“How Nature Based Solutions can contribute to Resilience”

MCR2030 Webinar
9 December 2021
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NATURE-BASED SOLUTIONS

According to the European Commission

"Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and ***help build resilience****. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions* **must therefore benefit biodiversity and support the delivery of a range of ecosystem services."** **(EC, 2015)**

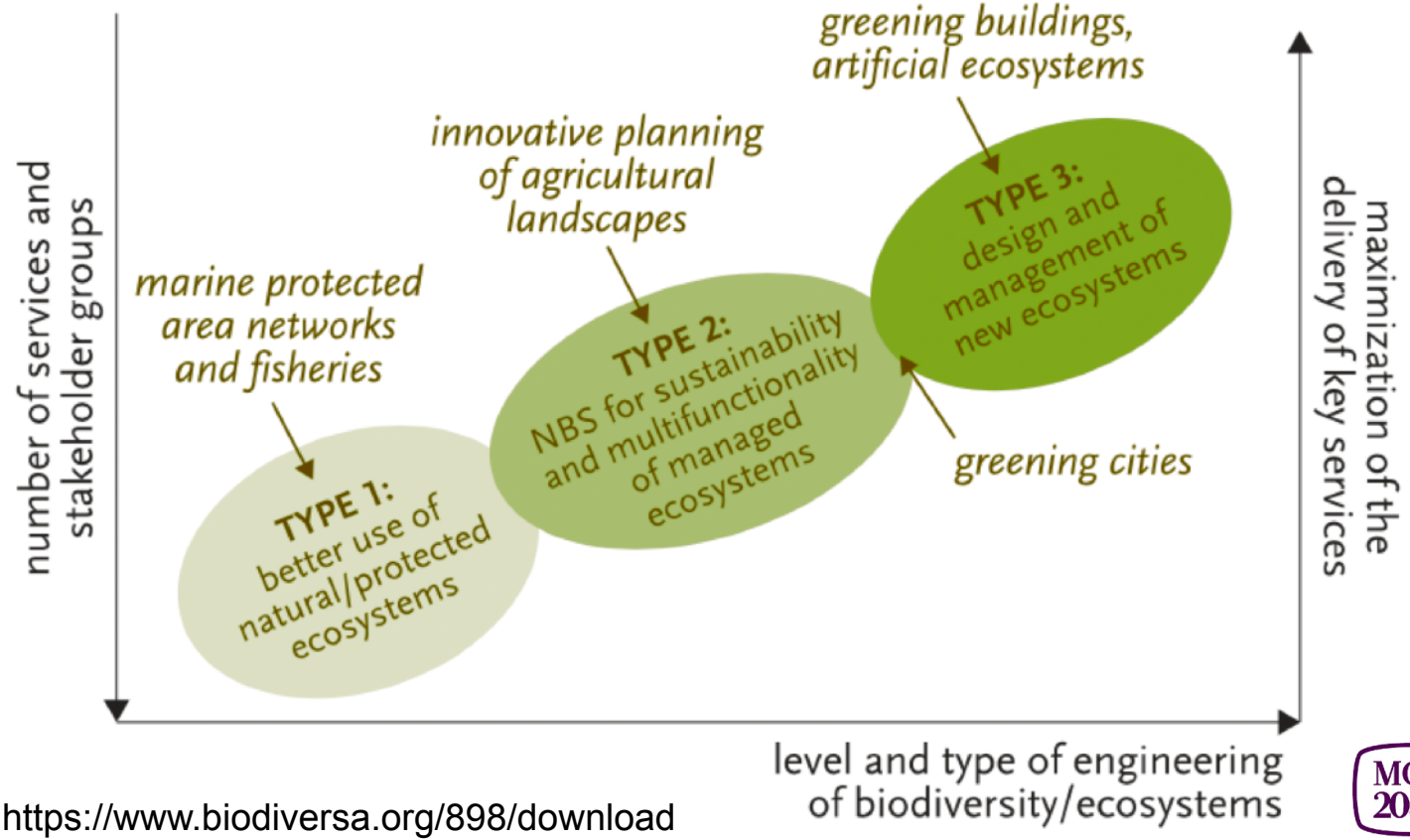
MCR2030

- MCR2030: a global partnership to **strengthen local resilience**.
- **Risk cannot be departmentalised** or made the responsibility of just one public service provider or responder. Need for integrated solutions.
- And cities must plan not just to reduce risk, but to **invest in resilience building.**
- **It's about allowing systems, services and people to respond to crisis, cope with shocks and stresses and rebound.**

MCR2030

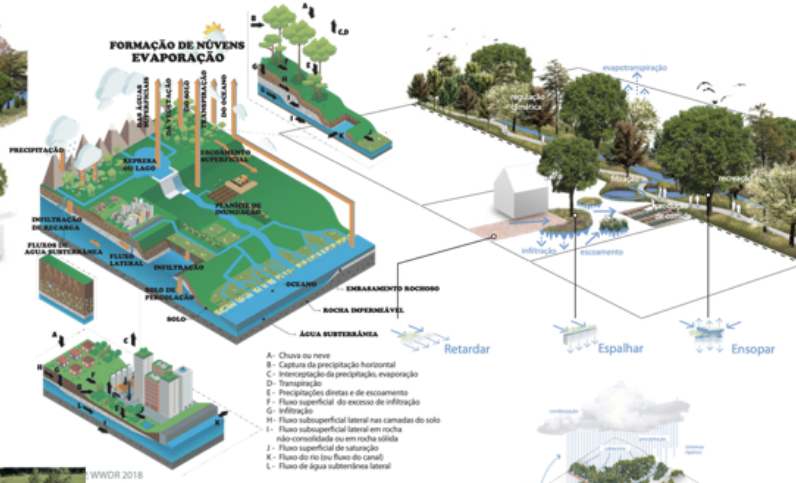
How do **NATURE-BASED SOLUTIONS** come in?

