



Interreg



Co-funded by
the European Union

NATURE-BASED SOLUTIONS

A chance to break our habits -
a way to transform our future

Information booklet

NbS

CONTENT

01	INTRODUCTION	<u>2</u>
02	WHAT ARE NATURE-BASED SOLUTIONS AND HOW CAN THEY BE APPLIED IN CROSS-BORDER PROJECTS?	<u>3</u>
03	HABITAT RESTORATION AND NATURE-BASED SOLUTIONS	<u>10</u>
04	NATURE-BASED SOLUTIONS IN TOWNS AND CITIES	<u>13</u>
05	THE ROLE OF NATURE-BASED SOLUTIONS IN PREVENTING NATURAL DISASTERS	<u>19</u>
06	NATURE-BASED SOLUTIONS IN AGRICULTURE	<u>21</u>
07	COMMUNITY PARTICIPATION, AWARENESS RAISING AND CAPACITY BUILDING IN RELATION TO NATURE-BASED SOLUTIONS	<u>23</u>
08	SUCCESS CRITERIA FOR THE USE OF NATURE-BASED SOLUTIONS	<u>27</u>
09	USEFUL LINKS	<u>31</u>



01 - INTRODUCTION

„To achieve a sustainable future, we should work with, not against nature to achieve global goals.”

([IUCN - NetworkNature](#))

Today, it is clear that addressing the climate and ecological crisis is deeply intertwined, and that responses to them cannot and should not be separated. The role of Nature-based Solutions (NbS) have now become of particular importance. NbS includes interventions that can simultaneously contribute to the sustainable conservation and restoration of ecosystems and biodiversity, to the sustainable management of a range of social problems and to the creation of new economic opportunities.

The aim of this information booklet is to present the concept of NbS, the closely related theoretical and policy background in a brief and comprehensible way, and to provide a common basis and inspiration for the wider application of NbS, mainly through good examples and best practices from the European Union.

With Nature-based Solutions, up to a third of the 2030 climate change mitigation targets could be met, which is why the use of NbS is a priority in the EU's strategy documents for the 2021-2027 EU cycle.

NbS is a complex umbrella term, so it was not our intention to provide a full description. Our publication can serve as a useful source of information for local decision-makers, public sector professionals, business and social organisations involved in project planning and development, with the aim of enabling cross-border projects to take inspiration from Nature-based Solutions. The collection of links at the end of the publication offers useful and interesting information and publications in Hungarian or English, or [click on the words highlighted in gold](#) for further useful readings.

It is important to note that the information booklet is intended as a guide only and does not replace the rules set out in the call for proposals.

02 - WHAT ARE NATURE-BASED SOLUTIONS AND HOW CAN THEY BE APPLIED IN CROSS-BORDER PROJECTS?

WHAT ARE NATURE-BASED SOLUTIONS?

There are a number of overlapping definitions of what Nature-based Solutions are. For this publication, we have used the definition of the [International Union for Conservation of Nature \(IUCN\)](#), and the [United Nations](#).

Nature-based Solutions are activities that protect, manage and restore natural or human-altered ecosystems with the aim of simultaneously solving pressing societal problems and challenges. A common feature of Nature-based Solutions is that they can offer environmental, social and economic benefits in synergy with each other: i.e. they increase biodiversity, the resilience of an area and human adaptability to the adverse impacts of climate change.

Nature-based Solutions do not have a single cadaster, but can be rather understood as a set of approaches and criteria: they contribute to more diverse natural environment, increase biodiversity and create conditions for cost-effective, long-lasting maintenance through resource-efficient and systemic interventions that are adapted to local conditions.

This complex approach requires a different way of thinking, different design and construction processes and different conservation solutions from the technical standards and practices that are widely used today.

WHERE AND WHY CAN WE USE NATURE-BASED SOLUTIONS?

Developed based on a [publication of the British Academy](#) issued as part of its COP26 Briefings Series, this section provides an overview of where and why we can use Nature-based Solutions, what positive impacts they can provide, and specifically, how they can contribute to climate change mitigation and adaptation.

Nature-based Solutions can be implemented in urban, peri-urban and rural environments. They can be applied and used in a variety of landscapes and ecosystems, including, forests, grasslands, uplands, farmlands, wetlands, marine, coastal and built environments. Depending on the local context they are implemented in, these solutions could range for example from the creation of forests, the protection and restoration of wetland areas, the increase of green spaces in the built environment, or the creation of rain gardens.

Nature-based Solutions can be categorised in several ways. These typically focus on either the context in which NbS are implemented or the nature of the intervention.

