowledge from research and practitioners and provide tailored guidance for both the EU and CELAC regions.



Cities Talk Nature webinars and events

CITIES TALK NATURE is a community of practice dedicated to restoring degraded ecosystems in municipalities in Latin America, Europe and other parts of the world. Together we explore the multiple advantages of restorative nature-based solutions, thus building resilience in our towns and cities. Become part of the CITIES TALK NATURE community and join our regular free webinars and events!



Cookbook for interactive online exchanges

The 'Cookbook for virtual interactive exchange formats for cities' gives guidance to public authorities, city networks and other organisations that want to build an inclusive online environment for sharing and learning between municipalities. Have a look at our tried and tested methods and cook up your own recipe for successful collaboration.



INTERLACE Hub

We are transforming the INTERLACE Hub into a new web-platform that will tell the stories and share the outputs of our project in an engaging, 'magazine' style. You'll be able to read articles and interviews about what the project has achieved, the impact we are delivering and why it's important – all featuring links to various tools, resources and other outputs we have created across both Europe and Latin America.



FURTHER PRODUCTS COMING SOON...

INTERLACE MOOC

The INTERLACE Massive Open Online Course (MOOC) is our instrument to spread knowledge about how nature-based solutions are planned, governed, financed, assessed and used in restoring ecosystems in cities together with its citizens. The MOOC will contain the following modules:

- 1 INTRODUCTION** about the importance of urban ecosystem protection and restoration.
- 2 GOVERNANCE INSTRUMENTS** for ecosystem restoration and NBS management.
- 3 CITIZEN ENGAGEMENT** to foster ecological education regarding culture, ethics, and gender issues.
- 4 MEASURES** used to tackle NBS performance, climate change adaptation, and mitigation.
- 5 URBAN DESIGN AND PLANNING** for resilient cities, with the use of social and nature-based tools.

Minecraft® programme

INTERLACE has been using the world's most popular video game – **Minecraft**® – to engage schoolchildren in designing and building nature-based solutions. We've built virtual replicas of our cities using data from OpenStreetMap and NASA. And our young designers have used these 3D environments to create practical solutions for real-world places they are familiar with.



CELAC NBS Repository

Oppla and Humboldt Institute (Colombia) are collaborating to develop a new NBS-focused web-platform for Latin America. The platform aims to replicate Oppla's success in Europe by gathering and sharing case studies, tools and resources contributed by projects and practitioners from across the region.



Arts Programme

INTERLACE seeks to implement art programs whose actions allow studying, strengthening, and promoting the relationships between people, their city, and nature; contributing to social transformation while taking care of nature. Art seeks to impact the way people understand and explain the world. Art is an engine of citizen mobilization that allows for strengthening the concept of community. Thanks to its multiple forms of expression, it allows any type of person with an interest to be linked through some artistic line that can be implemented in the city.

Envigado, a Colombian City, has used wall paintings and murals to recreate the fauna they are protecting under the local protected areas system -SILAPE- Local artists and kids have participated in activities that aim to connect people with nature using the art. Granollers is also planning to invite a recognized artist to use the art as a vehicle to connect their citizens with the areas they are working on under the NBS approach.



Active Learning Tour

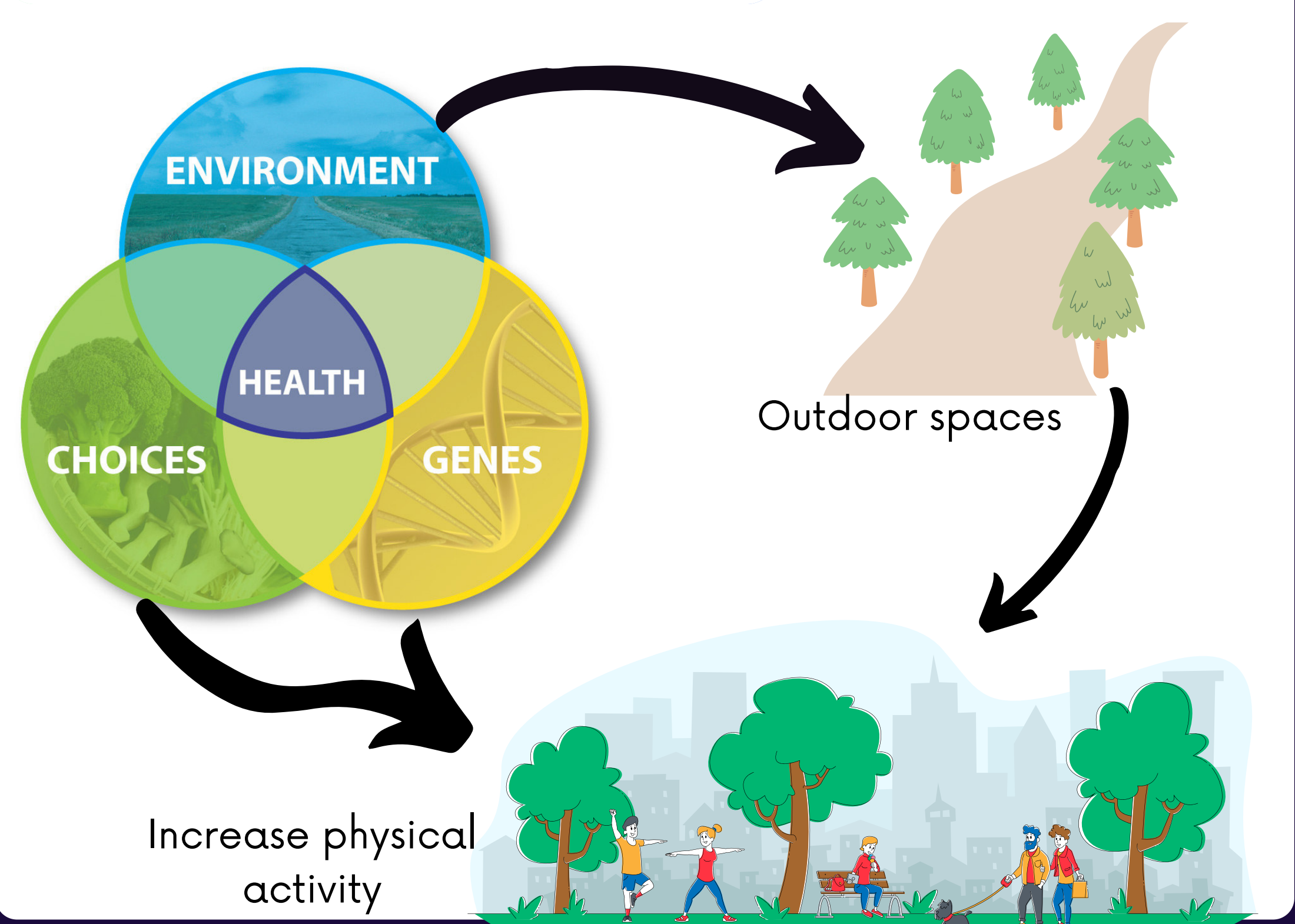
One part of Interlace's community engagement programme is to develop Learning Tours for young people in the project cities. Their aim is to teach young people about Nature-based Solutions for urban ecosystem restoration. In Chemnitz we went with the concept of an app based treasure hunt about Nbs in the context of sustainable city planning. The tour in Chemnitz is designed for 13–17 year old pupils. During the tour the participants will visit 7 different stations with individual questions concerning Nbs and their possible use in a sustainable city planning.

Using outdoor spaces to increase physical activity and reduce sedentary behaviour: results from a pilot study

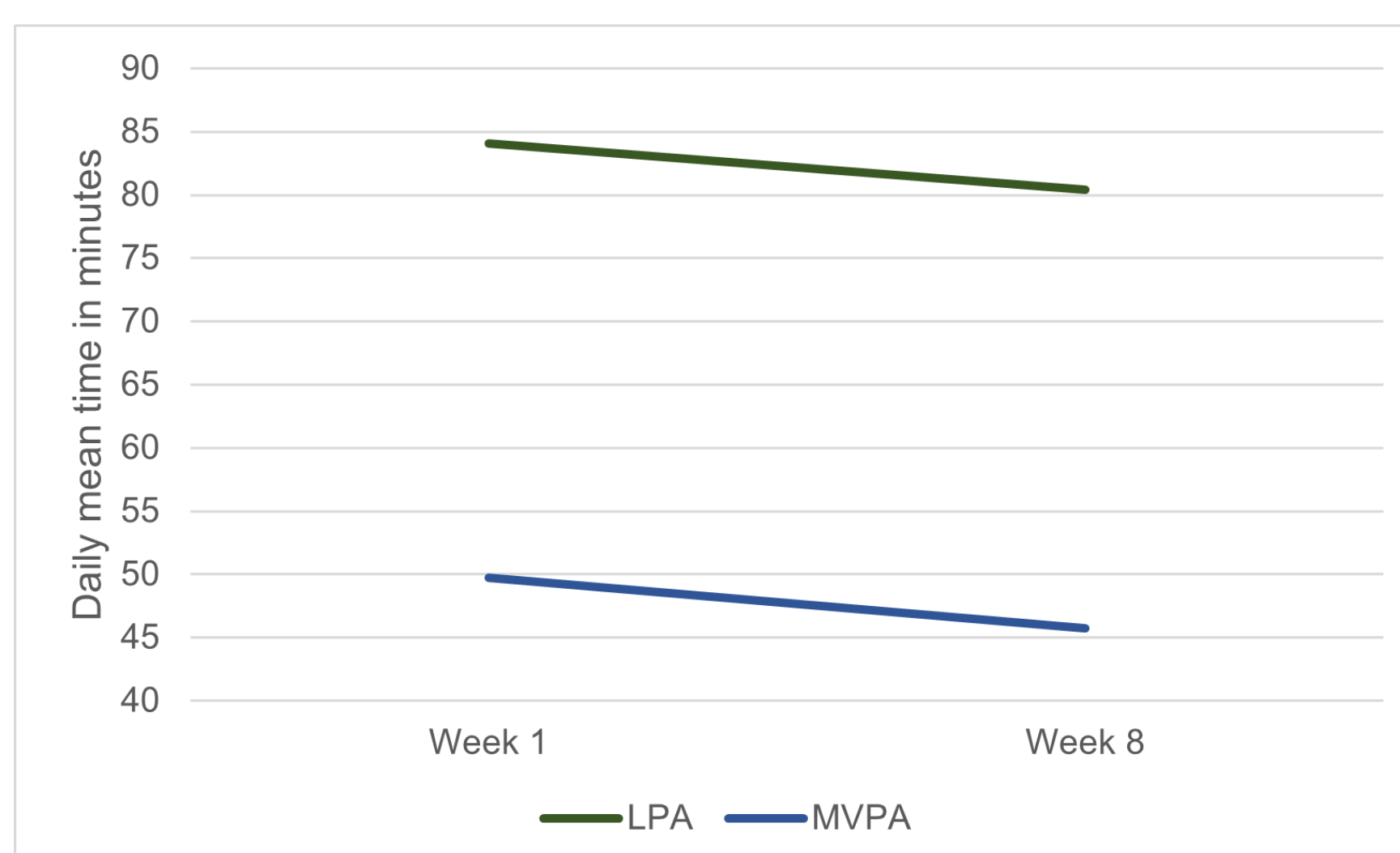
Gomes, TN¹; Suikkanen, S²; Gavin, K¹; Thuany, M³; Väänänen, I²; Donnelly, A¹

¹ Department of Physical Education and Sport Sciences, Physical Activity Health Research Cluster, Health Research Institute, University of Limerick, Ireland; ²LAB University of Applied Sciences, Finland; ³Faculty of Sports, University of Porto, Portugal;

