

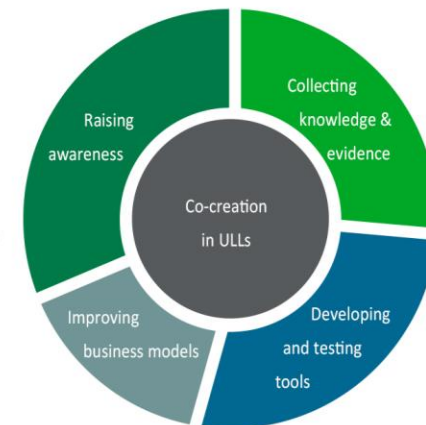


REGREEN PROMOTES URBAN LIVEABILITY, THROUGH FOSTERING NATURE-BASED SOLUTIONS IN EUROPE AND CHINA USING EVIDENCE-BASED TOOLS AND IMPROVED URBAN GOVERNANCE ACCELERATING THE TRANSITION TOWARDS EQUITABLE, GREEN AND HEALTHY CITIES.



ABOUT REGREEN

REGREEN aims to accelerate the crucial transition toward equitable, green, biodiverse and healthy cities in both Europe and China by improving knowledge and providing evidence of the benefits from NBS to address urban challenges, by developing and testing tools to guide, design and plan NBS and by consolidating business and investment models for NBS. Fundamentally for a transition to take place, REGREEN works with NBS awareness in education, governance and planning.



Urban Living Labs (ULLs) form the core element of REGREEN, where co-creation of knowledge involves local citizens, schools, businesses, organisations and public administrations enabling new forms of urban innovation. REGREEN consortium consists of 6 universities, 5 research institutes, 3 city authorities, 4 SMEs and 2 NGOs from China and Europe.

PARTNERS



CONNECT

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 82016

NATURE-BASED SOLUTIONS (NBS) FOR CITIES

Cities around the world are facing increasing challenges from the impacts of climate change, rapid population growth and social inequity through to constrained budgets for basic infrastructure and services. Nature-based solutions, unlike grey infrastructure, are inspired by nature, and if delivered appropriately can help to solve problems identified in a particular urban context. They are cost-effective and provide multiple benefits to both cities and citizens - ranging from restored ecosystems and biodiversity, adaptation to climate change to improved public health and creation of attractive public spaces.

TOOLS & EVIDENCE FOR NBS UPTAKE

CITY OFFICIALS & DEVELOPERS

- Guidelines for integrating NBS into existing governance systems
- Evidence and tools for ecosystem services mapping and modelling
- Evidence of valuation of NBS benefits and costs

ACADEMIA & BUSINESSES

- NBS innovation and business development support programme

SCHOOLS & GENERAL PUBLIC

- Educational tools for use inside and outside schools



NBS FOCUS IN REGREEN ULLs

PARIS REGION

- > Biodiversity enhancement
- > Heat mitigation
- > Water flow management

BEIJING

- > Air pollution removal
- > Biodiversity enhancement
- > Water flow management

AARHUS

- > Water flow management
- > Biodiversity enhancement
- > Carbon sequestration

SHANGHAI

- > Carbon sequestration
- > Water quality management
- > Biodiversity enhancement

VELIKA GORICA

- > Heat mitigation
- > Air pollution removal
- > Noise mitigation

NINGBO

- > Water quality regulation
- > Air pollution removal
- > Biodiversity enhancement

REGREEN ACTIVITY IN URBAN LIVING LABS (ULLs)

To promote the NBS agenda, REGREEN is raising awareness in the ULLs, working with teachers on educating children and students on NBS and biodiversity. REGREEN collaborates with start-ups to accelerate creation of green businesses, develops guidelines and training programmes for municipal technical staff and helps cities on how to integrate biodiverse NBS, both at the planning and project scale. For instance, through systematic depaving strategies and scenarios for NBS implementation with new models for urban ecosystem services and benefits. REGREEN takes a specific focus on equitable access to benefits of NBS.

EUROPE & CHINA

The European-Chinese cooperation in REGREEN will lead to mutual benefits for research and businesses. Planners and practitioners will learn from Chinese large-scale city design and Europe's long-running environmental research, as well as REGREEN's holistic social-ecological approach to the development of NBS in cities. Innovative approaches applied in China and Europe will inspire and benefit businesses. REGREEN will collect and spread existing and newly-produced knowledge, organise and participate in a series of networking arrangements specifically tailored to foster exchange between cities in China and Europe.