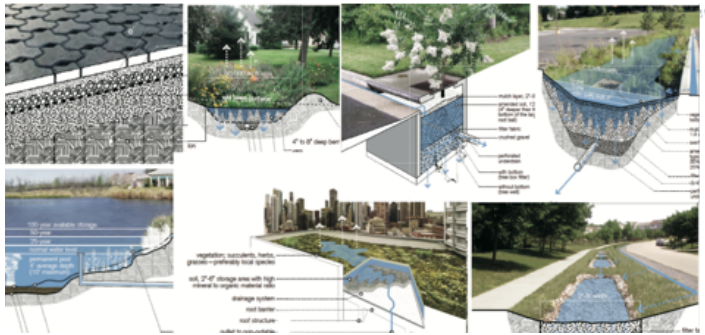
NATURE-BASED SOLUTIONS TYPES

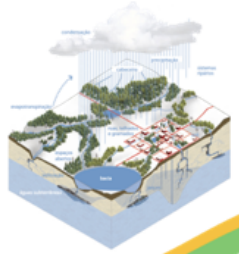


https://www.biodiversa.org/898/download

NATURE-BASED SOLUTIONS







http://uacdc.uark.edu/work/low-impact-development-a-design-manual-for-urban-areas

www.turenscape.com

MCR 2030 Making Cities Resilient

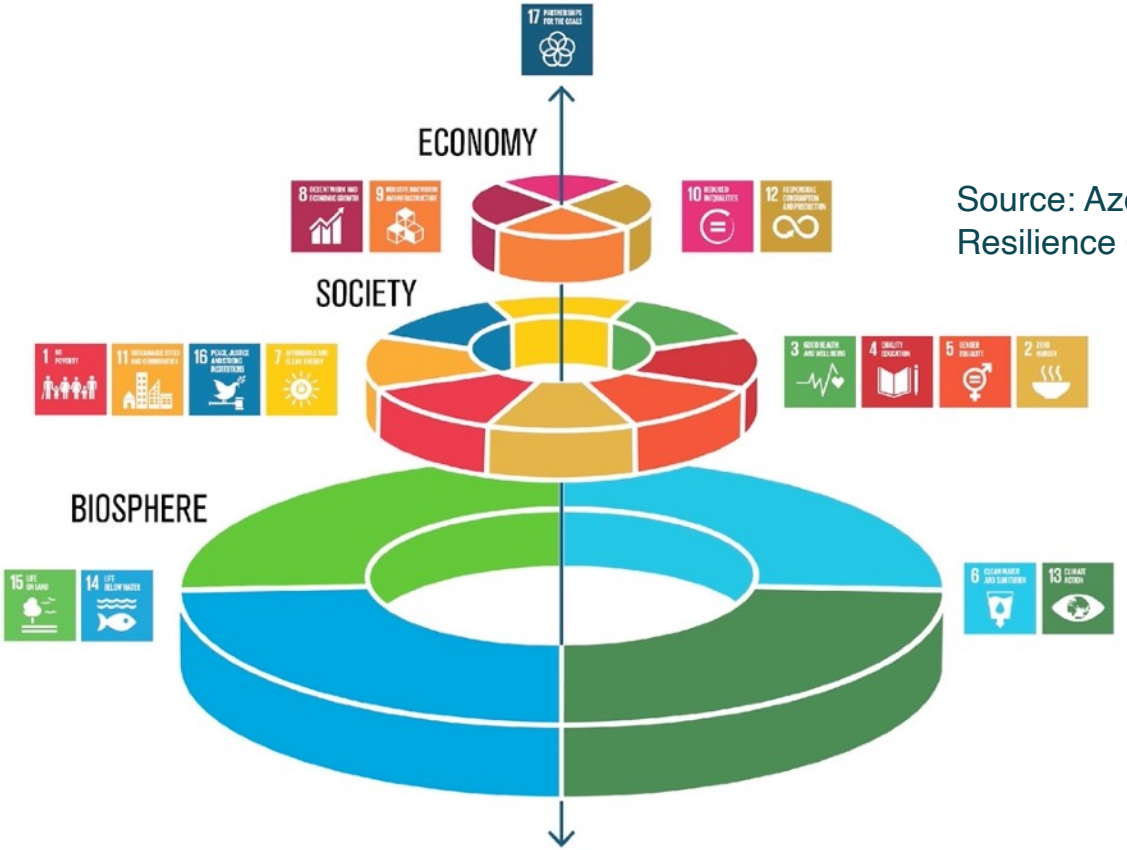
Co-Benefits of Nature-based solutions

Images source: European Commission

Understanding Nature-based solutions

- Protect and increase biological diversity
- Promote more resilient environments
- Seek multifunctionality / address social, economic and environmental challenges
- Offer a number of co-benefits
- Rehabilitate degraded ecosystems
- Consider the natural and cultural contexts of each place
- Value traditional, local and scientific knowledge
- Promote collaborative governance and the breaking of departmental silos
- Thrive through collaborative governance and contribute to a fairer and more equitable society