Introduction



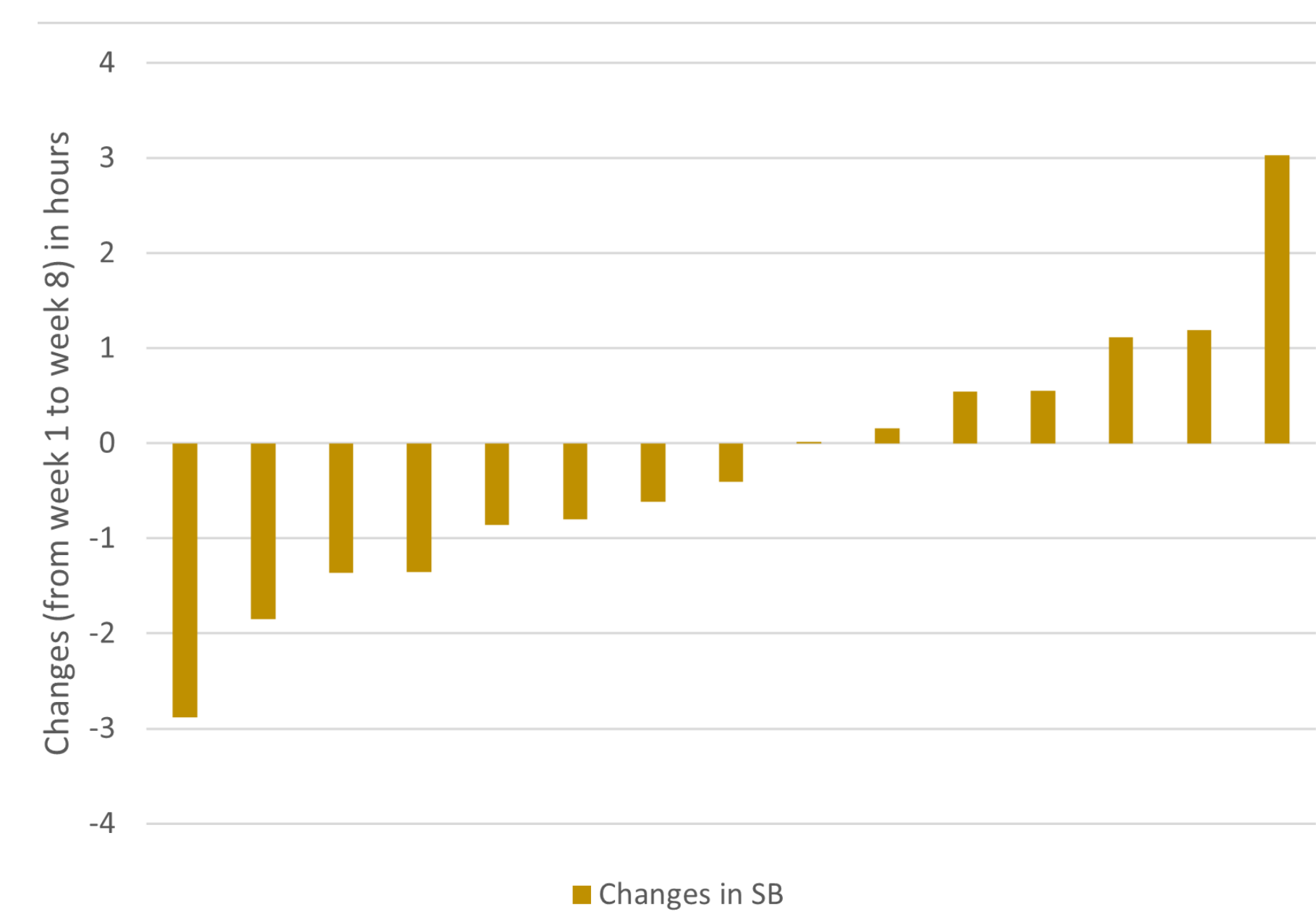
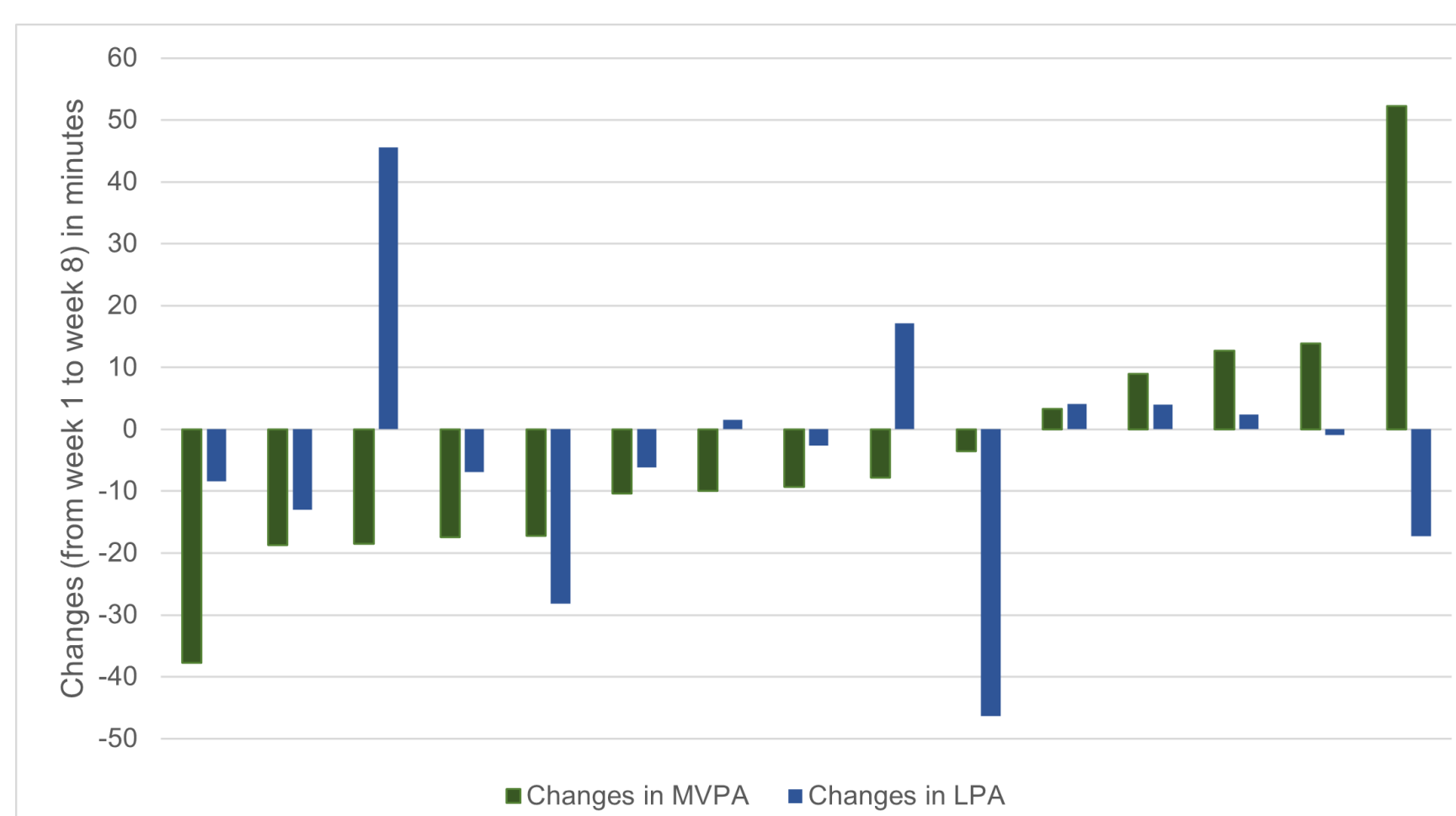
Results



No significant differences between weeks 1 and 8



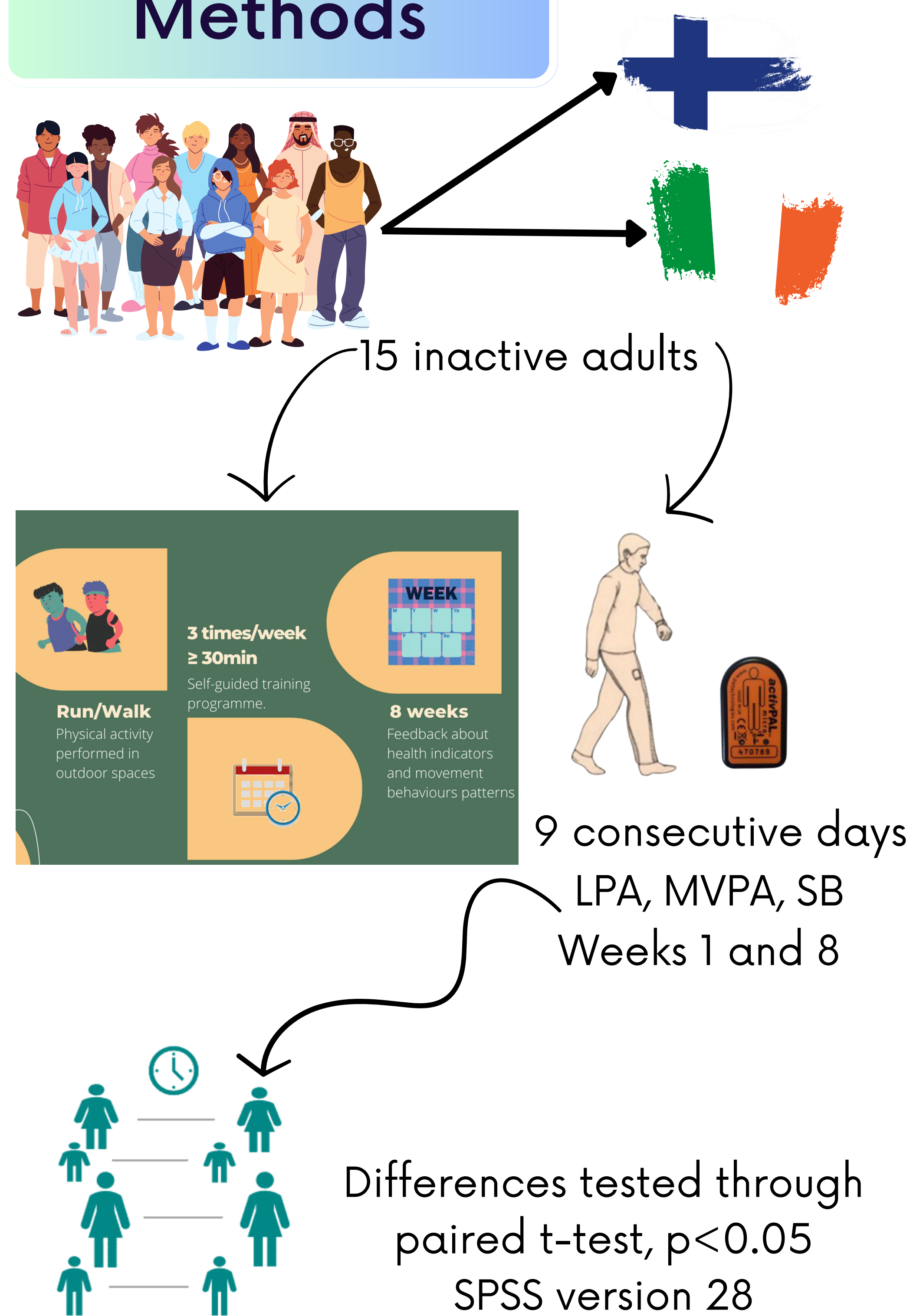
But a huge variability in changes in all the behaviours



Purpose

To test the feasibility of an intervention to evaluate the benefits of outdoor spaces in increasing physical activity (PA) and reducing sedentary behaviour (SB)

Methods



Conclusion

The pilot study's design showed it to be feasible with modifications. Future studies must include a control group to better understand the impact of the intervention on the studied outcomes. In a larger multicentre study we will compare PA in both "green spaces" and "grey spaces".

Contact Information

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<https://gogreeroutes.eu>



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Zhou J-J, Kang R and Bai X. A Meta-analysis on the influence of age-friendly environments on older adults' physical and mental well-being. International Journal of Environmental Research and Public Health 2022; 19: 13813.

ACKNOWLEDGMENT

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Driving a just transition toward low carbon cities

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magdalena.janzic@prospex-institute.org

The overall objective of JUSTNature is the **activation of nature-based solutions (NbS) by ensuring a just transition to low-carbon cities**, based on the principle of the right to ecological space.

City practice labs (CiPeLs) constitute the backbone of the project's activities by delivering community-engaged, co-explored, and co-decided innovation.

Practically, this refers to a work flow of oscillating phases of individual R&D through the co-development with key actors of a community of practice.



7 Cities, 6 City Practice Labs (CiPeLs)

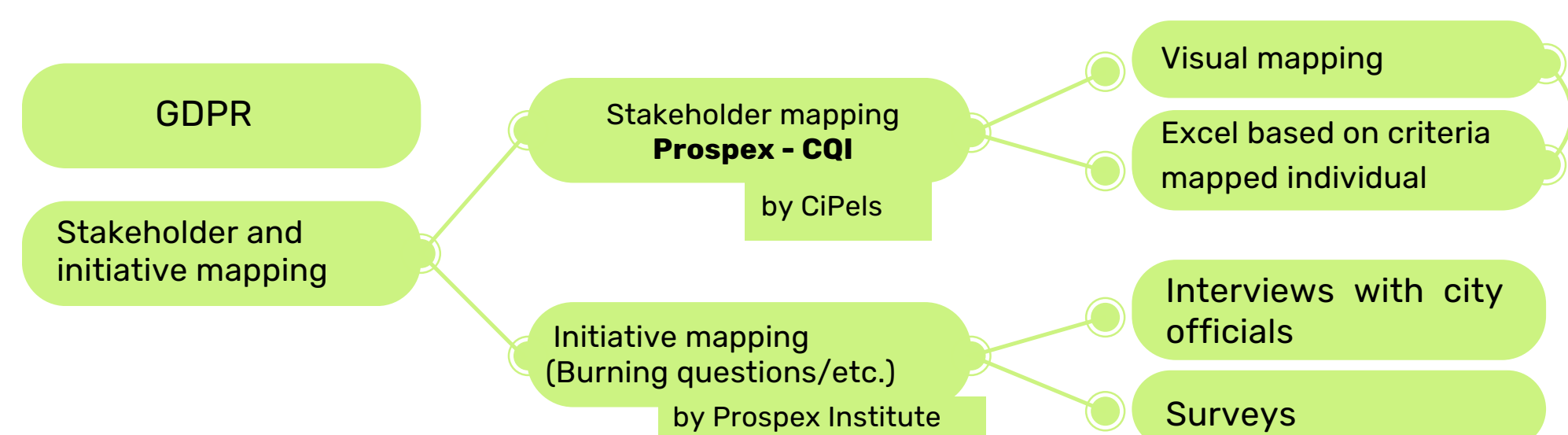
- Chania (Greece)
- Merano & Bolzano (Italy)
- Munich (Germany)
- Gzira (Malta)
- Leuven (Belgium)
- Szombathely (Hungary)

Co-creating just cities through NbS implementation in JUSTNature

Stakeholder engagement within JUSTNature - Prospex Institute

Mapping of local stakeholders and their needs:

- ➔ **Prospex CQI** (Criteria-Quota-Individuals) methodology
- ➔ Project-relevant criteria and categories to specifically address **justice** in the mapping



Guidelines on CiPeLs co-creation strategy and process:

- ➔ Guidance on the overall involvement of all relevant stakeholders in order to achieve just and locally relevant NbS.
- ➔ Individual Engagement Plans offering tailored advice to each CiPeL, recognising their unique local context and challenges

6 Local Stakeholder Workshops
bringing together CiPeL representatives and the members of the local community to co-create the course of the project.