Potential intervention areas for the application of NbS

01 Blue areas (inland):
Lakes/ponds, rivers/streams/canals, deltas,
wetlands/bogs/fens, marshes

02 Coastal and marine ecosystems:
Coastlines, mangroves, sand dunes, seagrass,
coral reefs

03 Water management solutions:
Rain gardens, swales and filter strips,
sustainable urban drainage systems, wells

04 Agricultural and food production areas:
Horticulture, pasture, community gardens and allotments,
aquatic structures

05 Forests and urban parks:
Forested areas, urban parks, semi-natural forests,
green belts and corridors

06 Shrub and grasslands:
Shrubs, grasslands, wildflower meadows,
urban lawns

07 Grey infrastructures with green features:
Alley and street greens, railroad bank and track greens, riverbank greens,
green squares and parking lots, green playgrounds and school grounds

08 Nature on and in buildings:
Green roofs, green facades, balcony greens,
green walls and ceilings, atriums

THE COMPLEX POSITIVE IMPACTS OF NATURE-BASED SOLUTIONS

It is now widely accepted that different types of NbS can provide answers to a wide range of environmental and socio-economic challenges:

- The use of NbS helps to adapt to climate change, improving the resilience of both the natural and built environment and society;
- NbS help to mitigate the progress of climate change by capturing and storing green house gases in the atmosphere and reducing the amount they emit;
- NbS contribute to the conservation and restoration of biodiversity;
- NbS improve the overall quality of the environment - including water, air and soil;
- NbS enhance sustainable use of natural resources and water, contributes to food and water security;
- In addition to implementing energy- and resource-efficient infrastructure interventions, NbS also bring a number of additional socio-economic benefits in terms of urban livability, social cohesion, improved health and well-being of the population, more inclusive governance, economic growth and green jobs. Compared to more traditional approaches, it can provide more efficient and cost-effective solutions. However, these developments can only be truly successful if they are well adapted to local conditions.

Global
challenges



Climate change
mitigation and
adaptation



Disaster risk
reduction



Economic and
social
development



Human
health



Food security



Water
security



Environmental
degradation and
loss of biodiversity

NbS for climate change adaptation

- ✓ Increase water availability and reduce drought associated shortages through water capture and/ or storage
- ✓ Prevent and/or manage occurrence of desertification, soil erosion and landslides
- ✓ Reduce outdoor temperature, minimise the urban heat island effect and prevent forest fires through increase in vegetation cover
- ✓ Dissipate the effects of flooding and storms through restoration of wetlands and coastal ecosystems
- ✓ Prevent coastal erosion and pollution through protection of coastal ecosystems
- ✓ Minimise the impact of stormwater through implementation of sustainable urban drainage infrastructure, renaturalisation of rivers and other water bodies
- ✓ Increase agricultural resilience through planting climate-resistant species and encouraging the use of sustainable agricultural practices

NbS for climate change mitigation

- ✓ Reduce energy use and carbon emissions through introduction of sustainable agricultural practices
- ✓ Increase carbon sequestration through increased wetland and tree coverage
- ✓ Increase carbon sinks and carbon sequestration through introduction of sustainable forest management measures
- ✓ Increase carbon sequestration through selection of more adaptable species
- ✓ Increase carbon sequestration and cooling through installation of vertical or horizontal artificial surfaces
- ✓ Halt desertification by restoring grasslands or other ecosystem types
- ✓ Promote climate-friendly lifestyle practices

Did you know what TeAM HUB is?



The [NetworkNature project](#) is an important resource for the NbS community in Europe, creating opportunities for co-operation and knowledge sharing at local, regional and international level in order to promote the widest possible dissemination of NbS.

In connection with the NetworkNature project, [TeAM HUB - the Hungarian Network of Nature-based Solutions](#) - was established in 2022, a professional community of organisations and individuals committed to the topic. The aim of the network is to provide a forum for the exchange of relevant national and international knowledge, experience and best practices, and to promote dialogue and cooperation between governmental, municipal, professional and civil society actors in order to promote the widest possible practical application of NbS. On the TeAM HUB website you will find many interesting knowledge resources and case studies in Hungarian language.



Conceptual framework and interconnections of Nature-based Solutions ©IUCN

What is the Paris Agreement and what is its significance?



Background: For almost three decades, the United Nations has been bringing together countries from around the world for global summits on climate change. This is the so-called COP (short for Conference of the Parties). COP21 was held in Paris in 2015.

The Paris Agreement (2016) was a real breakthrough, with all participating countries working together to keep global warming below 2°C and reach the 1.5°C target and adapt to the impacts of climate change, and allocating financial resources to achieve these goals. The commitment to 1.5°C is particularly important because any increase in global warming beyond that will cause severe damage to livelihoods and many more deaths.