The SDG “Wedding-Cake”: biosphere as the foundation



Source: Azote Images for Stockholm Resilience Centre, Stockholm University

The SDG “Wedding-Cake”: biosphere as the foundation

Source: Video - Nature-based Solutions Initiative

Global Biodiversity Framework (GBF)

Convention on Biological Diversity

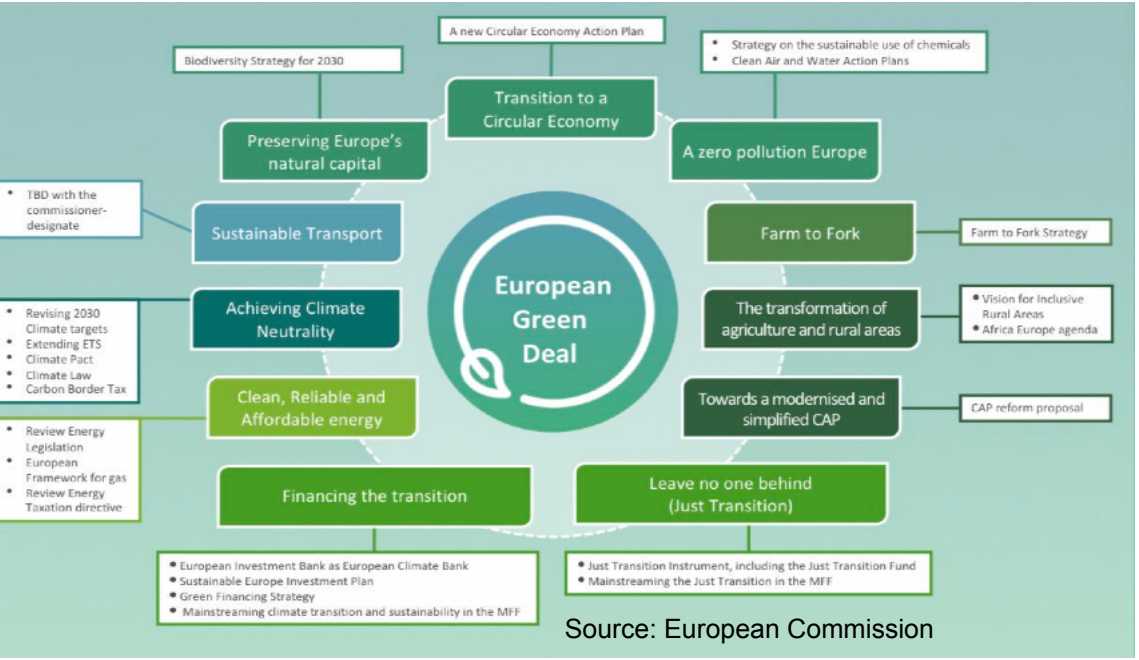
Sendai Framework

- Three of the four priorities of Sendai Framework for DRR directly and/or indirectly support NBS implementation, foster its wider uptake and link them with policies and land regulations.

UN Decade on Ecosystem Restoration

- UN declares 2021-2030 the Decade for Ecosystem Restoration.
- ICLEI is an official partner of the UN Decade for the Restoration of Ecosystems
- Objective: Restoring degraded or destroyed ecosystems as a contribution to the goals of the three UN conventions on climate change, biodiversity and desertification as well as to the Sustainable Development Goals (SDG)
- The restoration of degraded ecosystems can be achieved through various interventions such as natural regeneration, afforestation, the promotion of adapted agroforestry systems, etc.