5 Collaborative CiPeL Workshops
for the CiPeL teams to come together, share their progress and lessons learned, and discuss different aspects of the engagement process.

6 Cross-Learning Workshops
bringing CiPeLs and their twin city partners together with the aim of beginning a process for mutual learning and exchange to address common challenges.

In-depth exploration of existing initiative and local issues:

- ➔ 388 stakeholders mapped across the 7 CiPeLs
- ➔ Extensive backdrop of stakeholders, initiatives, burning questions, general recommendations for groups to engage, etc.
- ➔ Visual mapping - spatial indications of where certain communities are active in CiPeLs wider city area



Continuous support of the City Practice Labs

Creation of local JUSTNature's Facilitation teams

Provision of training sessions to the CiPeLs Facilitation teams

CiPeL's Periodic Meetings: knowledge sharing and updates

Training toolkit for the city facilitation teams - Practical guidelines on facilitation

Observation and evaluation of the CiPeLs, focusing on power structures, possible disparities and the identification of countervailing measures

Guidelines on power structures and possible countervailing measures

Reporting templates compiled by Facilitation Teams

Evaluation forms filled-in by workshop participants

Cross-Learning Activities with twinning cities:



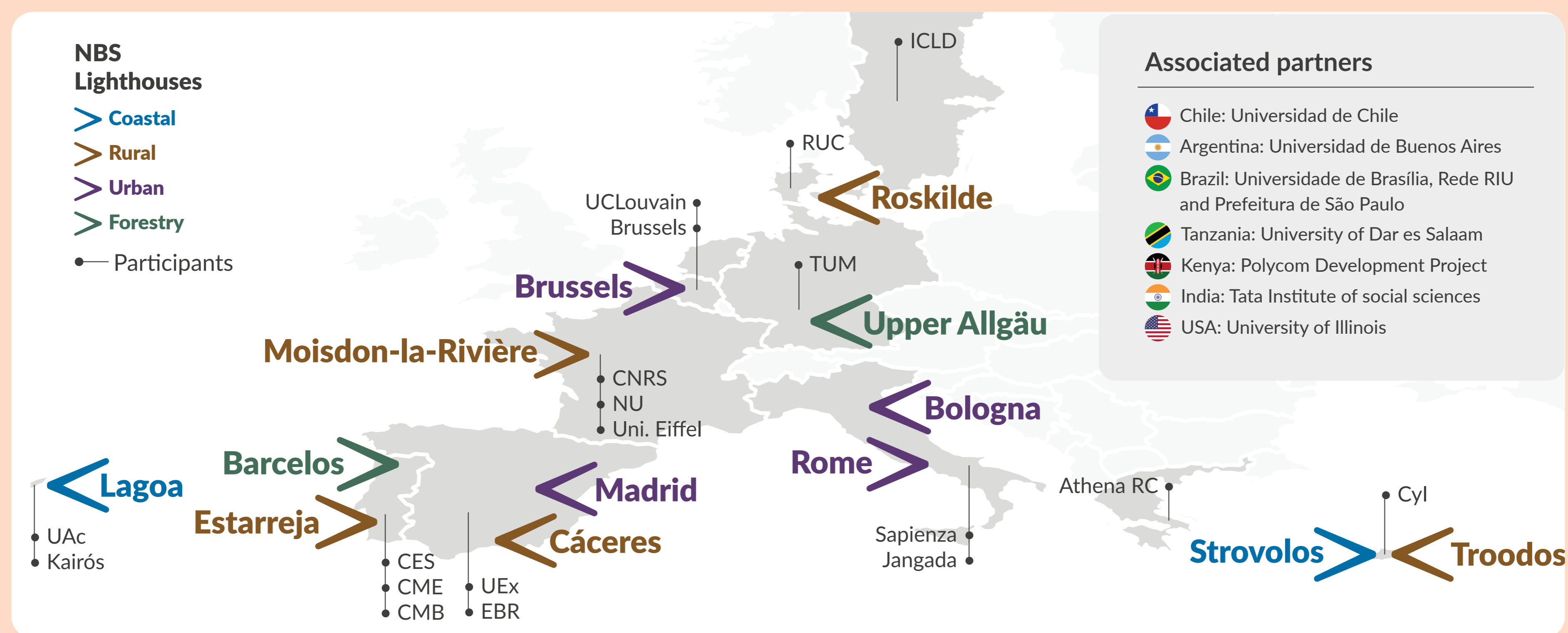


More than green

Lighthouses of transformative nature-based solutions for inclusive communities

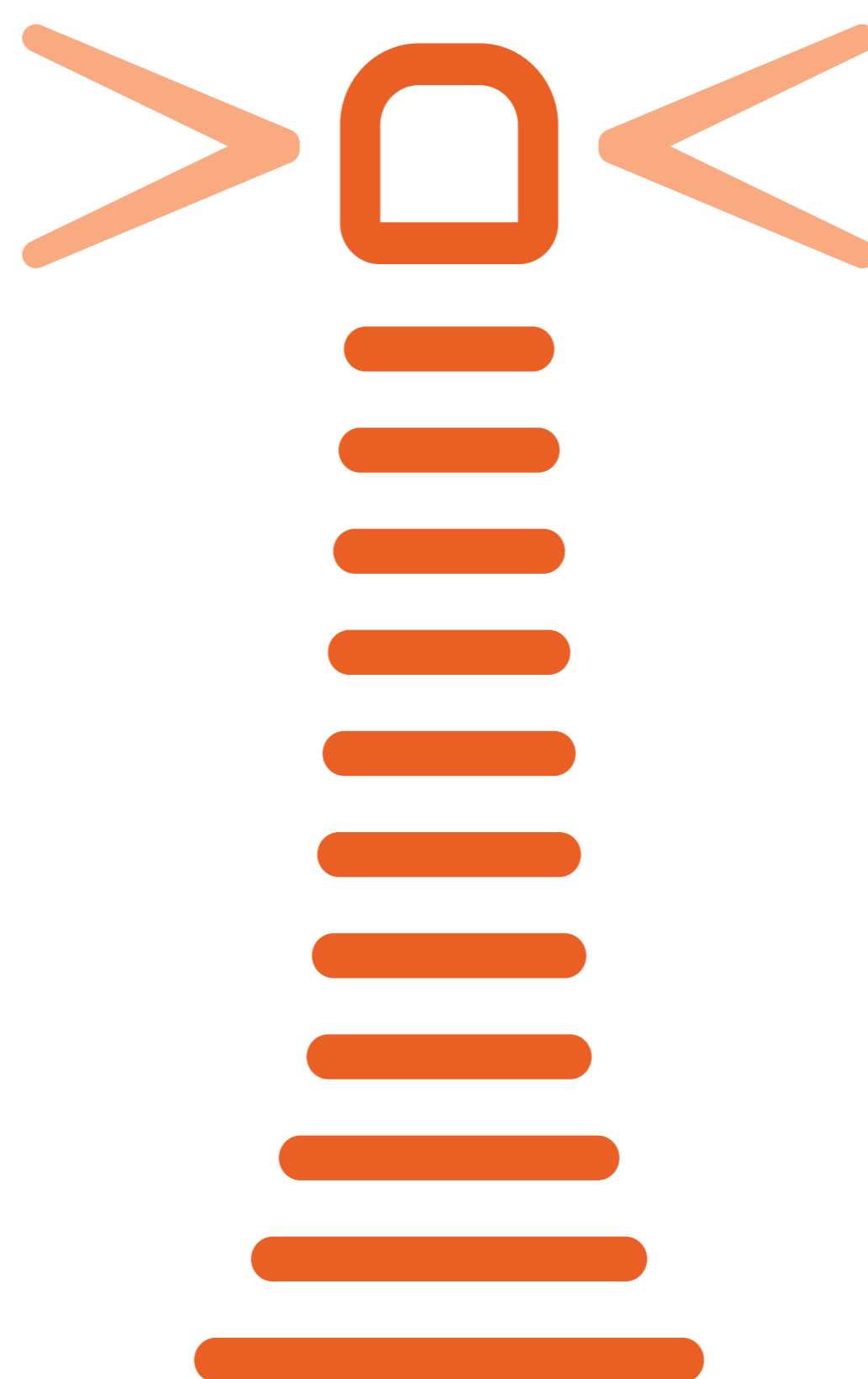
Consortium

- The TRANS-lighthouses project strengthens socio-politics as part of the public agenda for nature-based solutions towards systemic change.
- It aims to gather evidence on material and immaterial results of nature-based solutions in order to rethink and reframe the main elements that compose the complexity of creating social and ecologically just solutions.
- The consortium, coordinated by the Centre for Social Studies of the University of Coimbra, comprises research and innovation performing organisations, policy-making institutions and civil society organisations, with 19 European partners from 10 countries, as well as 9 observers from 7 countries in the Americas, Africa and Asia.
- The project is funded by the European Union, lasting from May 2023 to October 2026 and with a budget of almost 6 million euros, under grant agreement n.º 101084628.



Ambition and Objectives

- To become a European reference in terms of socio-political challenges, in order to locally support nature-based projects and solutions.
- Transformative**, aiming to contribute to the full potential of nature-based solutions with communities;
- Reflexive**, being grounded in assessment and critical analysis;
- Activist**, towards socioeconomic and political changes;
- Networked**, acting together across borders, disciplines and sectors;
- Solutions**, for multidimensional and nature-based governance;
- lighthouses**, leading research in action.



Approach

- A network of “lighthouses” in urban, rural, coastal and forest areas.
- Composed of living knowledge labs, assessment cases, pilot cases and international associated partners.
- Metaphor for a set of local governance arrangements and instruments, within multi-stakeholder networks and concerted groups.
- Assessment of the benefits and effects of solutions already developed to recognize practices and disseminate more economically and socially fair guidelines of implementation.
- New governance models, and approaches and tools for co-creation to be tested in small scale but big picture projects.

Overview

The uptake of Nature-based Solutions (NbS) is essential in improving urban climate resilience and is increasingly implemented around the world. However, there may be unintended consequences that could negatively impact human health and well-being.

In urban areas, some NbS measures could potentially lead to an increase in the risk of infectious diseases. Parks, green corridors, blue spaces, bio-retention facilities, stormwater wetlands, etc., could provide a suitable environment for vectors such as mosquitoes, ticks, and fleas to thrive (Heylen et al., 2019; Löhmus & Balbus, 2015; Medeiros-Sousa et al., 2017). These vectors are known to be able to carry a variety of infectious diseases. Furthermore, anthropogenic climate change has driven the expansion of vector distribution (Rocklöv & Dubrow, 2020; Semenza et al., 2022), resulting in their slow migration from tropical areas to higher latitudes where they are not commonly found, as in the case of some regions in Europe.

Given the projections of climate change and further warming, the simultaneous expansion of green spaces in urban areas and the emergence of new vectors and pathogens in Europe may lead to substantial future outbreaks of infectious diseases (Hansford et al., 2022). This could have detrimental effects on public health and pose a significant challenge to the capacity and efficacy of public health systems and biodiversity. Consequently, safeguarding health and well-being within the One Health framework would then become notably more demanding.

These complex and cross-cutting challenges require a system-wide response. In order to actively enhance urban resilience (Biesbroek, 2021; Tosun & Lang, 2017), the governance of Nature-based Solutions (NbS) must surpass the conventional sectoral boundaries that have historically shaped political regimes.

The governance of Nature-based Solutions (NbS) has emerged within public policy as a distinct category, often compartmentalised, operating in isolation and detached from the interconnected subsystems within urban environments (Wamsler et al., 2017). This mirrors the longstanding patterns of a global governance system that has perpetuated significant inequalities and overlooked the intricacies of environmental sustainability.

Fragmented, divided and compartmentalised governance structures are inflexible, limiting the incorporation of intra-sectoral concerns and also hindering the ability to make decisions swiftly, which is crucial given the present challenges posed by climate change (Howitt, 1993).

In contrast, climate resilience is multifaceted, multidirectional and dynamic (Rocklöv et al., 2023). In concordance, NbS governance must be conceived in this direction, transforming the fragmented, compartmentalised and siloed structures into more collaborative, systemic, and interconnected governance systems with the capacity to articulate and include the diversity of aspects that constitute the multidimensional urban system.

Policy integration and coherence have been identified as an underdeveloped concept in this setting. There is a knowledge gap in understanding the factors influencing the relationship between health, urban planning and environmental policy subsystems or sectors in urban spaces.

In addition, improving the understanding of how health risks are integrated into NbS governance would contribute to enhance the decision-making process by adopting a system perspective and strengthening the individual and collective capacity to recognise the relationships between different factors rather than just focusing on individual and specific components.

Better integrated analytical frameworks across health and environmental sectors are necessary to reduce the prevalence of vector-borne diseases and simultaneously enhance the climate resilience of urban systems.