What is COP26 and what commitments have been taken?

COP26 refers to the 26th conference, which took place in Glasgow in November 2021. It reaffirmed the Paris Agreement's climate protection and temperature reduction goals: the importance of protecting, conserving and restoring nature and ecosystems, biodiversity, including forests and other terrestrial and marine ecosystems that act as absorbers for greenhouse gases.

Concrete commitments have also been made to achieve the overall targets: 100 countries - together accounting for 85% of the world's forests - have signed the [Declaration on Forests and Land Use](#), committing to restore and conserve them by 2030. In addition, 45 governments have also signed up to the new [Declaration on Forests, Agriculture and Commodity Trade](#), which aims to promote sustainable agricultural trade without damaging forests and other ecosystems.

A third of the climate action that is needed to achieve the goals of the Paris Agreement could be provided by Nature-based Solutions. With much wider use of NbS, we could achieve up to 37% of the cost-effective emission reductions needed by 2030 to have a good chance of keeping global warming below 2°C by the end of this century.



WHAT DO WE MEAN BY ECOSYSTEM SERVICES?

A key tool for measuring, evaluating and detecting the positive impacts of NbS is the identification of the ecosystem services they provide.

Ecosystem services are the goods and services derived from the natural (forests, wetlands, coastal habitats, steppes, coral reefs, etc.) or human-induced (e.g. managed) functioning of ecosystems and contribute to the maintenance and enhancement of the well-being of society.

The advantage of this approach is that it translates biodiversity and ecosystem values into an economically meaningful language that can be incorporated into cost-benefit ('monetizable') analyses and political-economic decision-making.

Main types of ecosystem services

- **Provisioning services:** the goods and products themselves - e.g. timber, forest herbs, mushrooms, wool, raw materials for medicines, flowers, shells, etc.
- **Cultural services:** the non-material goods that people derive from ecosystems - e.g. cultural heritage, ecotourism, recreation, artistic inspiration, aesthetic experience, hunting, scientific research, environmental education.
- **Supporting services:** they form the basis of all other services - e.g. they include soil formation, photosynthesis and nutrient cycling.
- **Regulating services:** for example, climate regulation of forests, CO² sequestration, evaporation; air and water filtration, purification, runoff mitigation, erosion control; or even pollination, disease and pest control, mitigation of damage caused by natural disasters.

Some regulating processes are local (e.g. erosion control), while others are regional (e.g. flood control) or even global (e.g. climate regulation).

The diverse list of goods and services provided by ecosystems illustrates the importance of preserving and restoring the natural environment. At the same time, the inappropriate use of NbS can be counterproductive: it can cause damage to ecosystem services and the degradation of nature. Tree planting projects, for example, are popular around the world as an obvious answer to the fight against climate change and the reduction of CO² emissions - except when the wrong kind of tree is planted for the habitat. Planting only a single non-native or non-resilient species can lead to soil degradation and loss of biodiversity, and in the longer term can make forest maintenance much more costly.

The loss of biodiversity is altering ecosystems worldwide, undermining their ecological function and the services they provide. Since 1970, the world's mammal, fish, reptile and amphibian populations have declined by 68% on average (WWF, 2020). Between 2010 and 2015, there was an estimated loss of 32 million hectares of primary and regenerating forests (IPBES, 2019). The value of annual crop yields that are threatened by the death of pollinators could be in the hundreds of billions of dollars. As a result, ecosystems are also being rapidly degraded, affecting 3.2 billion people worldwide - and global economic output has declined by more than 10% as a result (UNEP, 2021).

At present, land degradation has reduced the productivity of the world's land by 23 percent. Restoring 350 million hectares of degraded land could sequester 13-26 gigatonnes of greenhouse gases from the atmosphere by 2030. Preventing, halting and reversing ecosystem degradation is a societal need and responsibility.

Carbon storage is one of the most important ecosystem services for global climate change mitigation. The plant canopy and root systems of terrestrial ecosystems - above- and below-ground biomass - are huge **carbon sinks**, i.e. carbon dioxide sequestered from the atmosphere is stored in plant biomass. Soil is also a major carbon sink, and its integrity and carbon sequestration capacity depends largely on the integrity of the cover plant.

The carbon sequestration capacity of a wetland (e.g. a wetland meadow) is very significant, considerably greater than that of a tree plantation or a park with mown grass. Riparian wetlands act as buffers during floods, and landscape-scale water conservation also helps to cope with increasingly frequent and intense dry periods.