EU Green Deal



Source: European Commission

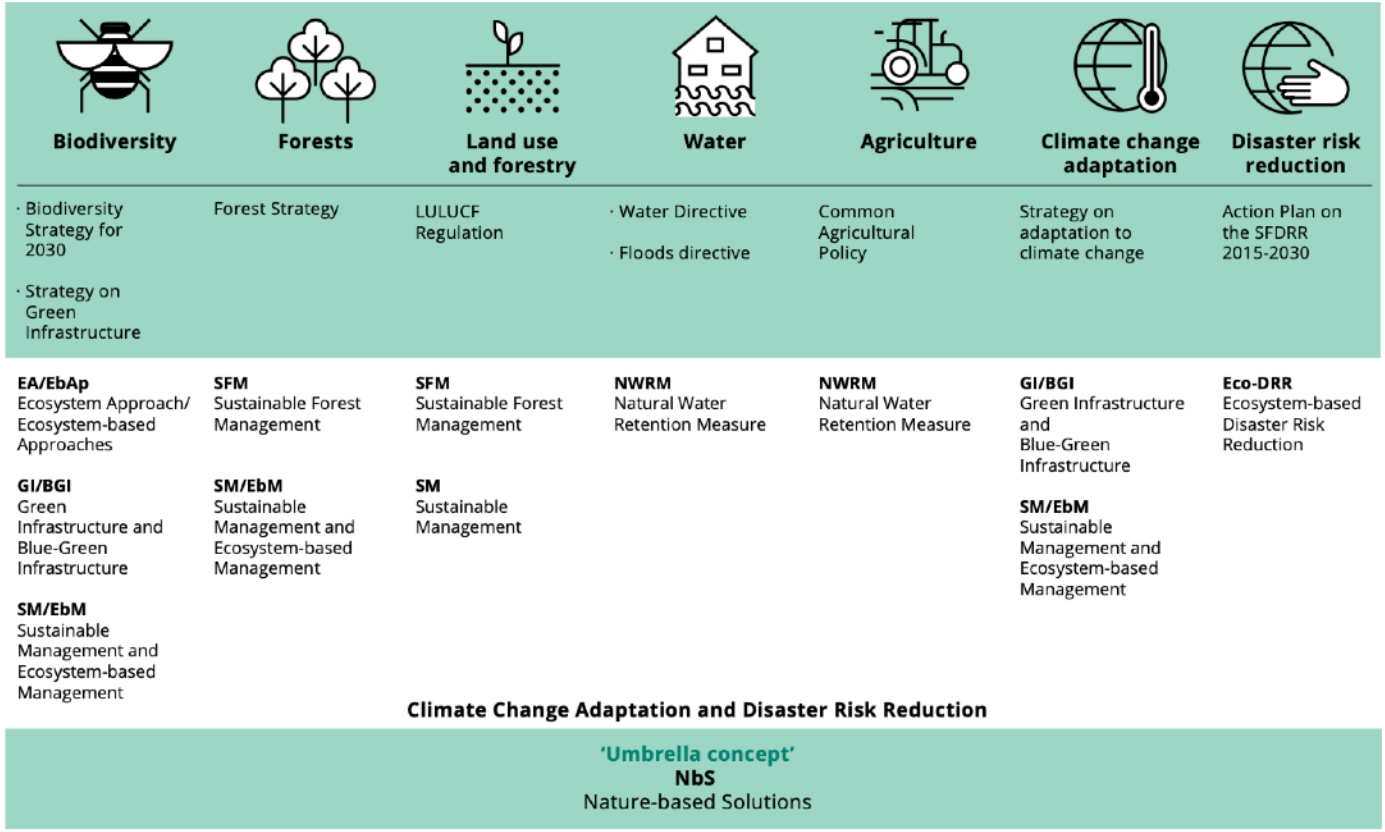
Policy areas:

- Biodiversity – protecting fragile ecosystems
- Farm to fork – sustainable food systems
- Climate Action – climate neutrality by 2050
- Eliminating Pollution
- Sustainable Mobility
- Sustainable Industry
- Cleaner Construction Sector

https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

Striving for climate-neutrality by 2050

Policy sectors for nature-based solutions (EU)



Source: European Environment Agency

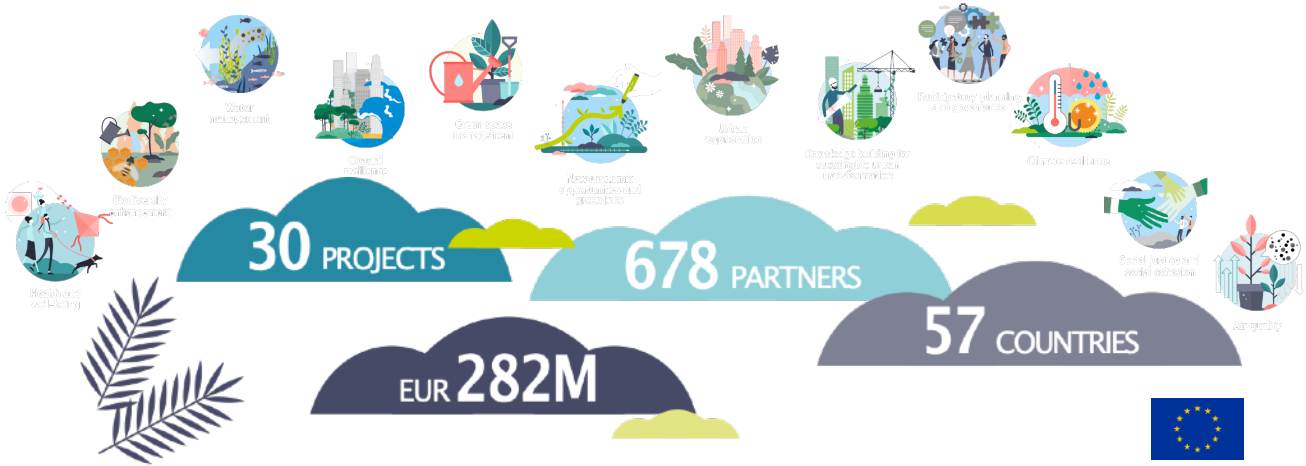
EU Strategy on Adaptation to Climate Change, 2021

- NBS mentioned to generate gains for adaptation, mitigation, disaster risk reduction, biodiversity, and health.
- NBS mentioned as particularly well suited for climate resilience.
- Importance recognised: NBS can help tackle the dual crisis of biodiversity loss and climate change
- Potential of NBS in several areas, including agriculture, forest resilience, urban greening, and ecosystem restoration.