Goal

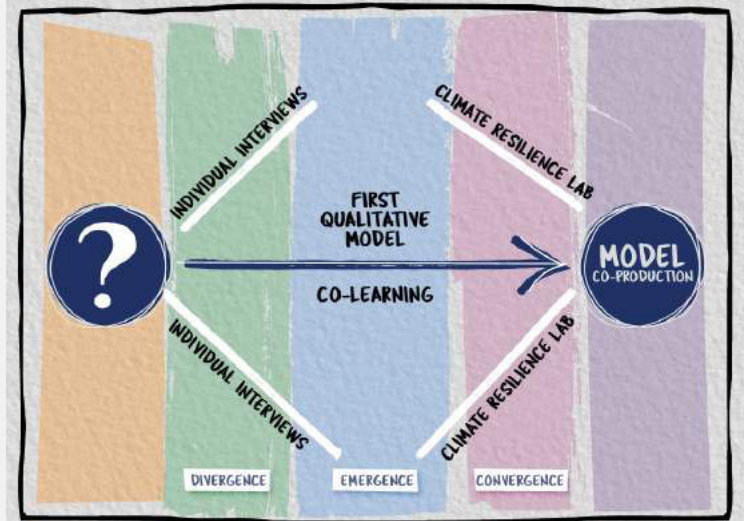
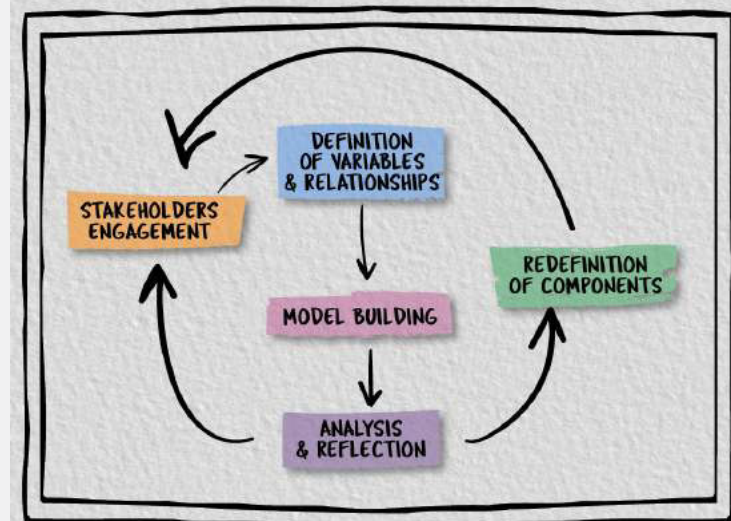
The research aim is to contribute to science-based knowledge on policy integration and coherence in urban systems with respect to NbS measures and health outcomes. Specifically, we will be focusing on the connections between health, urban planning and environmental subsystems when implementing NbS taking special attention to governance transition needs. To support this process, a decision-support tool will be developed using Participatory System Dynamics Modelling (PSDM).

The question that guides the research is: Which factors shape opportunities for and constraints on integrating health risks into NbS governance in European cities?

Methodology

PSDM was selected as the tool to map the interactions on the complex interplay between health and NbS. A system model co-creation process will be conducted to gain an understanding of how components from health, urban planning and environmental policy subsystems interact, how policy instruments from those sectors can be combined, and which arrangements are necessary to integrate health risk into NbS management and governance.

PSDM has been previously used to understand how the causal relationships between the different variables drive system behaviour over time. These causal relationships are circular, creating feedback loops that are either reinforcing or balancing and leading to system patterns. The co-creation process allowed stakeholders to interact with each other to make synergies and trade-offs visible.



Case Study

A case study will be conducted in Barcelona to test the co-development of participatory modelling. The city is committed to the secure of 1 square metre of green area per inhabitant, equivalent to 160 hectares of new green space by 2030. In addition, vector species (especially mosquitoes) have been established in the Mediterranean littoral from Girona to Cádiz and in Balears, increasing the risk of possible outbreaks of Dengue, Zika and Chikungunya in this case study area.



Partners

The Climate Service Center Germany (GERICS) and the University of Heidelberg co-developed the case study in collaboration with the Municipality of Barcelona. The case study is part of the IDAlert project, funded by the European Union. This project focuses on tackling the emergence and transmission of zoonotic pathogens by developing efficient tools for decision-makers and evaluating adaptation strategies to build a more resilient Europe to emerging health threats.



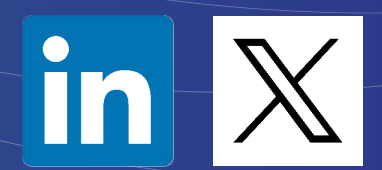
IDAlert has received funding from the European Union's Horizon Europe programme under Grant Agreement 101057554. Funded by the European Union

Integrating Health in Nature-based solutions governance. The missing piece to build urban climate resilience in a warming world.

Adriana Martin, María Mañez Costa, Laurens Bouwer (Hereon/GERICS)



Discover more



IDAlert IDAlertProject



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NATURELAB approach to Nature Based Solutions & Resilient Communities



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Introduction

The NATURELAB project started in June 2023 and has a total of 54 months of duration. It proposes an **integrative and innovative approach to contribute to resilient communities with a focus on health and care prevention**. The project **enhances and expands the green and blue area's benefits** – as resilience to climate change, the promotion of biodiversity and urban water management – **and links all to Health and Societal Pillars** (cf. Fig 1). The consortium **closely works with key stakeholders** (medical, healthcare, social and educational sectors, municipalities, NGOs) **and communities, providing solutions to improve health and well-being and promoting the protection of biodiversity and sustainability of rural, coastal, and urban regions**.

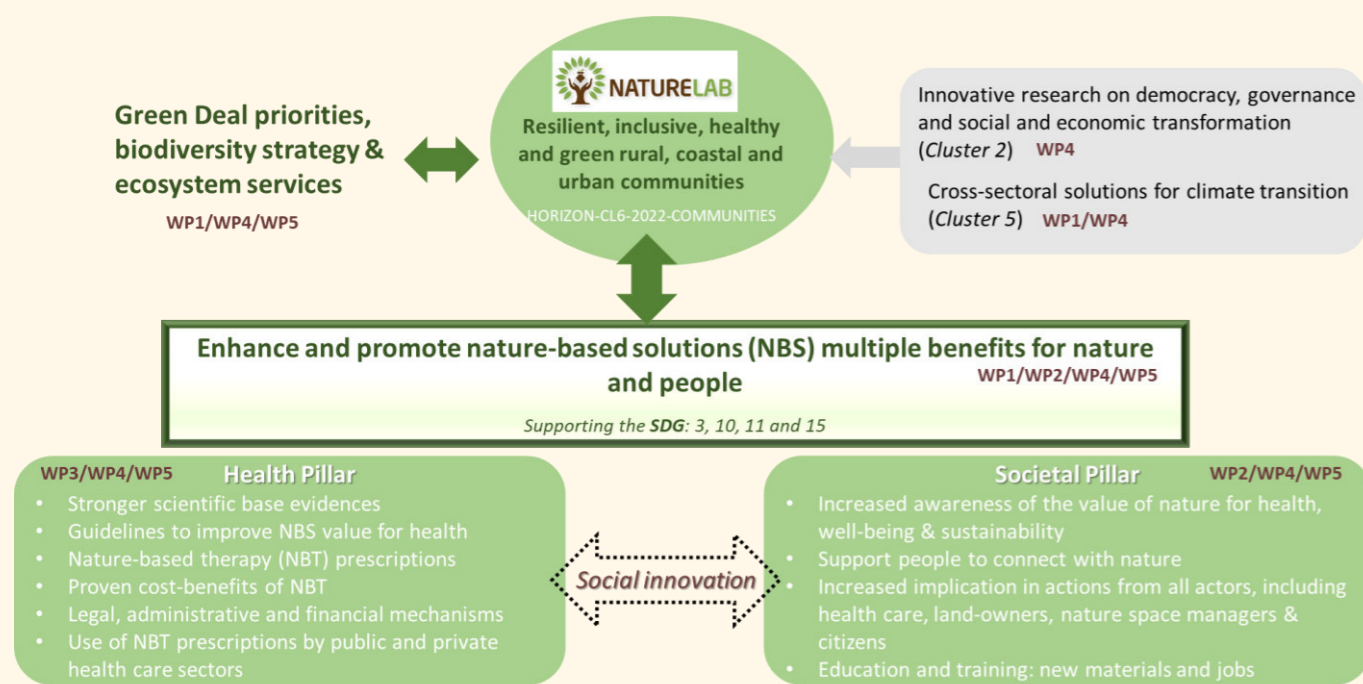


Figure 1 – NATURELAB context and pillars to support global benefits of NBS for nature and human beings.

Objectives

The location of the Experimental Sites (ES) was chosen to represent diverse climate and geographic settings, biodiversity and socio-cultural contexts. NATURELAB established a framework of nature and nature-based activities that are more likely to be used by urban populations and have a high potential to support health and well-being. **NATURELAB will specifically focus on nature exposure** and people's experiences in nature designed to enhance and promote the global opportunities offered by nature-based solutions (NBS) provided by:

- i) Forests and protected areas
- ii) Urban parks and;
- iii) Horticulture and gardening contexts

The research activities are implemented in five countries - Portugal, Greece, The Netherlands, Germany, and Peru (cf. Fig 2). The evaluation of the nature sites, the therapeutic programme and the assessment model (e.g., instruments and measures, experimental procedure) are tested at a total of 15 Experimental Sites (ES) (cf. Table 1).

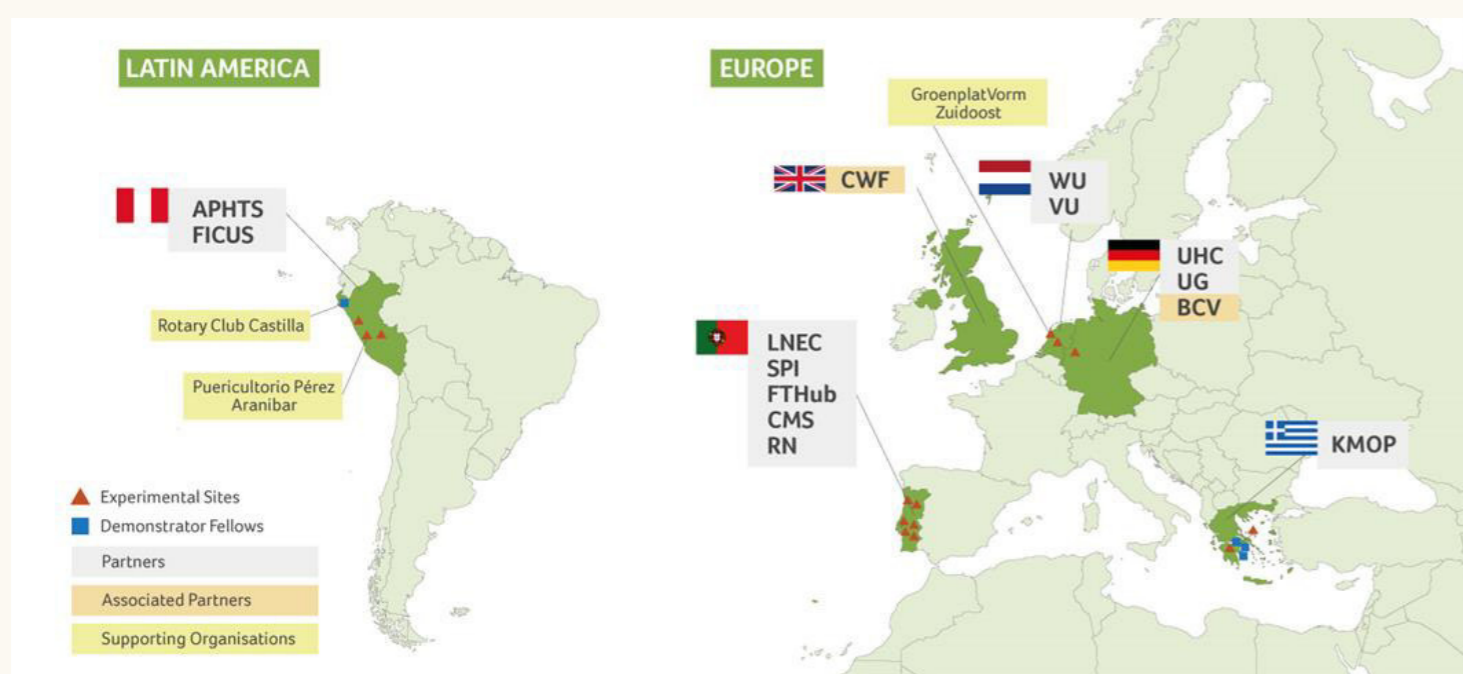


Figure 2 – NATURELAB consortium partners and locations.

Experimental Sites and Participants

Site	Participants	Site	Participants
#1 (PT)	Children, adults, elderly (≥ 200) Health conditions: Disabled and general population	#8 (NL)	General population (≥ 2000)
#2 (PT)	Adults, elderly (≥ 70) Health conditions: Depression, anxiety, work stress-related, and trauma	#9 (DE)	Adults (≥ 70) Health conditions: Obesity (BMI ≥ 30 kg/m ²) overweight (BMI > 28 kg/m ²)
#3 (PT)	Youngsters, adults/ families, elderly (≥ 65) Health conditions: Social isolation, and mobility issues (elderly)	#10 & #11 (EL)	Adults (≥ 50) Health conditions: mental disorders
#4 (PT)	Children attending elementary schools (≥ 80) Health conditions: attention deficit disorder, mental, and physical issues	#12 (EL)	Adults (≥ 30) Health conditions: severe mental disorders
#5 (PT)	Youngsters, elderly (≥ 60) Health conditions: several, including hypertension and depression	#13 (PE)	Institutionalized children 5-17 yrs. Old (≥ 50) Health conditions: Attention deficit disorder, hyperactivity, autism, and trauma.
#6 (PT)	Youngsters, adults, elderly (≥ 330) Health conditions: Hypertension, depression/anxiety, reduced mobility, and dementia (elderly)	#14 (PE)	Adults (≥ 30) Health conditions: Mild mental disorders
#7 (NL)	Adults, elderly, children (≥ 50) Health conditions: migrants (hope-seekers), and dementia	#15 (PE)	Adults (women), children (≥ 60) Health conditions: Bad nutrition, stress, and victims of domestic violence

Table 1 – NATURELAB Experimental sites: participants & health status.