NBS typologies and impact matrix



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NATURE-BASED SOLUTIONS

- Multi-functional performance matrix of urban Green Infrastructure (GI) – ideal for mapping and modelling
- Can help plan & design urban NBS
- Multifunctional GI typically support higher levels of biodiversity

Brief description	Object type	Object category	Food provision	Air pollution removal	Noise mitigation	Heat mitigation	Water quality mitigation	Water flow management	Maintaining carbon stocks	Supporting physical activity	Supporting social interactions	Restoring capacities - stress reduction and cognitive restoration	Supporting biodiversity
Mainly private space linked to dwellings	Gardens	Balcony	Low	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Low	High	Low
		Private garden	Medium	Low	Low	Medium	Medium	Medium	Low	Medium	Medium	Very high	High
		Shared common garden area	Medium	Low	Low	Medium	Medium	Medium	Low	Medium	High	Medium	Low
Mainly public space, but some access restrictions may apply	Parks	Pocket park	Low	Low	Low	Low	High	Medium	Low	Medium	Very high	High	Medium
		Park	Low	High	High	High	High	Medium	High	Very high	Very high	Very high	High
		Botanical garden	Low	High	Very high	Very high	High	Medium	High	Medium	High	Very high	Very high
		Heritage garden	Medium	Medium	High	High	High	Medium	Medium	Medium	High	Very high	High
		Nursery garden	Medium	Medium	Low	Low	High	Medium	Medium	Low	Medium	Medium	Low
Areas designed primarily for specific amenity uses	Amenity areas	Sports field	Negligible	Low	Low	Low	Low	Low	Low	Very high	High	Medium	Negligible
		School yard	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Very high	Very high	Medium	Negligible
		Playground	Negligible	Negligible	Negligible	Negligible	Low	Low	Negligible	Very high	Very high	Medium	Negligible
		Golf course	Negligible	Medium	Low	Low	Negligible	Medium	Low	Medium	High	High	Medium
		Shared open space (e.g. square)	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Medium	Very high	Low	Negligible
Areas designed primarily for specific uses (not leisure); some access restrictions may apply	Other public space	Cemetery	Negligible	Medium	Medium	Medium	Medium	Medium	High	Low	Low	Very high	High
		Allotment/other growing space	Very high	Medium	Low	Low	Negligible	Medium	Medium	High	High	Very high	High
		City farm	Very high	Medium	Low	Low	Negligible	Medium	Negligible	Medium	Medium	High	Medium
		Adopted public space	Low	Medium	Low	Low	Low	Low	Negligible	Negligible	Low	Medium	Low
		Street tree	Low	High	Low	High	Low	Low	Medium	Low	Low	High	Medium
Linked to routeways, geographical features and boundaries	Linear features/routes	Cycle track (as green/blue corridor)	Low	Low	Low	Low	Low	Low	Low	Very high	Medium	High	Low
		Footpath (as green/blue corridor)	Low	Low	Low	Low	Low	Low	Low	Very high	Very high	High	Low
		Road verge	Low	Low	Low	Low	Medium	Medium	Low	Negligible	Negligible	Low	Low
		Railway corridor	Negligible	Very high	Very high	Very high	Low	Medium	High	Negligible	Negligible	Low	Very high
		Riparian woodland	Low	Very high	Very high	Very high	Very high	High	Very high	High	High	Very high	Very high
		Hedge	Low	Medium	Low	Low	High	High	Medium	Negligible	Negligible	Medium	Medium
		Waterbodies	Negligible	Low	Low	Low	Low	High	Medium	Low	High	Very high	High
		Lake	Medium	Low	Medium	High	High	High	Very high	Medium	High	High	Very high

Brief description	Object type	Object category	Food provision	Air pollution removal	Noise mitigation	Heat mitigation	Water quality mitigation	Water flow management	Maintaining carbon stocks	Supporting physical activity	Supporting social interactions	Restoring capacities - stress reduction and cognitive restoration	Supporting biodiversity
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		Heritage garden	Medium	Medium	High	High	High	Medium	Medium	Medium	High	Very high	High
		Nursery garden	Medium	Medium	Low	Low	High	Medium	Medium	Low	Medium	Medium	Low
Blue space features	Waterbodies	Pond	Negligible	Low	Low	Low	Low	High	Medium	Low	High	High	Very high
		Lake	Medium	Low	Medium	High	High	High	Very high	Medium	High	High	Very high
		Reservoir	Low	Low	Medium	High	High	High	Very high	Medium	High	High	Very high
		Estuary/tidal river	High	Low	High	High	High	N/A	Medium	Medium	High	High	Very high
		Sea (incl. coast)	High	Low	High	Very high	High	High	Very high	Very high	Very high	Very high	Very high
Other un-sealed features without specified use, often on private land	Other non-sealed urban areas	Woodland (other)	Low	Very high	Very high	Very high	High	High	Very high	High	High	High	Very high
		Grass (other)	Low	Low	Low	Low	Medium	Medium	Low	Very high	High	High	Medium
		Shrubland (other)	Low	Medium	Low	Low	High	High	Medium	Medium	Medium	High	High
		Arable agriculture	Very high	Medium	Low	Low	Negligible	Low	Negligible	Low	Negligible	Low	Low
		Sparsely vegetated land	Negligible	Negligible	Low	Negligible	Low	Low	Negligible	Medium	Medium	Medium	Low