Source: European Commission

- An essential component of the EU Green Deal that further shows the linkages between climate action and biodiversity conservation. Also links with the EU Biodiversity Strategy to 2030, the Farm to Fork Strategy and the upcoming EU Forest Strategy.

Relevance of nature-based solutions



CLIMATE AND WATER RESILIENCE

Connecting Nature
Grow Green
Urban GreenUP
UNaLab

INCLUSIVE URBAN REGENERATION

CLEVER Cities
EdiCiNet
ProGIreg
URBINAT

INSURANCE VALUE OF ECOSYSTEMS

NAIAD

INTERNATIONAL RESTORATION AND REHABILITATION OF URBAN ECOSYSTEMS

CLEARING HOUSE (EU-CHINA)
REGREEN (EU-CHINA)
CONEXUS (EU-CELAC)
INTERLACE (EU-CELAC)

NEW NBS GOVERNANCE, BUSINESS, FINANCING MODELS AND ECONOMIC IMPACT ASSESSMENT TOOLS

NATURVATION
NATURE4CITIES

HYDRO-METEOROLOGICAL RISK REDUCTION

OPERANDUM
PHUSICOS
RECONECT

INTER-RELATIONS BETWEEN CLIMATE CHANGE, BIODIVERSITY AND ECOSYSTEM SERVICES

DRYvER
FutureMARES
MaCoBioS
PONDERFUL

IMPROVE WELL-BEING AND HEALTH

EUPOLIS
GO GREEN ROUTES
IN-HABIT
VARCITIES

NBS MULTI-STAKEHOLDER DIALOGUE PLATFORM

Think Nature
NetworkNature

ECOSYSTEM RESTORATION

AMBER
MERCES

Cities from Horizon 2020-funded NBS projects

Image source: European Commission

How ICLEI can support: Working with cities to upscale and outscale NBS

NATURE-BASED DEVELOPMENT

Cities can engage:

GLOBALLY

- CitiesWithNature
- UrbanByNature
- Cities Biodiversity Summit at COP 15 CBD
- The Edinburgh Declaration

IN EUROPE

- UrbanByNature
- NetworkNature: It is in our nature to network – we will expand the wider NBS community and support you in implementing and amplifying your nature-based solutions.
- Horizon2020/Horizon Europe Task Forces
- Green City Accord
- Representation with the European Committee of the Regions

Cities can join forces on:

- ICLEI is an official partner of the UN Decade for Ecosystem Declaration
- Horizon Europe upcoming calls
- NBS Programmes & Platforms ((UbN, CWN, NN)

Cities can use:

- Pollinator's guidance
- NetworkNature's resources page

Cities can subscribe:

- UrbanByNature by ICLEI Europe, Digest
- CitiesWithNature, Buzz
- Urban Resilience Newsletter by ICLEI

Cities can participate in events:

- Once-off + regular (e.g. EURESFO ESCT, ICLEI World Congress)

ICLEI Local Governments for Sustainability EUROPE

MCR 2030 Making Cities Resilient

Platforms and campaigns

ICLEI Local Governments for Sustainability EUROPE

FACILITATING KNOWLEDGE EXCHANGE, engaging cities in COMMITMENTS

UrbanByNature
The Global Programme for Urban Nature Pioneers

4 Regional Hubs Brazil, China, Korea and the Caucasus + European Hubs in UK, B and PL

Network Nature

Platform + National NBS Hubs in 27 EU MS

How ICLEI can support LGs
Working with cities to upscale and outscale NBS

NATURE-BASED DEVELOPMENT

ICLEI Local Governments for Sustainability EUROPE

Act Local!

Network Nature

Advancing nature-based solutions together

NATURVATION

NATure-based URban innoVATION

Connecting Nature

COproductioN with NaturE for City Transitioning, INnovation and Governance

CLEVER Cities

Inclusive. Green. Sustainable.

proGIreg

Nature-based solutions for post-industrial areas

REGREEN NATURE-BASED SOLUTIONS

Fostering nature-based solutions for smart, green and healthy urban transitions in Europe and China

CONEXUS Urban nature connects us

CO-producing Nature-based solutions and restored Ecosystems: transdisciplinary neXus for Urban Sustainability

GO GREEN ROUTES

Resilient Optimal Urban natural, Technological and Environmental Solutions

NICE

Innovative and Enhanced NBS for Sustainable Urban Water Cycle

MULTISOURCE enhanced natural treatment solutions

ModULar Tools for Integrating enhanced natural treatment SOlutions in URban water CyclES

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How ICLEI can support LGs
Working with cities to upscale and outscale NBS

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ICLEI Local Governments for Sustainability EUROPE

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NBS Fact Sheets, REGREEN Project

https://www.regreen-project.eu/news/regreen-factsheets-are-now-available-and-reday-to-download/

- Biodiversity
- Collaborative Governance
- Health and Wellbeing
- Education
- Water Quality Improvement
- Flood Mitigation
- Noise Mitigation
- Heat Mitigation
- Air Quality Improvement
- Business Activation
- Urban Design Elements

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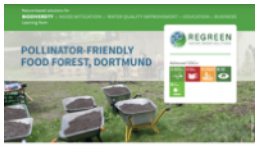
https://www.regreen-project.eu/news/regreen-factsheets-are-now-available-and-reday-to-download/



Biotope City, Vienna - Heat Mitigation

> OBJECTIVES

Like many other cities, Vienna has to tackle increased heat stress and air pollution as well as a growing population in many neighbourhoods. The local Biotope City Foundation wanted to support the city by creating a real Biotope City: this concept is based on the sum of flora, fauna, and humans, which understands dense cities as an extension of nature and not as something detached.