Nature-based therapies (NBT) are scientifically validated programmes that support people to connect with nature in ways designed to respond to their specific needs and expectations.

NATURELAB was designed to gather new scientific evidence from the cross-cutting characterisation of all ES and the analyses of the impact of NBT on the health and well-being of 4,000 participants with distinct health needs. The variety of the ES allows a comprehensive analysis of the best indicators to characterise the healing potential of the blue and green nature areas.



Figure 3 – NATURELAB ES - examples of nature contexts of the Experimental Sites.

Urban Healing Gardens and Horticulture/Gardening spaces are being designed and implemented in Portugal and Peru, aiming at maximizing their potential to serve communities, providing enhanced environmental and health and well-being services. The results will allow NATURELAB to establish an appropriate design for NBS. Hence, the NATURELAB approach represents a step forward in the identification of the most relevant indicators promoting health and well-being, setting pioneering grounds for the management of nature, including NBS and protected areas.

Outcomes

NATURELAB **promotes the sustainable and safe management of water in cities** (e.g., rainfall harvesting to irrigate the garden/horticulture; *in situ* disposal and treatment of stormwater; water reuse/irrigation with reclaimed water), **increasing resilience to climate change**, providing **new sources of food, income, and wellbeing and contributing to urban resilience**.

The project will establish an **innovative portfolio**, rating and ranking nature characteristics according to their potential to contribute to the health and well-being of communities. It will also deliver **guidelines for the sustainable design and management** of healing gardens and horticulture and gardening spaces supported and illustrated by the NATURELAB showcases.

Governance will be addressed, and the results will inspire and guide public and private stakeholders to take on an innovative and comprehensive approach when designing and managing urban green spaces, bringing the concept from research to exploitation.



www.naturelab-project.eu

The shortest vs. greenest home–school routes: Do children have to walk more to enjoy green space exposure, and what may it mean?

Mojtaba Khanian

Social-Ecological Systems Analysis Lab, University of Lodz, Poland

Edyta Łaszkiwicz, Jakub Kronenberg

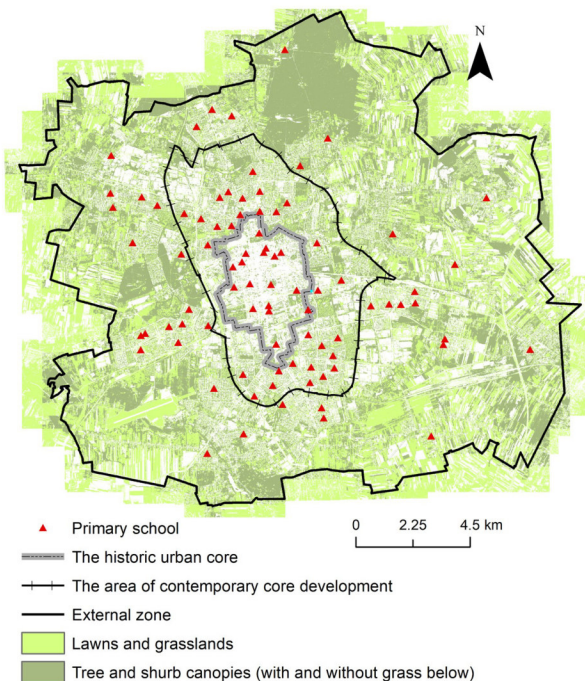
Research context

- Multiple benefits of home–school walking such as enhancing children's physical and mental health, reducing traffic congestion, and lowering carbon footprints.
- Exposure of children to greenery in their home–school walking routes can maximize these benefits.

Research goals

- Measuring extra green benefits and the extra distance that children have to walk from home to school if they choose the greenest home–school routes.
- Evaluate the relevance of the trade-off between the shortest and greenest children's home–school routes and its spatial variation between the historic urban core, the area of contemporary core development and the external zone of the city.

Methods and data



Datasets:

- Pedestrian street network data;
- Urban green spaces data;
- Location of the primary schools and children's homes;
- City zones data.

Methods:

- Viewshed analysis;
- Network analysis;
- Statistical analysis.

Results

- The median length of the shortest and greenest home–school routes are 484 and 566 m, respectively.
- Children who decide to reach schools using the greenest routes, instead of the shortest, could increase their exposure to greenery by **18%**.
- Maximizing exposure to greenery requires choosing routes longer by **9.5%** (46 m) than the shortest alternative.
- **34%** of children could maximize their visual exposure to greenery with no or very small (below 10 m) increase of the route's length.
- With extra distances above **800 m** exposure to greenery ceases to increase.
- An extra visual exposure to greenery varies depending on the extra distance requires to cover by children.

Trade-offs between distance and visual exposure to greenery for children's home–school routes in city's zones.

City zone	Median route's length [in m]		Median visual exposure to greenery [in %]		Median extra distance [in %]	Median extra visual exposure to greenery [in %]
	Shortest	Greenest	Shortest route	Greenest route		
The historic urban core	384.76	407.18	26.00	34.92	0.63	2.23
The area of contemporary core development	417.05	475.97	53.80	67.42	11.88	22.22
External zone	592.25	682.51	51.80	65.38	11.29	17.18
P value	0.00** *	0.00***	0.00***	0.00***	0.00***	0.00***

- The extra distance being the result of the differences between the shortest and greenest home–school routes characterize by the intra-city variation.
- Extra green space exposure is lower in the city center than in outer zones.

Conclusions

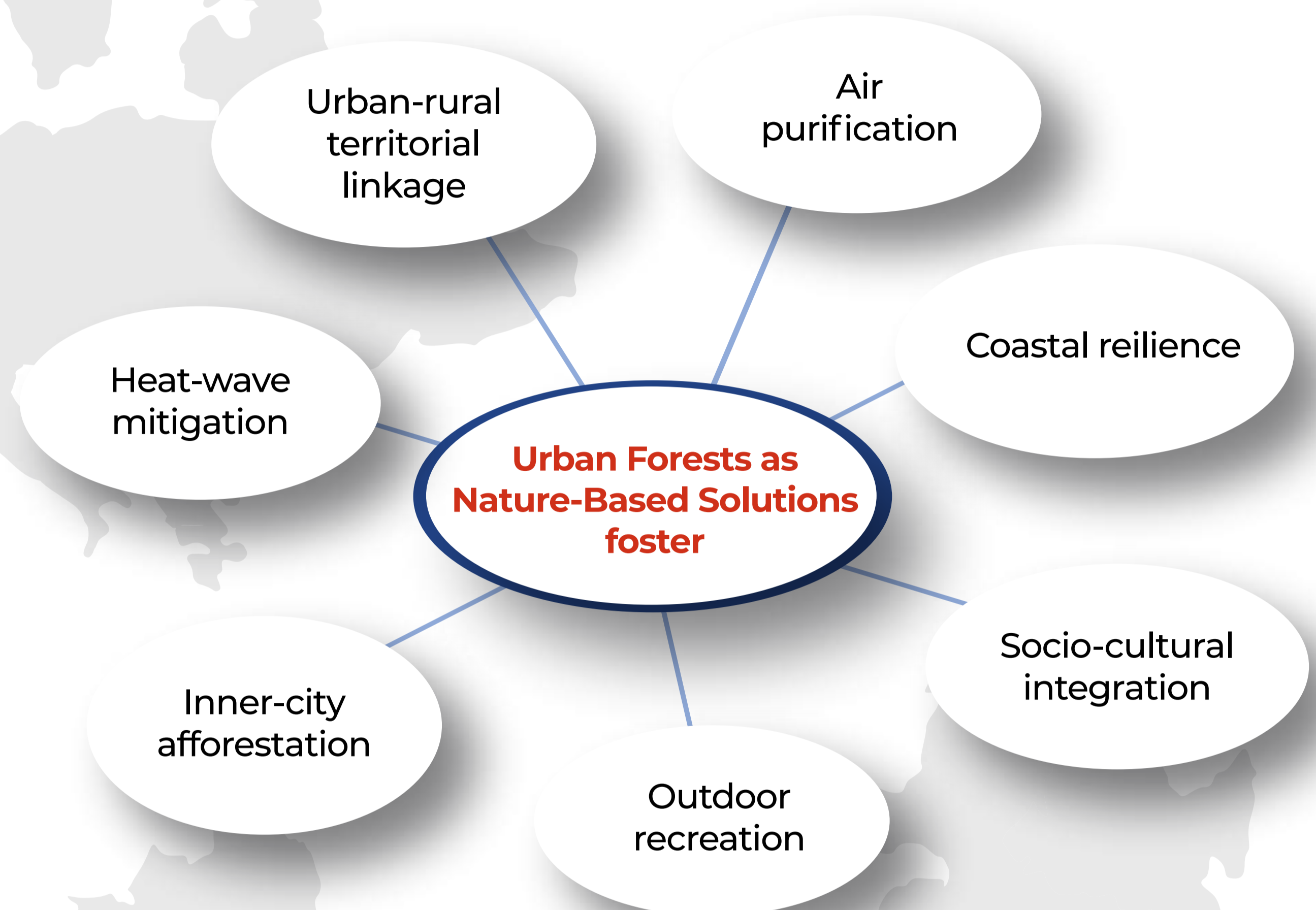
- Ensuring a green, walkable urban environment is essential in encouraging children to choose active transportation modes.
- A deeper understanding of the trade-offs between distance and green space exposure could help integrate environmental and transportation goals, contributing to the creation of more environmentally sustainable cities.
- More awareness is needed regarding the city's spatial heterogeneity to allocate new greenery in a way that could support active transportation for all.



CLEARINGHOUSE
中欧城市森林应对方案

The **CLEARING HOUSE** project addresses a global challenge that unites European and Chinese cities in their quest to develop more resilient cities and livable societies in order to **improve human wellbeing**. Our main focus is on **tree-based green infrastructure** which is the basis for “urban forests as nature-based solutions”

54 Months
26 Partners
10 NBS Case Studies
• 5 in Europe
• 5 in China



Discover the project's outputs!

- A typology for Urban Forest as Nature-Based Solutions
- An educational package “City of Trees”
- An interactive Knowledge Depository for researchers
- Thematic guidelines on UF-NBS for policy-makers and practitioners
- An online benchmarking tool for urban forestry
- Project publications
- Case studies at Network Nature

Scan this QR code to see all available outputs!



www.clearinghouseproject.eu

This project has received funding from the European H2020 Research and Innovation programme under the Grant Agreement n° 821242. Several Chinese CLEARING HOUSE partners have also contributed to the funding.



CLEVER Cities MILANO



NBS

In Milan, the CLEVER Cities project has successfully established three primary CLEVER Action Labs in the southwest quadrant of the city: CAL1 dedicated to Green Roofs and Walls, CAL2 centered around Giambellino Park, and CAL3 focusing on the Green Train Station. Despite encountering numerous challenges, including bureaucratic and political obstacles, pandemic-related restrictions, and unforeseen constraints within the construction market, all three laboratories have managed to effectively execute their activities.



"...I was thinking about my Mulberry tree that I planted, since it wasn't raining I was saying: poor thing, how is it doing, I wonder if someone is watering it, I already have it in my heart!"

In a metropolis like Milan, urban regeneration processes have standardized procedures that often do not include active citizen involvement. This mode of operation accelerates implementation timelines but does not ensure care and use of spaces post-implementation. The CLEVER Cities project, with its innovative process, has made it possible to test a new inclusive and collaborative procedure, helping to green over 30,000 square meters of city surface.



PUBLIC PROCEDURES

The CLEVER Cities project has introduced some innovative elements within the urban development of the city of Milan for the realisation of Nature-based Solutions. This project has also influenced the city's Urban Zoning Plan by adding the "RIC-Reduction of Climatic Impact" factor, incentivizing the adoption of green roofs and walls.

CO-DESIGN AND CO-IMPLEMENTATION

The project has fostered collaboration with over 540 individuals who have actively participated in the design and implementation of NbS. This collaborative effort highlights the project's resilience and commitment to promoting sustainable urban development in Milan, transcending the barriers that might have otherwise prevented progress.



CO-MANAGEMENT

Co-design meetings enabled the building of an emotional caring relationship between citizens and associations and the future public space. For G129 Park, co-design allowed the establishment of an active group who chose to be part of a Collaborative Public Pact for the shared management of the fenced area within the park with vegetable gardens, orchard and other green solutions. A special agreement with the Bocconi University has been activated to care for the green areas of Tibaldi Station.

MULTISOURCE

 Coordinator: INRAE
 20 Partners
 12 Countries
 7 Pilots
 €5,169,165.00
 2021 - 2025

MULTISOURCE will facilitate the systematic, citywide planning of nature-based solutions for urban water treatment, storage, and reuse. With seven technical pilots across Europe and USA, a wide range of urban waters will be treated throughout the project, and decision support tools will be co-designed together with municipality partners in Girona, Oslo, Lyon and Milan as well as other local, national, and international stakeholders.