POSSIBLE WAYS OF USING NBS

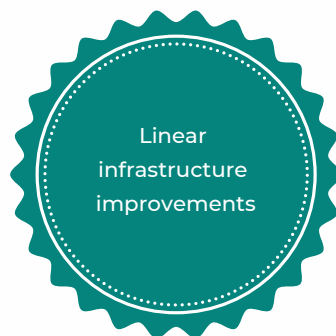
In order to mitigate the negative effects of climate change and to restore the ecological balance and biodiversity, Nature-based Solutions should be pursued and, where possible, given priority from the initial planning stage onwards.

In practice, NbS can be used in a variety of ways: They can be directly linked to the main intervention activity of the project or more indirectly, horizontally.

Here are some examples of the types of intervention areas where NbS can be used:

Nature-based Solutions for infrastructure investments

- ✓ green roofs, green facades for public buildings (e.g. community centre, museum, church, information point, sports centre)
- ✓ increasing green spaces (e.g. outdoor cultural, community, sports and recreational spaces; urban parks; community gardens, courtyards and parks of public buildings)
- ✓ shading (e.g. green roof on bus stops)
- ✓ water management (rain gardens, soakaways, other water surfaces)
- ✓ planting native and/or drought-tolerant plants (trees, shrubs, grass) in urban parks and other green spaces (e.g. Miyawaki Forest)
- ✓ using the Stockholm Tree Planting Scheme
- ✓ design of water-absorbing pavements
- ✓ the construction of soakaways along the road
- ✓ roadside tree planting to improve shading and air filtration
- ✓ using the Stockholm Tree Planting Scheme



- ✓ green roofs, green facades for public buildings (e.g. community centre, museum, hospital)
- ✓ renewing the open spaces of the museum garden, churchyard, schoolyard, community centre by greening and creating blue infrastructure;
- ✓ green facade as part of a community building renovation (church, museum, community centre)
- ✓ community (kitchen and herb) garden
- ✓ rainwater harvesting, greywater harvesting
- ✓ installation of compost toilets

- ✓ prevention and mitigation of flash floods through on-site infiltration of rainwater (instead of pipelines), log dams, reservoirs
- ✓ use of permeable pavements / replacement of sealed surfaces, construction of rain gardens
- ✓ (semi-)natural rehabilitation of stream and river banks, dam removal;
- ✓ increasing green areas to tame stormwater run-off
- ✓ protecting and revitalising river habitats against flooding
- ✓ integrated water management, water conservation and appropriate land use

- ✓ integrated water management, water conservation and appropriate land use
- ✓ sustainable forest management: continuous cover forestry management

Renewing
the built environment
and heritage

Disaster risk
prevention

Agricultural
and forestry
developments

- ✓ preserving protected indigenous species and their habitats
- ✓ protecting and revitalising river habitats
- ✓ close to nature forestry
- ✓ removal of invasive alien species
- ✓ interventions promoting biodiversity (e.g. insect hotels, nesting sites, wildflower meadows)



- ✓ reducing CO² emissions - e.g. planting native, drought-tolerant tree, shrub and grassland species and increasing their proportion; establishing Miyawaki Forest
- ✓ waste management: increasing the rate of composting
- ✓ noise pollution through green infrastructure



- ✓ the use of natural materials, for example in the construction of information boards, rest area furniture, storage facilities
- ✓ the use of natural materials, for example in the construction of educational trails, cycle paths, water moorings and forest gymnastics tracks



Possible social, soft-type solutions to promote NbS



Awareness-raising, education:
actions, trainings - workshops presenting ecosystem services of Nature-based Solutions to different target groups (e.g. local decision-makers, opinion leaders, public sector workers, NGOs, students)

Institutional capacity building:
organisational development, leadership training, training of project managers



Strategy-making:
development of a participatory regional/municipal/community strategy, guidelines, action plans - in which Nature-based Solutions are prioritised in future developments, etc.

Governance-management model:
developing, adapting, testing and implementing methods and operating mechanisms for the long-term maintenance of Nature-based Solutions



Monitoring model/practice:
developing, adapting, testing and implementing data collection and monitoring methods measuring the environmental, natural, climatic, social and economic effects of Nature-based Solutions

Creation of an information booklet, publication, study, survey, educational film, etc., preferably online/electronic, closely related to the soft-type activity.



03 - HABITAT RESTORATION AND NATURE-BASED SOLUTIONS

PROTECTING BIODIVERSITY AS A STRATEGIC PRIORITY

The [EU 2030 Biodiversity Strategy](#), developed as part of the [European Green Deal](#), is a comprehensive, long-term plan to protect nature and reverse ecosystem degradation. The main objective of the Strategy is to ensure that, with the active involvement of society, Europe's biodiversity is in a recovery phase by 2030, thereby increasing our resilience to the adverse effects of climate change.