Biotope City Vienna is now one of the most remarkable projects of the International Building ExhibitionVienna 2022: it shows how urban greening can be used to adapt to climate change impacts such as heat stress whilst at the same time being affordable enough to offer social housing (²/₃ of the flats).

> DESCRIPTION

Biotope City is the world's first official climate-resilient district, with an approximate area of 7 ha. It is located on the property of a former Coca-Cola company in the south of Vienna, Austria. The district offers 930 housing units of various shapes and sizes of which two thirds are affordable social housing. "Green for all" constituted an important pillar of the project from the very beginning to ensure all residents had access to good quality urban nature.

Another pillar of the district's development is its climate-optimised design, which was made possible through the planning software GREENPASS. The orientation of the buildings was planned to provide optimal shading and wind circulation, supported by the abundance of green spaces (2.5 ha of green area on the ground and 11.1 ha leaf area), which cools down the air flows. Overall, native species of vegetation with different structural forms was prioritised. From the start of the project 10 metres high trees of 18-20 different species were planted. Their location was chosen wisely to provide the best shading performance. Several different types of nature-based solutions were installed throughout the district, including: large-scale green roofs, green facades, artificial wetlands, and water ponds for rainwater retention.

According to the GREENPASS analytical models, the wind stays in the district for around 2-3 minutes; in that time all the nature-based solutions cool down the wind flow through evapotranspiration and the shade-optimised architecture, reducing the air temperature by up to 2.2°C. Other benefits include the on average 33% decrease in water run-off and more than twice the average carbon sequestration on a typical heat day compared to the same area without these nature-based solutions.

Another important pillar in the re-design of the district was to promote a mixed and varied usability of the public space to increase the comfort of the residents. The idea was to create a lively zone through public communal areas with generous space for playing, sport, leisure, and urban gardening across all buildings. Private and communal areas such as roof gardens, pools, or greenhouses offer opportunities to meet and mingle that are highly appreciated by the residents.

From the start, a cooperative planning process was carried out by the architects' offices, specialist planners from various disciplines and municipal departments as well as representatives of the property developers and the district,

- Several different types of NBS: large-scale green roofs, green facades, artificial wetlands, and water ponds for rainwater retention.
- Climate-optimised design at district level (use of a planning/modelling software) for orientation of the buildings, optimal shading and wind circulation
- According to modelling, the wind stays in the district for around 2-3 minutes; NBS cool down the wind flow through evapotranspiration + a shade-optimised architecture reduces the air temperature.

Farfalle in ToUr, Turin - Health & Well-Being


Nature-based solutions for
HEALTH & WELL-BEING :: WATER QUALITY IMPROVEMENT :: BIODIVERSITY :: EDUCATION
Learning from:

FARFALLE IN TOUR
PROJECT OF TURIN

REGREEN
NATURE-BASED SOLUTIONS

Adressed SDGs:

> OBJECTIVES

The Farfalle in ToUr project in Turin, Italy, combines butterfly conservation with providing job opportunities for citizens, who live with mental or physical illnesses. Connecting people with nature by creating and maintaining butterfly oases is at the core of this project. The Farfalle in ToUr demonstrates the potential of nature for improving health and well-being and social inclusion in a city.

> DESCRIPTION

The project was founded after doctors enquired how patients with mental and physical illnesses could be involved in protecting butterfly populations in the City of Turin. What started as a project with no external funding, running on low costs and citizens volunteering, gained more attention once it became an active part of the EU-funded project proCiteg in 2018. It started with as few as two volunteers as 'users' in the project and went on to recruit 12 paid users who now act as experts for the project. These users are in charge of co-designing all activities surrounding project planning, implementation and awareness raising. Since they need to be out in the gardens, interact with others and especially school children; these users, who all are patients with mental or physical illnesses, feel resourceful, relevant and connected with society and nature. There is a primary focus on awareness raising in this project and several public events, photo exhibitions and meetings take place during the course, with a lot going online following the pandemic restrictions of course.

The main actors involved and targeted in this project are not only the patients as experts, but also school children, educators working for different social cooperatives (Il Margine and La Rondine) and refugees. This multidisciplinary approach and being able to reach out to vulnerable communities and children makes it quite unique. The project also promotes citizen science: citizens are involved in planting plant species, which attract pollinators and butterflies in their own gardens or balconies particularly well. Twice a year citizens are invited to Pollard Walks, which entail regularly counting butterflies along transects during flight season. These walks are organised in partnership with the European-wide initiative "The Butterfly Monitoring Scheme" to help monitor the butterfly population. Overall citizens are involved in the planning, designing, implementation as well as monitoring of the Farfalle in ToUr project. All data collected is open source and can be accessed online to understand the changes in biodiversity before, during and after the implementation of these Butterfly Oases.