or



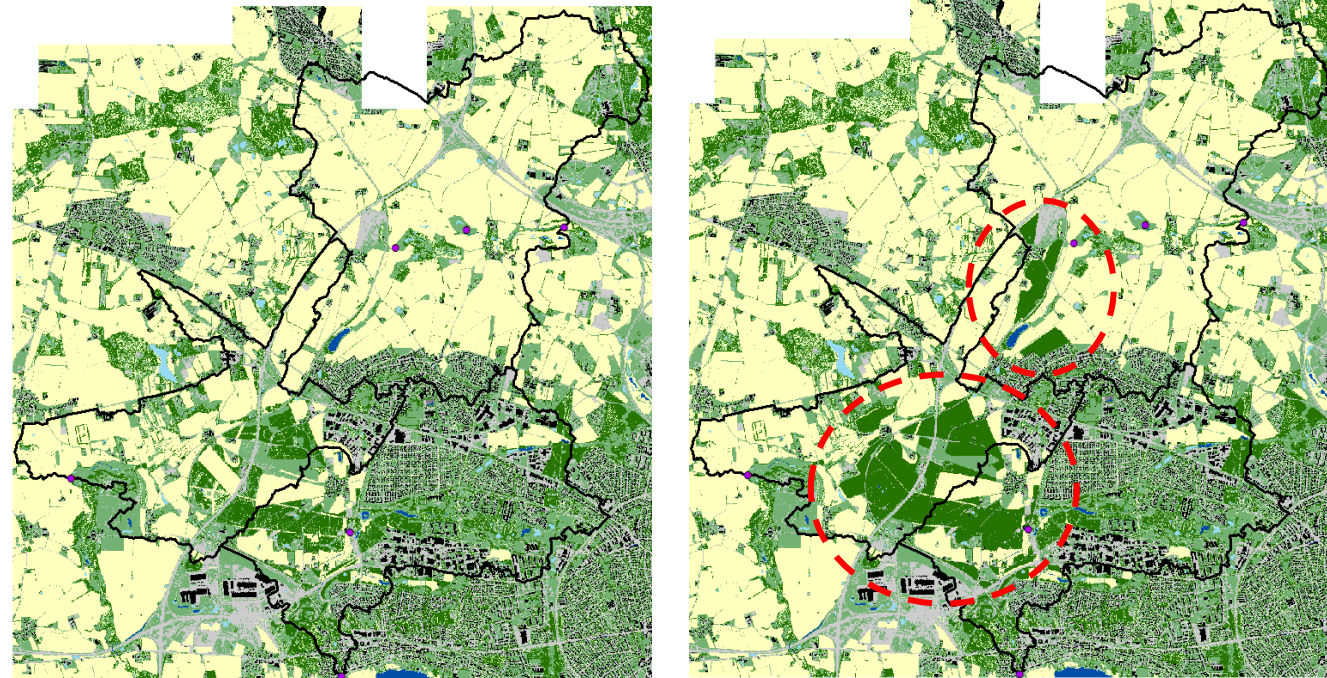
Jones et al., 2022

Mapping & modelling of ecosystem services



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- 30m and 10m resolution mapping & scenarios @6 ULLs 2000, 2020, 2030
- High resolution mapping in EC ULLs used for ESS modelling (noise, temperature, flooding, air pollution, biodiversity...) and valuation of NBS benefits
- High resolution mapping used in link between biodiversity and education
- Mapping and modelling linked to governance, economics and culture: Urban rural partnerships