MULTISOURCE will demonstrate the benefits of increased water quality, water storage, reuse, but also contribute to the creation of valuable urban habitats and provide other important ecosystem services.

OBJECTIVES

-  Nature-based systems
-  NBS technologies
-  City-wide scale NBS
-  Urban water tools
-  Governance and policy



RAW WASTEWATER
Location: Lyon, France
Technology: Rhizosph'air aerated french wetland
Main innovation: Compact (<1m²/PE*), new design guidance; innovative/ICT monitoring approaches

PRE-TREATED WASTEWATER
Location: Leper, Belgium
Technology: Phytoparking@
Main innovation: Compact (<1m²/PE*) can be retrofit in parking lots and provide secondary use for parking

COMBINED SEWER OVERFLOW
Location: Merone, Italy
Technology: Aerated + free water surface wetland
Main innovation: Increase urban resilience to extreme events, reduce pressure on sewers; new NBSWT market opportunities

HIGH-STRENGTH WASTEWATER
Location: Bozeman, USA
Technology: VF wetland with recycle and partial saturation
Main innovation: Seasonal operation, recirculation for increased nutrient removal from high-strength wastewater

RAINWATER
Location: Leipzig, Germany
Technology: Green roof + storage (five variations)
Main innovation: Improvement of evaporation efficiency and biodiversity via vegetation selection and management

ROAD RUNOFF
Location: Oslo, Norway
Technology: Raingarden, water-treatment, storage and potential irrigation
Main innovation: Exploring possibilities for alternative water sources for irrigating urban green areas. Demonstrating the use of innovative sorption materials for water treatment.

GREYWATER
Location: Girona, Spain
Technology: Aerated + free water surface wetland
Main innovation: Increase urban resilience to extreme events, reduce pressure on sewers; new NBSWT market opportunities

7 TECHNICAL PILOTS



The impact of the local community on the preservation of wild green space in the city

Case study of the Drwinka River Park, Cracow

Magdalena Biernacka

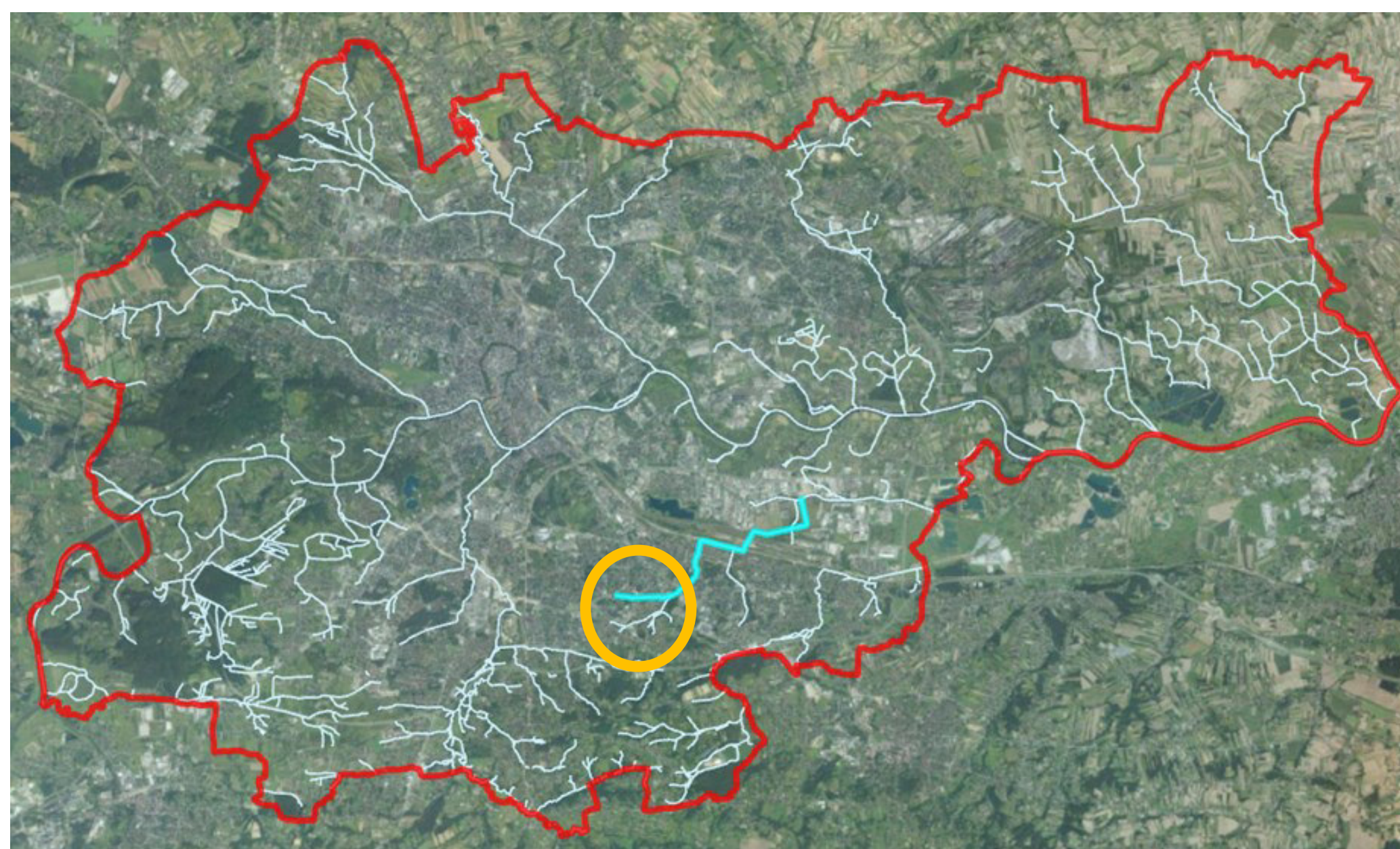
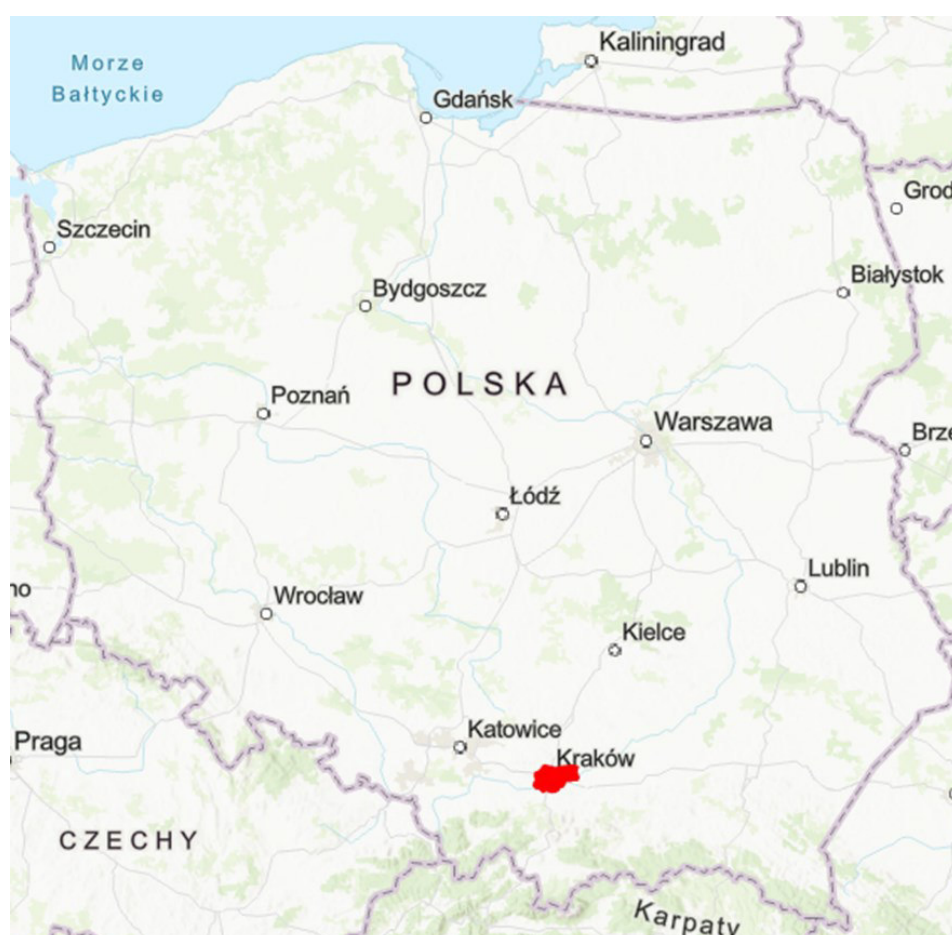
Social-Ecological Systems Analysis Lab, University of Lodz, Poland

Tomasz Bergier, Łukasz Mielczarek, Przemysław Szwafko, Agnieszka Mędrek, Jakub Kronenberg

Research context

- **Progressive development**, urban densification vs. valuable natural areas;
- Strong involvement of **local residents**;
- Building resilience to **climate change**, fighting air pollution, preserve nature;
- Case study within the **CLEARING HOUSE** project.

Case study area



Methods

- Analysis of planning **documents, literature, reports, maps**;
- **Research walk** in the Drwinka River Park;
- **Consultations** with officials, president of Drwinka Association;
- Upcoming – **survey among residents** in the park area.

Natural values



Key actors

- Municipality of Cracow;
- Municipal Greenspace Authority;
- Drwinka Association;
- Local residents;
- Companies – technical infrastructure.

Results and impacts

- Strong social commitment – **local zoning plans**;
- Detailed documentation of **700 species** (flora, fauna, mycobiota);
- Outdoor **educational activities** for children (natural trials, dead wood paths, educational boards);
- From grassroots initiative to **green space protection**.

Further challenges

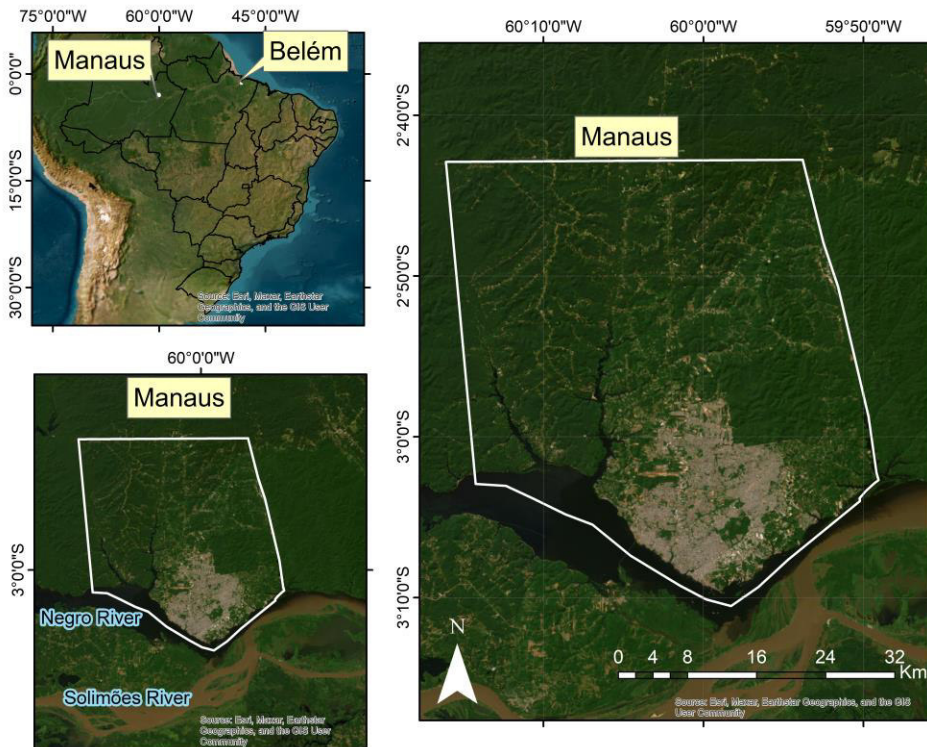
- **Investment pressure** – developers, part of local residents;
- Transformation of the park area into **forest** land use;
- Reduction of **physical barriers** (tunnels for animals);
- Reduction of **light pollution** (bats, insects);
- Conflicts of interests – **diverse needs** of local residents;
- Fighting vandalism and littering.