The Butterfly Oases are all in gardens owned by public institutions such as the Local Health Company. Currently, there are four Butterfly Oases with ten more gardens to follow in future. In 2020, some of the Butterfly Oases were integrated into the city's green corridors to allow pollinators to move even easier across Turin. Citizens were also given plants and seed bombs to attract pollinators in their surroundings.

> CHALLENGES

Like every project, there are some challenges involved as well. Some of them are listed below:

- Including different municipal departments led to diverging agendas and viewpoints emerging which had to be aligned and compromises to be found.
- There were some technological barriers, e.g.:

Image: Farfalle in ToUr Team

- Startpoint: Doctors enquired how patients with mental and physical illnesses could be involved in protecting butterfly populations in the City of Turin
- The Farfalle in ToUr project in Turin combines butterfly conservation with providing job opportunities for citizens, who live with mental or physical illnesses.
- The project also promotes citizen science: citizens are involved in planting plant species, which attract pollinators and butterflies;
- Currently: 4 Butterfly Oases with 10 to follow
- Interaction with school children.

Reduna Project, Almada - Coastal Resilience

> OBJECTIVES

One of the consequences of global warming is sea-level rise. In urban settings along coastlines, rising seas threaten not only houses, but also infrastructure such as industries, roads, power plants, freshwater aquifers, etc. Rising sea-level also pushes destructive storm surges further inland, posing very high risks for coastal populations, as storm surges can push water kilometres inland, causing extreme flooding far from the coast.

The Portuguese ReDuna project aims to restore the natural capacity of the Almada sand dune-beach ecosystem to healthily respond to natural drivers, enhancing its resilience to sea-level rise and storms. By monitoring in detail the dune ecosystem, the project has been providing scientific and technical knowledge on effective restoration techniques, which provides valuable information for vulnerable coastal areas.

> DESCRIPTION

Almada is a coastal city with a 13 kilometres long coastline on the Atlantic shore. It is visited every year by 8 million tourists during summer. However, due to sea-level rise, the area's current coastline regression puts in danger tourist services and existing private infrastructure, making coastal protection a high priority in Almada, Portugal. The beaches and the dunes are structures that are at the same time extremely sensitive and highly adaptive ecosystems towards environmental drivers. Their flexibility makes them react easily to the forcing functions of wind, ocean and sediment supply patterns, acting as a natural barrier.

The ReDuna project started in 2014, in response to strong winter storms in the coast of Costa da Caparica, which caused the destruction of the dune system. After this event, the beach was sand nourished and the dune profile along 1.1 kilometre of coast was restored using willow sand fences and planting of native dune plant species (100,000 plants) to help the recovery process. For this end, seeds were collected from a nearby area to preserve the local genetic integrity of the site. Also, human pressure mitigation measures were implemented such as pathways, fences and project communication. The construction phase took 6 months. Project monitoring is still being carried out, to show how an ecosystem-based protective structure can be self-sustainable. Four years after the initial plantation, roots were more than 4 metre deep and in high density, forming a strong root network that stabilised the foredune. The restored dune fostered resilience to storm effects and coastal erosion due to a more stable sediment transfer and balance between the dunes, the beach and the ocean floor. In March 2018, the restored dunes provided an effective response to Storm Emma.

The idea was to help the ecosystem restore itself and regain complexity, while tracking the changes through monitoring led by the Faculty of Science of Lisbon University, Centre of Ecology / Geology research group. Geomorphological and ecological parameters were monitored at six-monthly intervals initially, and then yearly with indicators as geomorphological evolution, beach-dune sediment stock, biodiversity colonization (new plants and animals), vegetation survival, community structure evolution, impact of fences on survival, growing and establishment of plants, for example. To detect the site's geomorphological changes, a GPS-based monitoring of the transect was performed, creating a 3D-model of the dunes. Nowadays, photographic data can be easily obtained by drones, which is a non-intrusive method. Thanks to these photos the survival and growth rate of the dune vegetation as well as the colonisation of new plants in the dune system can be analysed. The results obtained during the first two years of the project showed that 90% of the planted native species have survived, attracting 49 new wildlife species, which increased biodiversity and provided ecological resilience to the restored ecosystem.

The ReDuna project established strong community involvement from the very beginning. The area's design was presented, discussed and defined with engagement of target groups, who could identify themselves with the project goals and actions from an early stage. After the implementation phase, several maintenance actions followed, which included native species plantation and invasive alien species removal with the involvement of the local community, NGOs and schools, with the support of the Municipality's Environmental Education and Awareness Division. The ReDuna project was financed by the EU Structural & Cohesion Funds for coastal protection through the National Environmental Agency of Portugal. The hard costs during the first phase associated with structural actions, without considering human resources, conducted studies, project development and monitoring reached 250,000 EUR. Maintenance campaigns are foreseen within the dune system after each summer and each storm season, as there is a need to refresh the willow fences infrastructure, replace part of the vegetation and renovate some walkthroughs.

- Restore the natural capacity of a sand dune-beach ecosystem to healthily respond to natural drivers, enhancing its resilience to sea-level rise and storms.
- The beach was sand nourished and the dune profile was restored planting native dune plant species (100,000 plants) + using willow sand fences
- Human pressure mitigation measures were implemented such as pathways, fences and project communication.
- Monitoring: geomorphological evolution, biodiversity colonisation, vegetation survival, beach-dune sediments
- In March 2018, the restored dunes provided an effective response to Storm Emma.