Water flow mitigation model – before & after



or



City Explorer Toolkit

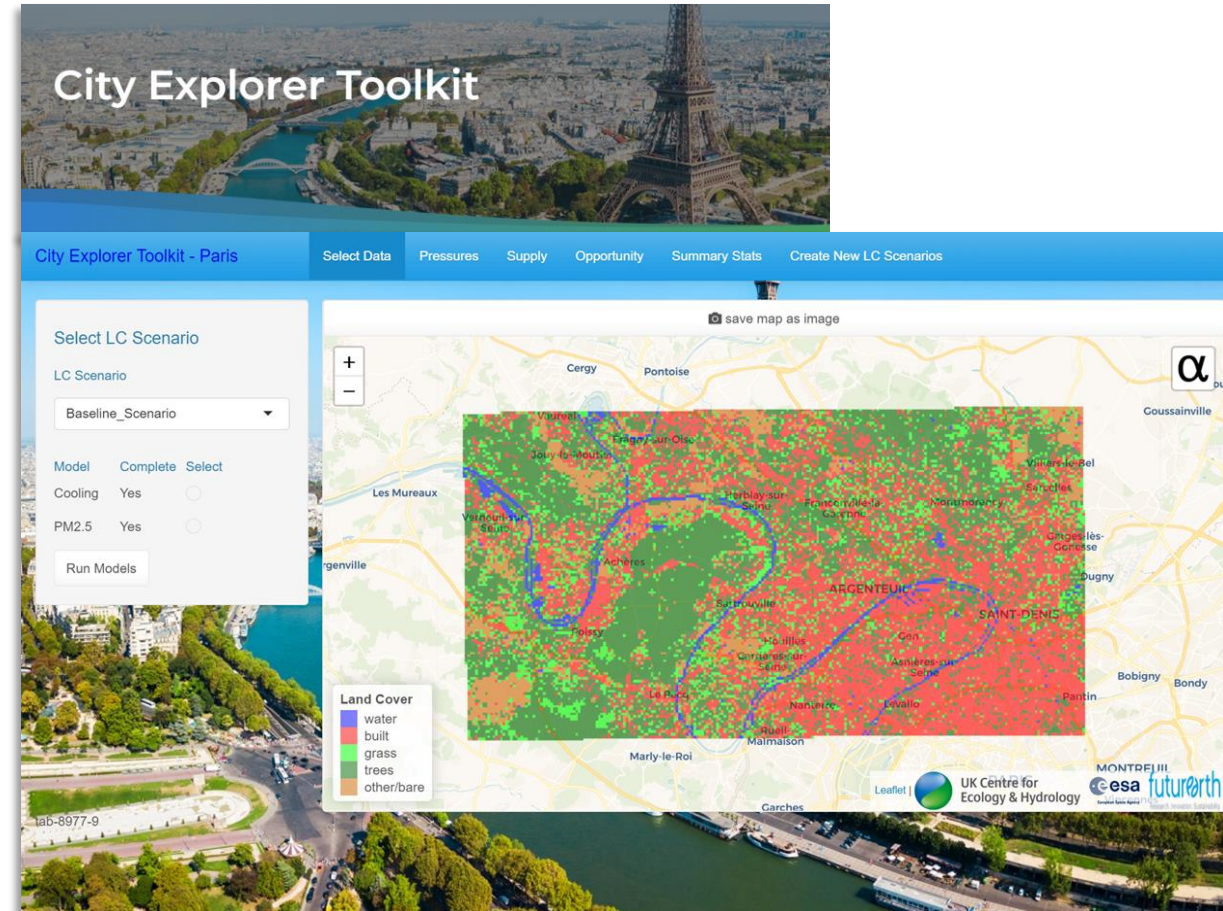


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- Interactive web-based tool to help plan Urban Green & Blue space
- Empowers urban planners to understand where best to create urban green spaces
- Ensures that the benefits, such as heat reduction, improved air quality, and noise reduction, reach the communities who need them most



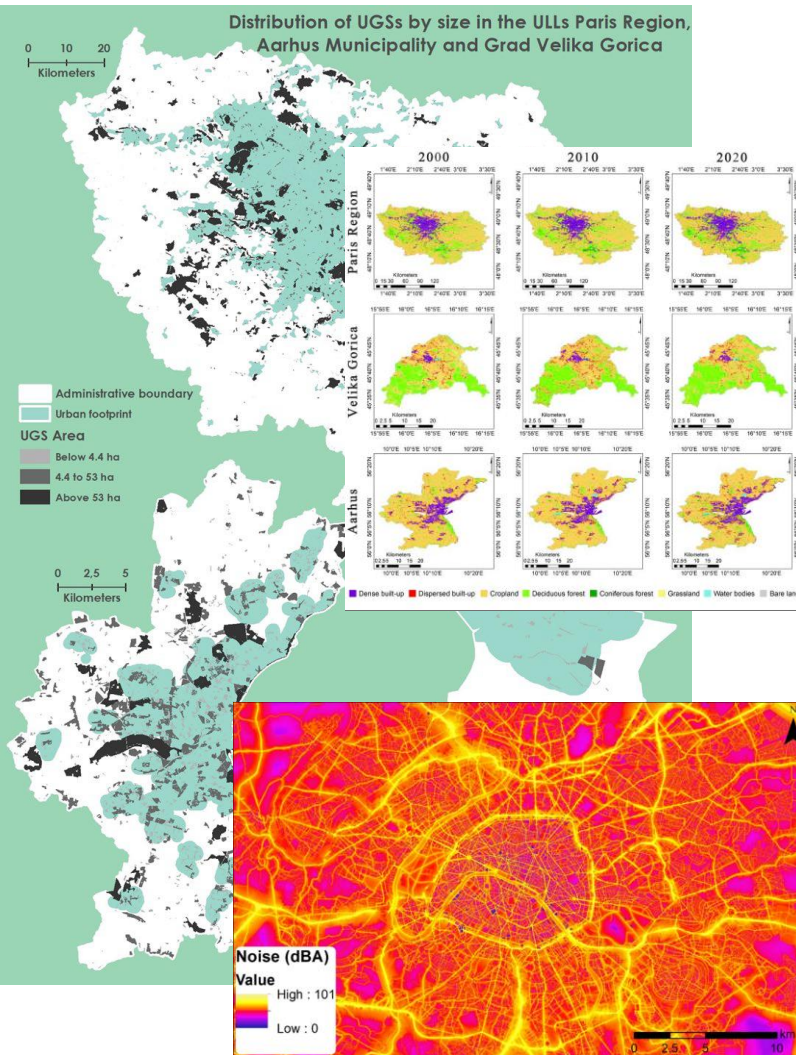
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Fact sheets for mapping and modelling procedures