Spatio-temporal Impacts of Urban Expansion of Manaus in the Center of the World's Largest Tropical Rainforest, Brazil



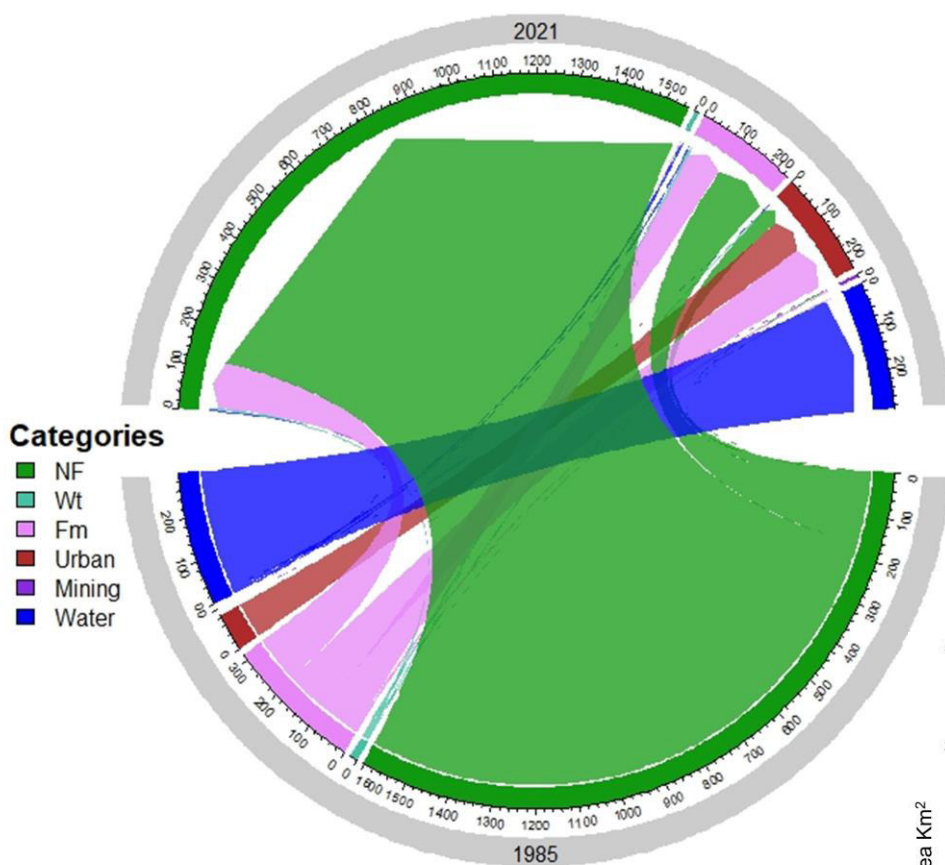
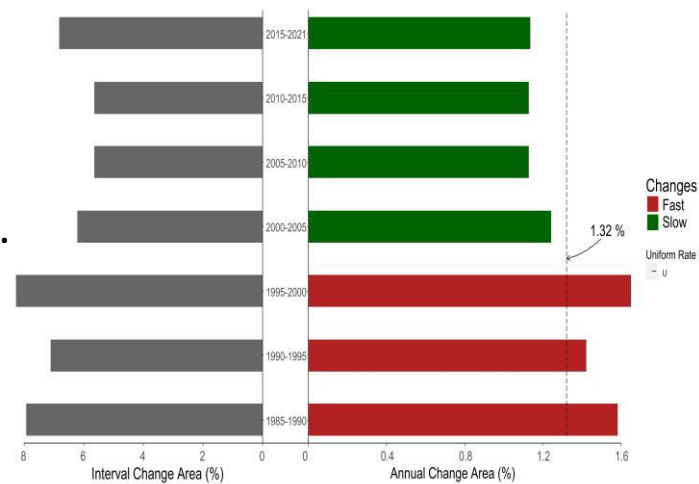
Edivando Vitor do Couto¹, Rafael Carletti², Walter Timo de Vries¹, Pamela Durán-Díaz^{1,*} ¹ Chair of Land Management, Department of Aerospace and Geodesy, Technical University of Munich, Arcisstr. 21 80333 Munich, Germany

*Contact: edivando.couto@tum.de



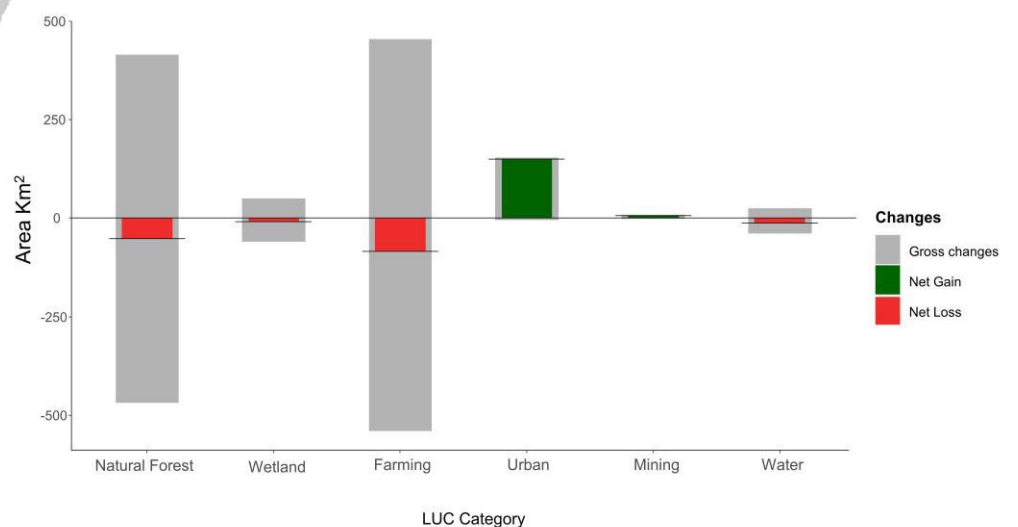
- Manaus: Capital of Amazonas state in the Brazilian Amazon.
- Population density: 180.2/km² in 2022.
- Total area: 11,401.092 km²; Urban area: 377 km² (IBGE, 2022).
- Located at the confluence of the Negro and Solimões rivers, where the Amazon River begins.
- Population: 2,255,903 the largest city in the Brazilian Amazon.

- Forest areas decreased from 68.95% (1995) to 66.75% (2021).
- Farming areas decreased from 11.08% (1995) to 9.91% (2021).
- Urban areas increased from 3.71% (1985) to 10.16% (2021).
- Mining areas increased from 0.06% (1995) to 0.33% (2021).



- This reflects changing priorities and pressures on Manaus, with increased urbanization and resource extraction.
- Calls for sustainable land use planning to balance growth and conservation.

Manaus should consider zoning improvements, infrastructure investment, affordable housing, and green urban design.



VARCITIES - CASTELFRANCO VENETO Pilot - Visionary solution VS6

The Untold Stories: Co-creation of Nature-based Solutions, what did we learn?

Sara Biancifiore, PhD candidate in Sustainable Development and Climate Change - IUSS Scuola Universitaria Superiore Pavia - Politecnico di Torino - Eurac Research

Background and problem statement

Nature-based solutions (NBS) have been largely adopted in different urban contexts, being able to provide climate change mitigation and adaptation as well as other multiple benefits, like biodiversity increase, air quality improvement, disaster risk reduction and water management. European-funded projects, as well as public administrations and private companies, often apply participatory planning processes in urban regeneration, since they are considered to deliver collective benefits to the communities involved and promote climate justice. The research's objectives are to analyze the contribution of participatory processes and digital technologies to the quality of decision-making and compare the literature on the topic and the reality of the application to urban projects. Urban digital transformation and Nature-Based actions that are proposed by various Horizon Europe projects go in this direction. Nature-based solutions are, by the Europe Commission's definition: "Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience" (European Commission & Secretariat-General, 2019). NBS is considered able to address different and important societal challenges both in cities and landscape areas, such as climate change mitigation, adaptation and disaster risk reduction; to foster sustainable urbanization and biodiversity enhancement, as well as the market challenges, being able to create new jobs and contribute to the green economy shift. They can promote the achievement of the UN Sustainable Development Goals for 2030. (Wild et al. 2020) (European Environment Agency 2021) (European Commission & Secretariat-General, 2019)(Wendling et al. 2021)

Research idea

In recent years, there has been an increasing amount of literature on the topic of the multiple benefits correlated to Nature-based solutions in urban projects, starting from 2015, with a peak in the recent last years, 2021 and 2022. Nature-based solutions are often presented as an alternative to grey solutions in climate change adaptation. The idea mostly present is to monitor and analyze the correlated positive outcomes on air quality, environmental and biodiversity enhancement and social impacts, related to higher life quality. In this process, the urban design of the solutions plays an important role, especially when related to the regeneration of public space. This is why participatory planning approaches and design thinking are often suggested in the process, with the idea of both promoting positive local networks and directly involving the citizens and users. The main research idea is to point out the involvement of citizens and users in the planning process to promote a democratization of the public space and its regeneration through nature-based solutions.

Are participatory processes able to achieve people's inclusion in the planning process? Is this useful to bring the project closer to people's needs or is it just a way of gaining citizen's approval from the municipalities involved?

As pointed out also by literature papers, a critical aspect is to evaluate the contribution of participatory processes on the quality of decisions. Public consultations are often seen as a way of building public trust in the decision-making process, which is very important for the success of this kind of regeneration process and for the implementation of social-learning strategies. (Ferreira et al., 2020a; Frantzeskaki, 2019)

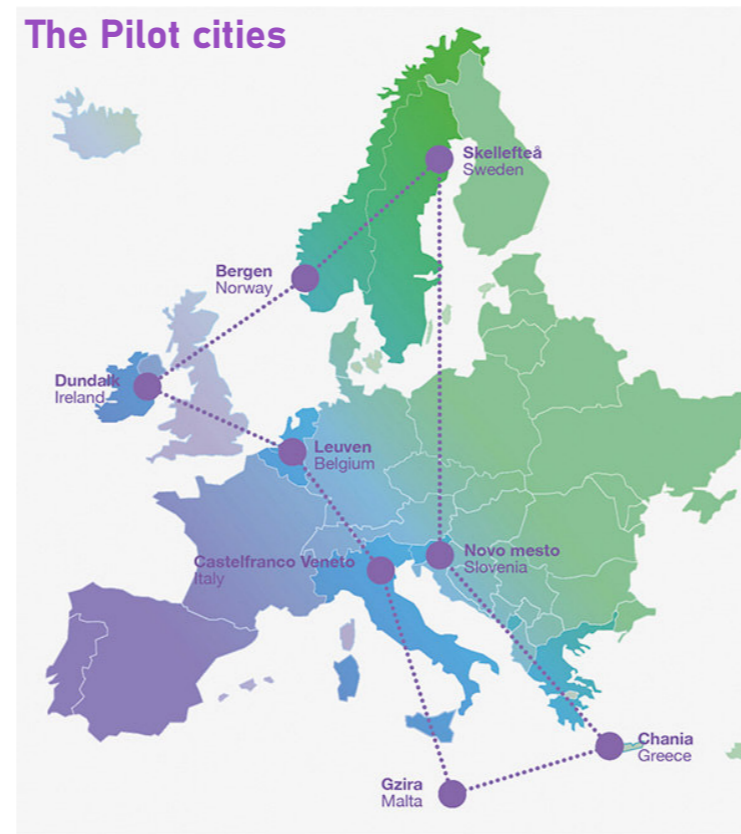
VARCITIES European Horizon 2020 project

The Varcities project is a European Horizon funded project that tries to develop new solutions, also called Visionary Solutions at the urban and city scale, combining Nature-based solutions and digital solutions.

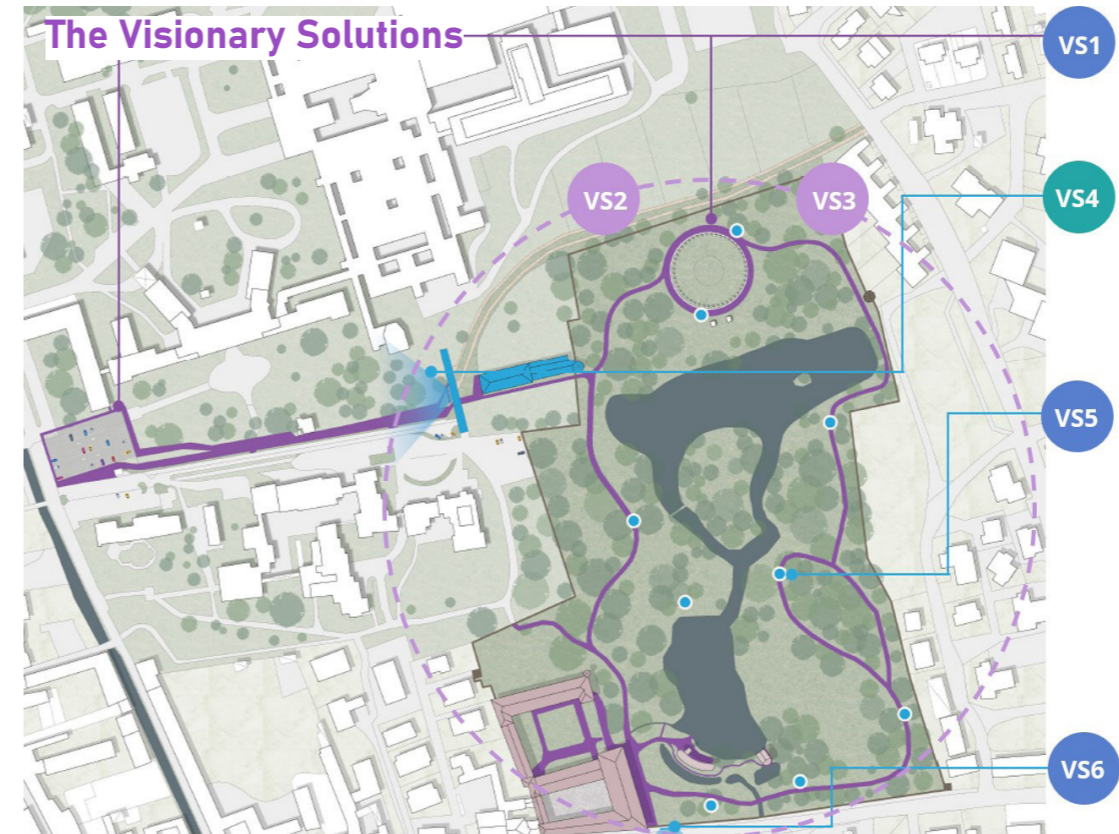
The vision is to increase the health and well-being of citizens: children, young people, middle aged, and the elderly, who are exposed to diverse climatic conditions and challenges around Europe, by exploiting nature-based solutions from a digital, social and cultural perspective. Public spaces are seen as people-centered, being able to support creativity, inclusivity, health, and increase life quality for the citizens. The project started in September 2020 and it will last until February 2025, with a consortium of 25 partners. The seven selected Pilot Cities are allocated in different European countries and climates, that are currently testing and implementing a series of innovative urban actions.