NBS PLATFORMS: CASE STUDIES

OPPLA.eu

Amsterdam - NBS for greening the city and increasing resilience

Bari - NBS for greening the urban space

Berlin - NBS for urban green connectivity and biodiversity

Dresden - NBS for sustainable urban transition

Dublin - NBS for a more sustainable city by 2030

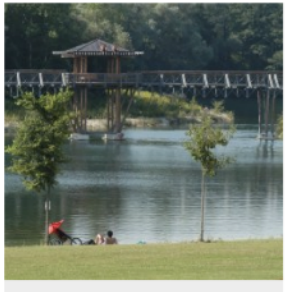
Edinburgh - NBS enhancing health, wealth and sustainability

Bilbao - NBS for dealing with extreme temperature and rainfall events

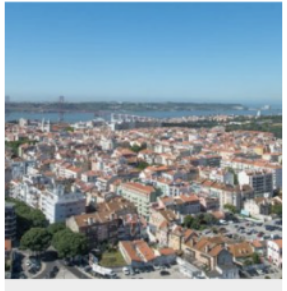
Bristol - NBS for ensuring a sustainable future

Budapest - NBS for climate resilience and pollution control

Genk - NBS bridging green and industrial heritage



Linz - NBS as a motor for urban growth



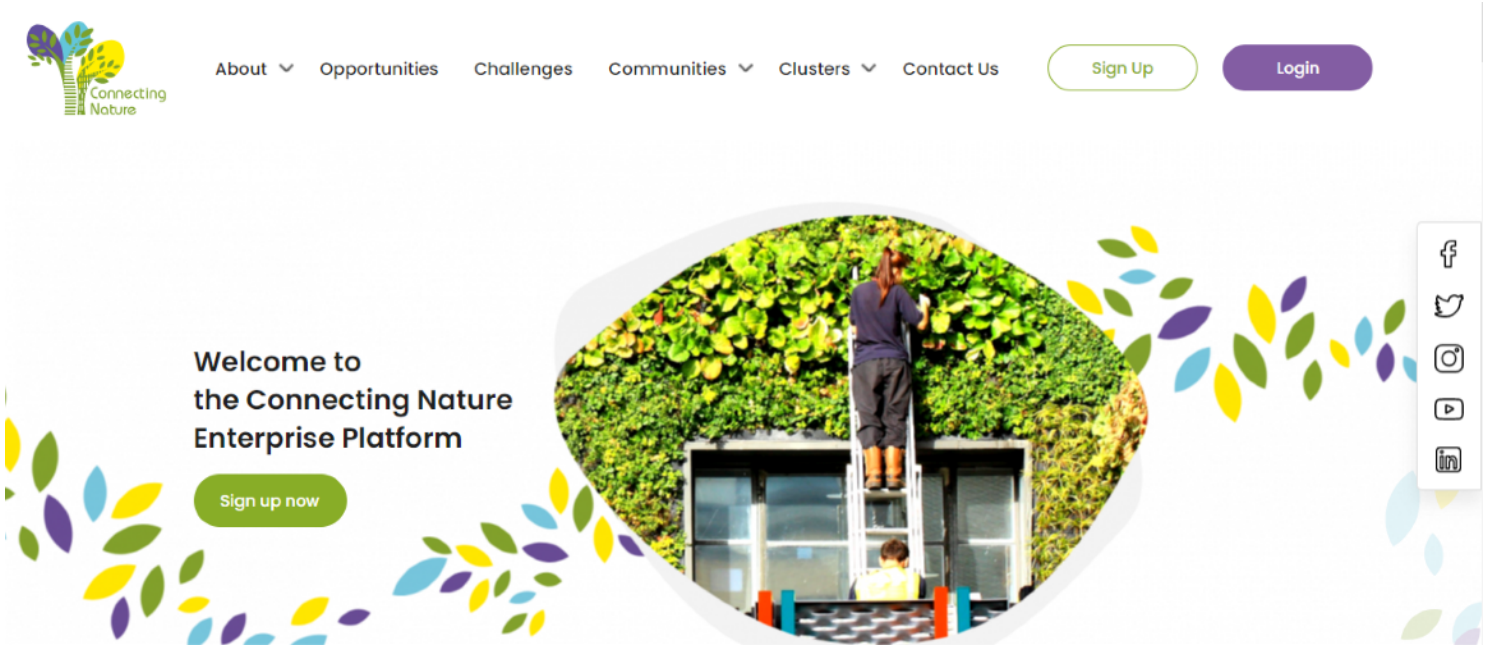
Lisbon: NBS Enhancing Resilience through Urban Regeneration

NBS PLATFORMS: CASE STUDIES

https://una.city/

Connecting Nature

Connecting Nature Enterprise Platform



Resilience and nature-based solutions

- Resilience of NBS depends on (bio)diversity, therefore, consideration of the biogeographical context is key, avoiding a solely anthropocentric approach.
- NBS depends on effective engagement with stakeholders.
- NBS can provide opportunities to create, strengthen, and reinforce a focus on complexity and interactions in social-ecological systems, which in turn support governance and planning approaches to resilience.
- NBS can provide a continued delivery of ecosystem services despite variability, disturbance and management uncertainty, decreasing vulnerability and enhancing urban resilience.

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Thank you!