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- 🌐 Factsheets for key mapping and modelling approaches – developed and applied in the REGREEN project
- 🌐 applied methods and outputs in a short and comprehensible way
- 🌐 e.g. urban land use, urban footprints ...
- 🌐 ... modelling of hydrological, noise and air quality benefits from NBS, habitat quality of green spaces
- 🌐 and many more



or



Nature-based Solutions fact sheets



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13 best practice fact sheets across NBS types (e.g. green roofs, food forest, green noise barrier, biotope city, green corridors, butterfly conservation & job opportunities, bio-rich meadows...)

Link to UN SDGs

Emphasise on good practices, barriers and lessons learned

Available in English & Chinese



or







Walkable Floormaps – learning & governance



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A tool for learning, governance and dialogue among decision-makers, planners, citizens, children and youth



-  Aerial photo printed on canvas
-  QR-codes links to information, videos etc.
-  Lines/polygons showing development plans
-  Feedback opportunities



or

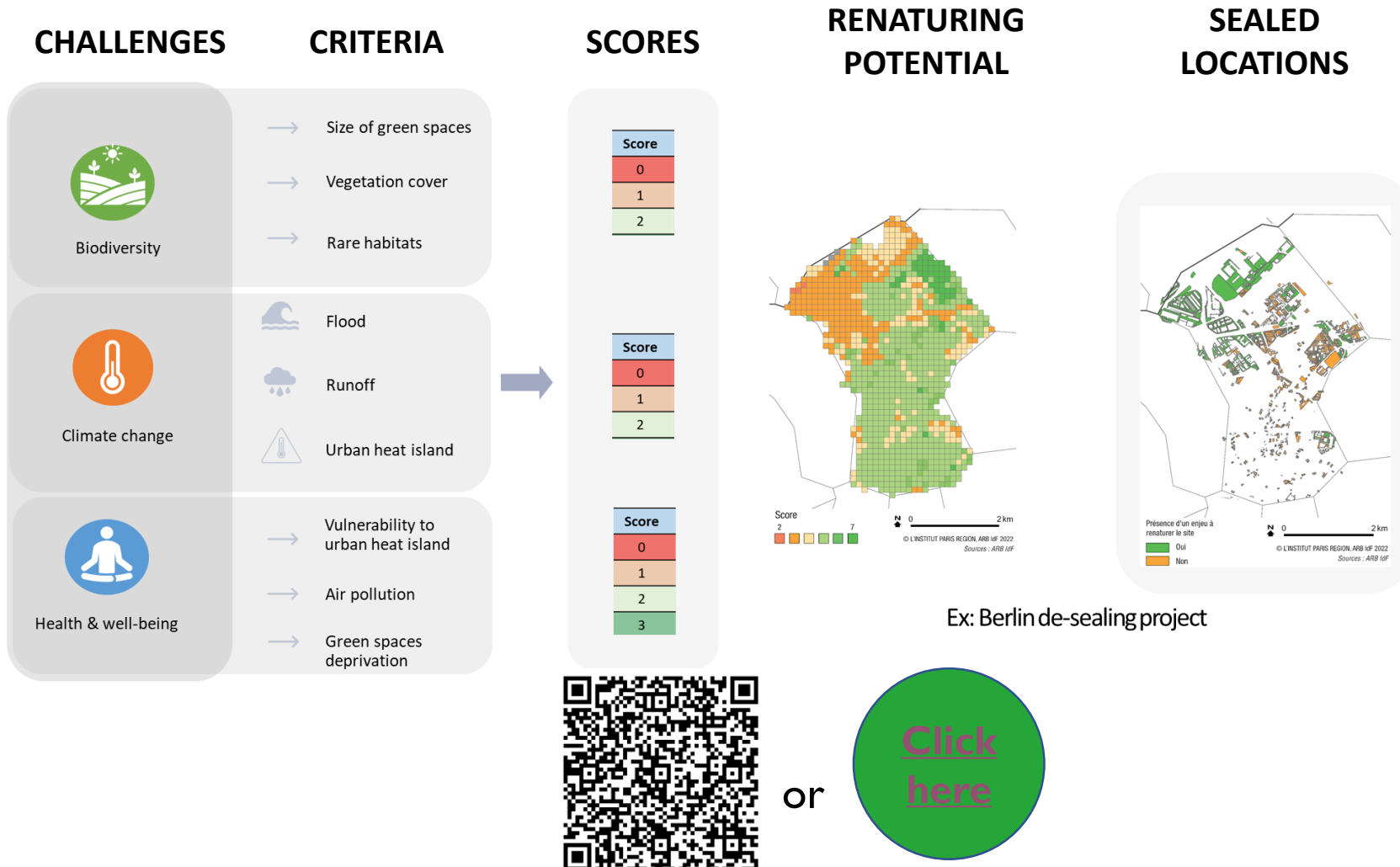


How To Design Interactive Walkable Floor Maps

Depavement and renaturalisation



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Methodology used to develop a tool to support regional master planning and local depavement and renaturalization strategies