Castelfranco Veneto is a town and a municipality of Veneto, located in Northern Italy, 30 km away from Treviso, the province capital, and approximately 40 km from Venice. The actual population is approximately around 33.300 inhabitants, and the municipality area covers a surface of around 50 sq. km, with a density of 655,2 inhabitants per square kilometer. The main economic activities of the area are manufacturing, mainly metalworking, trading, construction and tourism. Under Varcities project six Visionary Solutions have been financed, with the objectives to create a healing garden for elderly and people suffering from Alzheimer's disease and to develop the Local Observatory on therapeutic effects of the landscape.

VARCITIES project



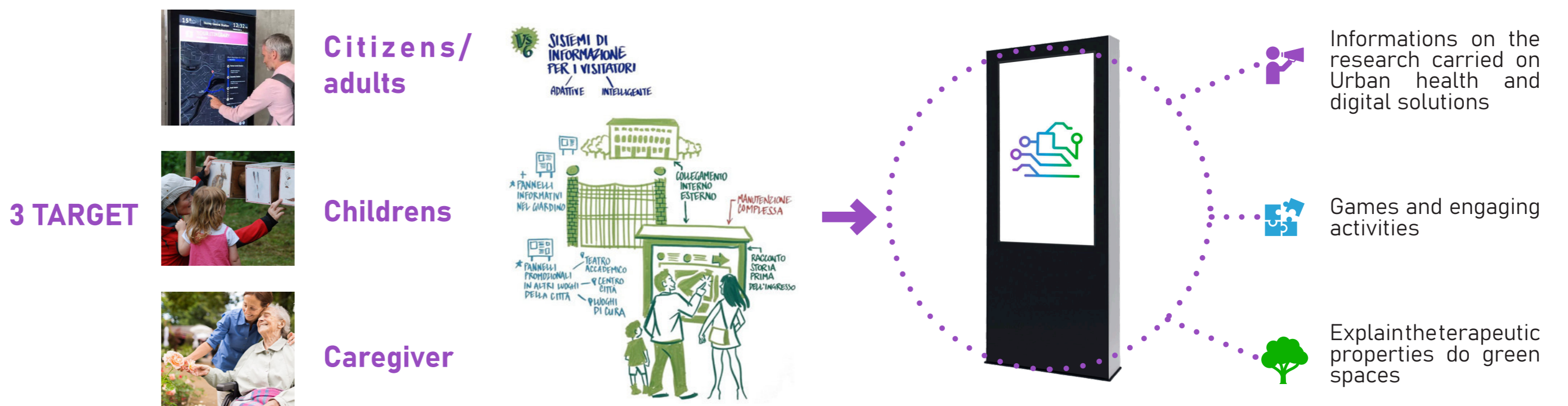
CASTELFRANCO VENETO pilot



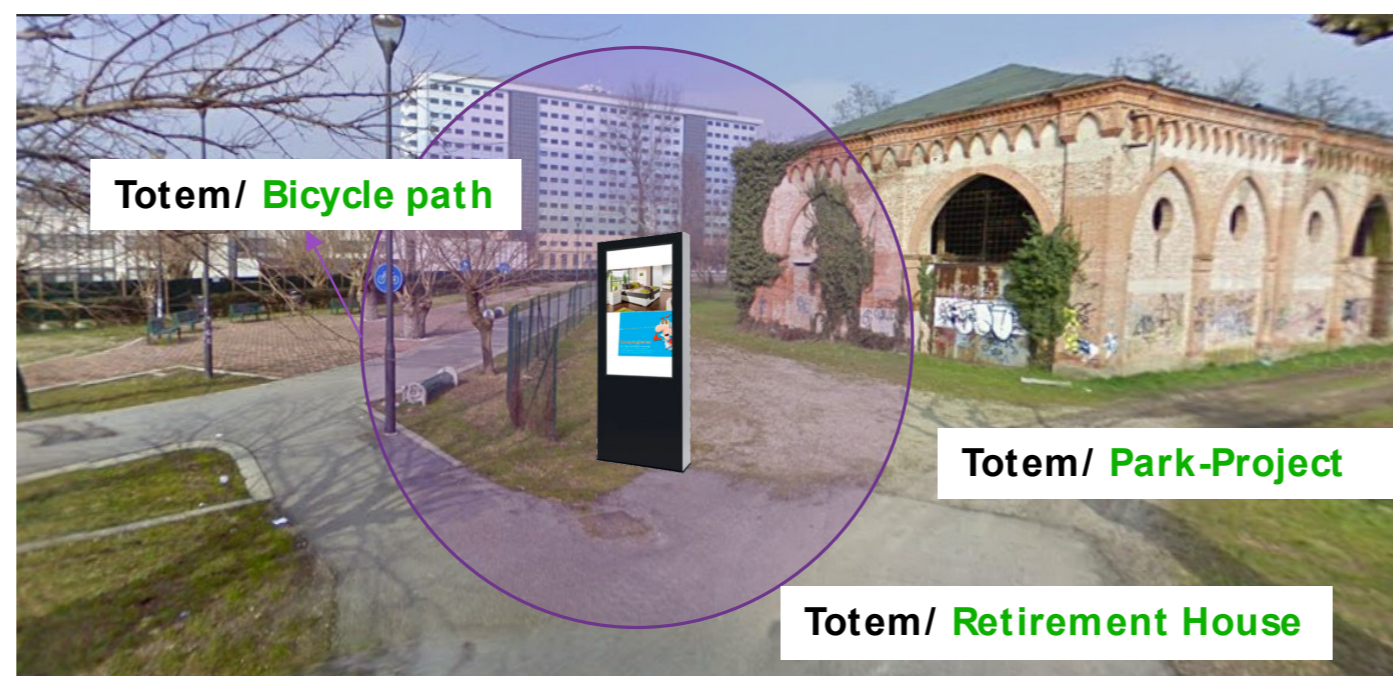
Visionary Solutions

- VS 1: The creation of garden access routes
- VS 2: The analysis and monitoring the effects of natural environments on well-being.
- VS 3: The collection and monitoring of microclimatic and environmental conditions in the different areas of the garden, forest area, open area, lake area, in order to carry out an assessment of the effect of green and blue areas on health and well-being of visitors.
- VS 4: The development of "Best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing" and establish of a "Local Landscape Observatory"
- VS 5: Implementation of virtual and ICT tools
- VS6: Installation and realization of a touch screen totem

VISIONARY SOLUTION VS6 totem



Relationships with the context



TOWNHALL MEETING with the citizens



Accessibility

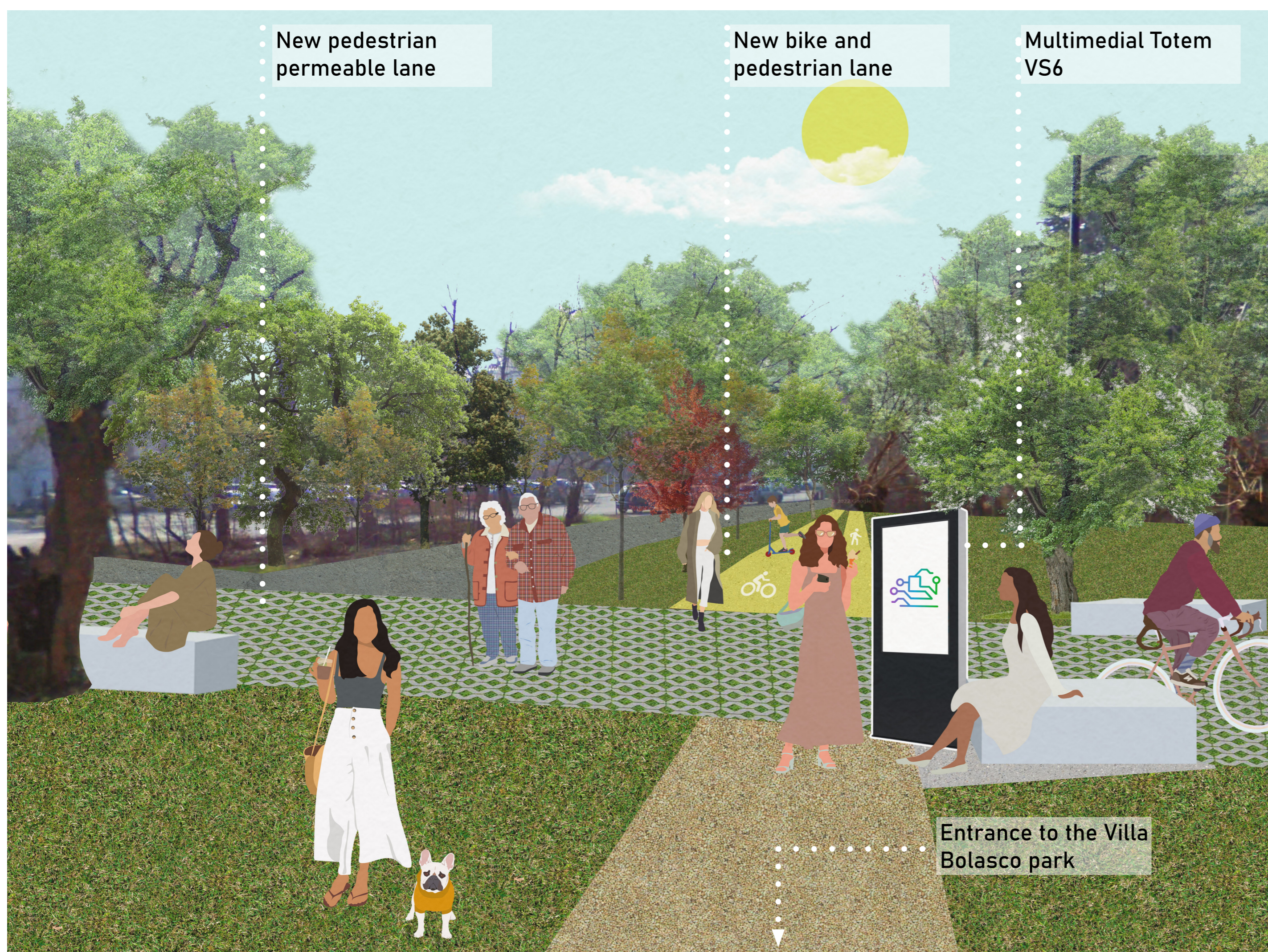


URBAN HEALTH Concept

Through the Totem I inform you about the benefits that the Park has and the role that greenery plays for your H&WB within urban contexts.

I'll tell you how the Park can also be a teaching and discovery space for your children

I convince you, caregiver, to bring your family member to the park as an alternative treatment for physical and mental well-being through the designed VSs in Villa Bolasco



The engagement of local stakeholders was carried starting from June 2021 with different methodologies and techniques. The Castelfranco Veneto team has addressed the challenge through a combination co-creation initiative: public town hall meetings, feedback forms, as well as ad hoc issue-specific working groups.

Co-Creation activities:

- June 2021: First co-creation workshop in order to introduce, validate and refine the VS with the local stakeholders.
- November 2021: Second co-creation workshop with the aim of collecting feedback on the updated VS from a wide range of stakeholders.
- January 2022: Meetings among pilot experts and representatives.
- May 2022: Spring in Villa Bolasco 2022 event with two rounds of Focus groups and workshops. (Varcities, 2023)

Varcities project developed through participatory methodologies six visionary solutions for this pilot, which are:

VS 1: The creation of garden access routes to ensure an improved accessibility to the target users of the garden, visitors, elderly people and people with special mobility needs, with new access road to the villa and improvement of the internal paths of the garden to allow a direct, safe and comfortable visit of the Villa Bolasco historic garden.

VS 2: The analysis and monitoring the effects of natural environments on well-being, behavior and physiological states in elderly and people with dementia, in order to support the design of green spaces and to foster nature-based psychological and clinical interventions.

VS 3: The collection and monitoring of microclimatic and environmental conditions in the different areas of the garden, forest area, open area, lake area, in order to carry out an assessment of the effect of green and blue areas on health and well-being of visitors.

VS 4: The development of "Best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing" and establish of a "Local Landscape Observatory" with a focus also on the therapeutic effects of green and blue areas.

VS 5: Implementation of virtual and ICT tools (i.e., sensors, smartphones and apps) to support a rewarding experience of garden users & for the assistance of visitors with disabilities, making the garden more accessible and inclusive in the long-term for all visitors. Visitors' behavior will be monitored via sensors and Android devices, for safety reasons but also to understand the most visited parts of the park.

VS6: Installation and realization of a touch screen totem located at the entrance of Villa Bolasco, near the Landscape Observatory, to develop an information system for visitors of the garden. The system, by showing images, videos and sounds of the garden, and by visualizing environmental monitored data, will stimulate the curiosity of citizens and visitors, informing them on what are hidden behind the external walls and its cultural and natural value, in order to perceive the benefits provided by the nature on health and well-being. (Varcities, 2023)

obtain feedbacks on the preliminary idea, elaborate it and then implement the totem's software design.