Tackles challenges such as biodiversity recovery, adaptation, improving health and living environment

Training of technicians

- 🌍 A training kit to equip participants with the knowledge and skills to successfully implement NBS projects in their cities
- 🌍 Tailor-made approach designed to address context specific needs and challenges, such as depaving, water management, green roofs, and green space design and management



or

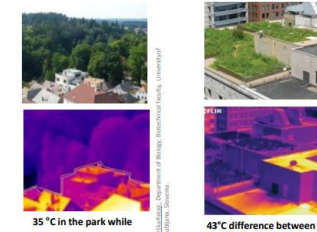


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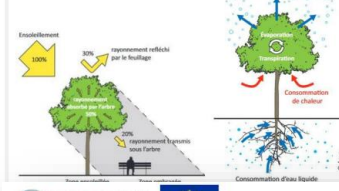
Nature-based solutions to reduce urban heat island

DECREASE IN SURFACE TEMPERATURES



The size and composition of green spaces are also important factors that influence both the cooling effect and how far it extends. A study carried out in London points out that areas of 5 to 15 hectares have a cooling effect of 0.6 to 1 degree that can be measured 180 – 330 metres beyond the study site (Monteiro et al, 2016).

COOLING EFFECT

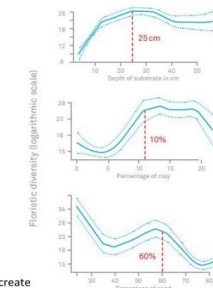
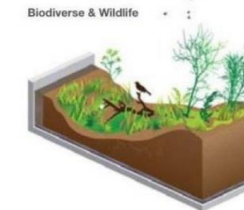


Vegetation management in Existing Green Space

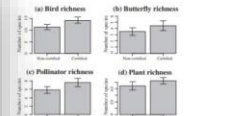
Choosing to mow urban parkland less often, perhaps every few weeks, as opposed to once or twice a week, increases the number of pollinators (Connif, 2014). Many cities have taken reduced mowing schedules one step further by creating 'no mow zones' or 'urban growzones.'



Green roofs design



It is advisable to vary substrate depth on a roof to create different conditions for living organisms. By the same token, the diversification of plant strata (moss layer, herbaceous layer, shrubs or even trees) is a sign of quality



Shwartz et al. (2013). Local and management variables outweigh landscape effects in enhancing the diversity of different taxa in a big metropolis. Biological Conservation, Elsevier

Understanding NBS-wellbeing complex system

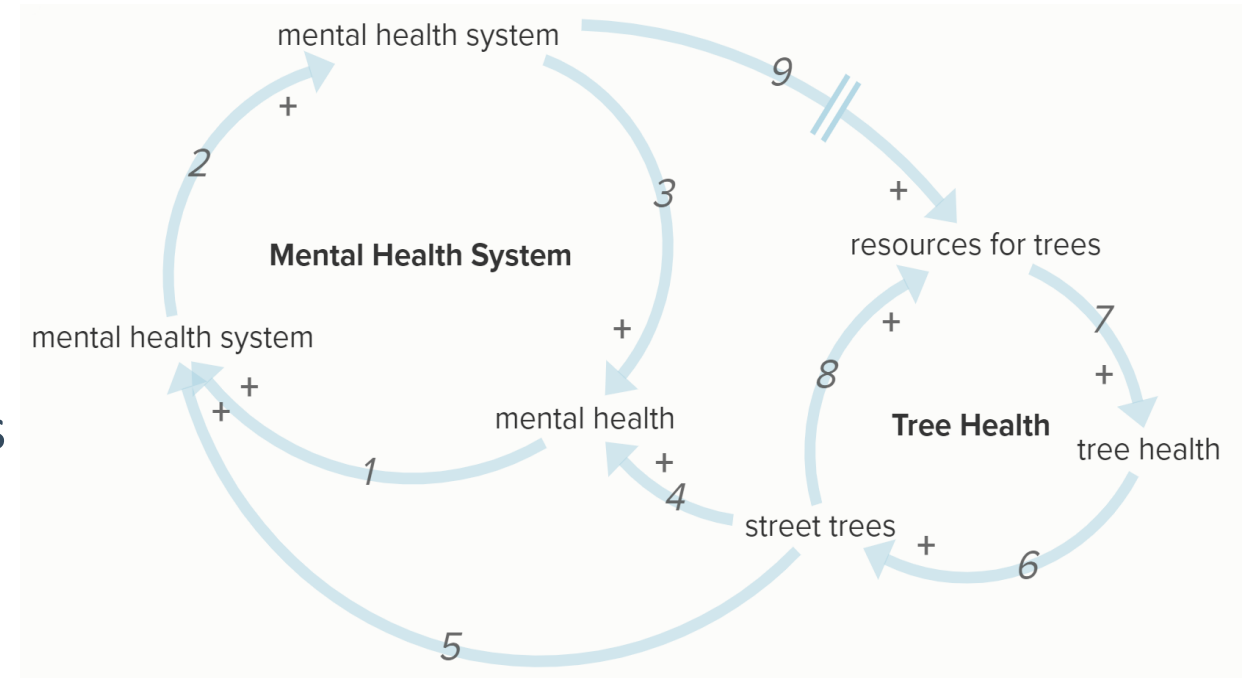


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- 🌐 Causal Loop Diagrams developed based on evidence review and expert consultation
- 🌐 Worked example – street trees and mental health
- 🌐 Establishes potential relationships to be explored in NBS evaluations
- 🌐 Reveals possible unintended consequences of NBS interventions



or



Alvarado et al (2023) 10.5751/ES-14013-280201

Vigie-Nature École – citizen science



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- 🌐 Citizen science protocols to monitor ordinary biodiversity, its loss, and the impact of human activities on the environment
- 🌐 For school children 3-18y
- 🌐 Implemented in 15 schools in Paris region ULL
- 🌐 French & English languages



or

[Click
here](#)



Greenopolis – educational learning platform



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- 🌐 Interactive digital learning platform for schoolchildren aged 8-12
- 🌐 Catalogue of activities for exploring urban nature through experiments, fieldtrips and creative exercises.
- 🌐 Available in English, French, Danish & Croatian (works on tablet and computer)



or

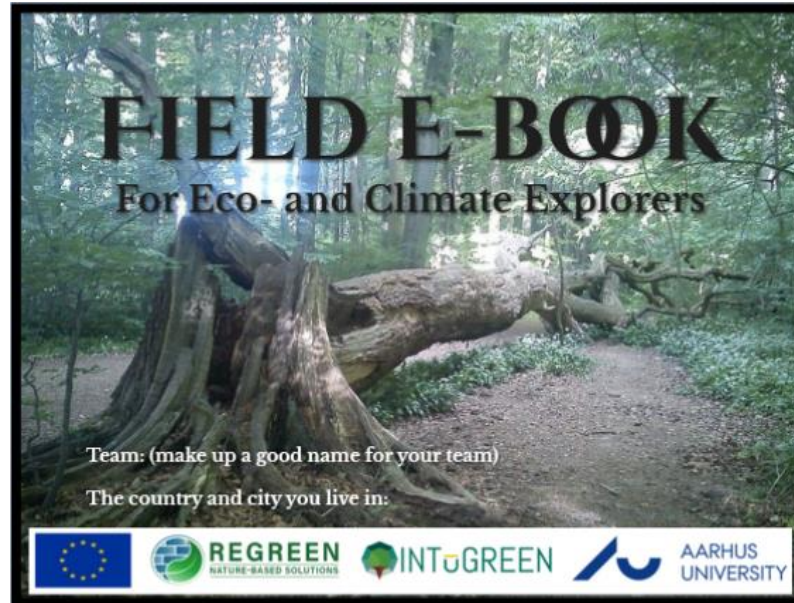


Field E-books

- Digital app for exploring local nature.
- Students create book by adding pictures, videos, texts, drawings, links and more.
- Easily adapted to all subjects and grade-levels.
- Allows children to share local knowledge across schools, languages, and countries.



or



Nature-based solutions in your city

Find examples of nature-based solutions in your neighbourhood and take pictures of them

What are they used for?



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<i>Everyday nature</i>			
Insects in our neighbourhood			
Name	Name	Name	Name
Facts and feelings about the insect	Facts and feelings about the insect	Facts and feelings about the insect	Facts and feelings about the insect

Everyday nature – the plants and animals we live with Nominations of animals and insects

- * Prettiest
- * Rarest/commonest
- * Best camouflage
- * The one with the coolest superpower
- * The one with the most cool colours
- * More...



Play biotopes – creating synergies between children and nature

Main findings

- We can create synergy between urban biodiversity and children's play through design/management of urban green.
- *Playbiotope* – combine needs of non-human species with needs for children's play.
- Co-creating urban management with children increases play and interest for species
- Creative management – important for multifunctional green spaces



or

[Click
here](#)

Outcomes

- Mårtensson F, Litsmark A, Wiström B, Hedblom M. Playgrounds- places where both children and nature thrive. *Movium Facts #3*.
- Wiström B, Mårtensson, F, Ode-Sang Å, Litsmark A, Hedblom M. Creative management – a framework for designing multifunctional play biotopes. *Submitted to Urban Ecosystems*
- Hedblom M, Mårtensson F, Ode-Sang Å, Wiström B, Litsmark A. Play biotopes put into practice – creating synergies between children and nature. *Submitted to Nature & People*
- Mårtensson F, Hedblom M, Wiström B, Ode-Sang Å, (Litsmark A). *An ecologic turn in the mapping of children outdoor environments; - affordances, landscape configurations and play-biotopes. DRAFT.*



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Decision Support Tool



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🌐 An online decision support tool designed to provide customized guidance and resources to stakeholders, including SMEs, communities, local authorities

🌐 To build, implement, and deliver effective NBS



or



**Regreen**
Nature Based Solutions

[Take Part](#) [Decision Support Tool](#) [menu](#)

Decision support tool


Online decision tool will help you to build, implement and deliver nature-based solutions. Learn more about: planning and management, co-benefit optimization of NBS, and building business models. Tool derives from the work of Regreen project, and its activities.

What is your organisation type?

Select

What is your main field of interest in NBS implementation?

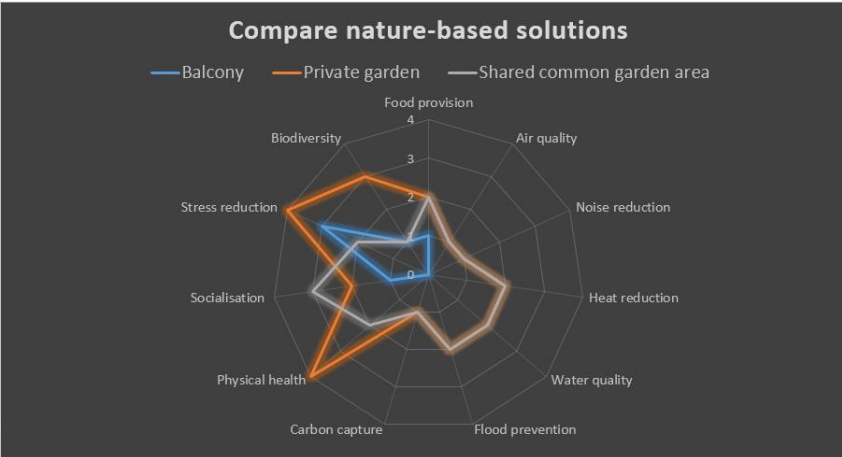
Select



Matrix of NBS services

Compare nature-based solutions

— Balcony — Private garden — Shared common garden area



Service	Balcony	Private garden	Shared common garden area
Food provision	2	3	4
Air quality	2	3	4
Noise reduction	2	3	4
Heat reduction	2	3	4
Water quality	2	3	4
Flood prevention	2	3	4
Carbon capture	2	3	4
Physical health	2	3	4
Socialisation	2	3	4
Stress reduction	2	3	4
Biodiversity	2	3	4

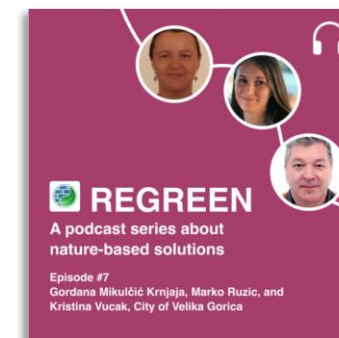
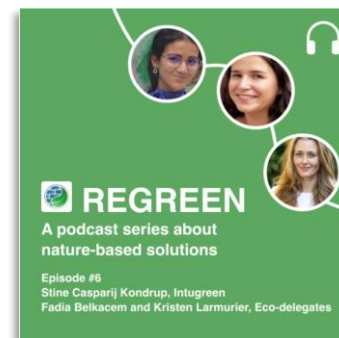
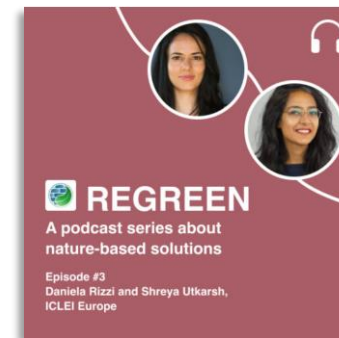
Podcast series about Nature-based Solutions



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8 episodes

1. NBS & REGREEN
2. Water challenges and afforestation projects (Aarhus ULL)
3. NBS & UN SDGs
4. Restoration of biodiversity in urban areas (Paris region ULL)
5. Citizen science - how to increase critical thinking about nature, biodiversity and NBS
6. Children and nature learning
7. Forest as a problem and a solution (Velika Gorica ULL)
8. The green side of a huge city (Beijing ULL)



or



Additional Infos to the Sessions



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- 🌐 Policy, Governance and Institutional Issues of NbS Integration
- 🌐 Environmental Aspects of Nature-Based Solutions and Restoration
- 🌐 Ecological Quality of Restoration Activities and Nature-Based Solutions
- 🌐 Nature-Based Education – Opportunities, Pedagogies and Challenges



or



REGREEN Community on Zenodo

- 🌐 Publications
- 🌐 Datasets
- 🌐 Presentations
- 🌐 Videos and Audios



or





Let's stay connected!

LinkedIn