The strategy also sets out concrete commitments and actions up to 2030. These include extending the EU's network of marine and terrestrial protected areas (Natura 2000), introducing stricter rules to protect areas of high biodiversity value, and launching an EU nature recovery plan to protect and sustainably manage fragile ecosystems.

The forthcoming [European Union Nature Restoration Law](#), which is currently under consultation, is the first comprehensive legislation of its kind and a key element of the EU 2030 Biodiversity Strategy. This law sets mandatory targets for the restoration of degraded ecosystems - in particular those capable of enhanced carbon sequestration/storage and those capable of preventing or mitigating the effects of natural disasters.

Europe's natural environment is in alarming decline, with more than 80% of habitats now in a state of degradation and neglect. Restoring wetlands, rivers, forests, grasslands, marine ecosystems and the species they support will help both increase biodiversity and limit global warming to 1.5°C. Every euro invested in habitat restoration brings benefits of € 8-38 to the society as a whole.

The United Nations Environment Programme (UNEP) and the [Food and Agriculture Organization \(FAO\)](#) have jointly launched the UN Decade for Ecosystem Restoration 2021-2030, which aims to prevent, halt and reverse the degradation of all ecosystems. In the Strategy, 10 principles and an Action Plan have been defined, which together serve to ensure the effectiveness of the recovery actions. Several organisations have joined the initiative as partners, including [ICLEI](#) and IUCN.

For more information, [click here](#).

DID YOU KNOW?

HABITAT RESTORATION

BIODIVERSITY IN EUROPE

In Europe, it is now accepted that tackling the climate and ecological crises are inextricably linked. Not only is biodiversity beneficial in its own right, but without it, the continent and its society cannot effectively combat climate change.

What is habitat restoration?

Habitat restoration is a process in which professionals deliberately change the characteristics of an area and try to recreate an ecosystem similar to the native one. The simplest form of ecosystem restoration is to restore the original vegetation.

In most cases, the original vegetation is still present, but in a severely reduced state. In such cases, reducing negative impacts can be a solution. In degraded habitats, there are typically only traces of the original habitat. The habitat can then be rehabilitated, but only if the environmental conditions are re-established. Where rehabilitation is no longer an option, the creation of a semi-natural habitat may still be an alternative. In the case of wetlands, reconstructing the original hydrological conditions can produce spectacular results.

What is an ecosystem?



There are several accepted definitions of ecosystems. An ecosystem is a complex and dynamic set of plants, animals, micro-organisms and the natural environment that coexist together and whose parts are interdependent. An ecosystem is a set of living organisms that are interconnected with each other depending on the physical environment from which they have evolved. The characteristics of each ecosystem determine the type of life that develops in each environment. For example, we can talk about marine or freshwater ecosystems, or even forest ecosystems, or other types depending on the environment in which they were formed.

DEFINITIONS

BEST PRACTICES



Potential use of NbS in forest management - Continuous cover forest management

A shift to continuous cover forest management is a nature-based solution that is to be welcomed from the point of view of carbon sequestration and ecosystem services. At its essence, this is selection cutting. In this process, the wood is not harvested in one continuous cutting area at a time, but in small patches, called gaps. In these areas, the regeneration of the forest can be partly natural, as the age composition of the trees will be mixed and the structure of the forest will be varied. A major disadvantage of traditional cutting is the loss of wildlife, as the forest climate and water cycle in the cutting area disappear - and it is not aesthetically pleasing either.

However, applying the nature-based solution not only ensures continuous forest cover, but also continuous income, because forests do not produce a large, one-time income every 80 or 120 years, but steadily. Continuous cover forest management, with its emphasis on both nature conservation and climate adaptation, is also on the rise in Hungary. While in 2005, 98% of the domestic forest area was managed in the so-called rotational cutting system (i.e. the area of forest of similar age trees that was ripe for cutting was cut down permanently in each cycle), the share of continuous cover forest management has increased to almost 10% in 2021 (currently 14-15% in Central Europe).

River revitalisation by removing dams

[Dam Removal Europe](#) aims to restore European rivers of great natural or cultural importance by removing dams. The UK has around 50-60,000 dams, weirs and culverts, including industrial, agricultural and flood defence structures. There are another 1.2 million dams across Europe. Many of them are no longer functional, fragmented and redundant, yet they remain in place - blocking the free migration of fish and other organisms, severely disrupting natural sediment movement and in places even increasing the risk of flooding. Removing these barriers has been shown to improve river function, water quality, system ecology and habitat connectivity, while also boosting water tourism and recreation. Thanks to the activities of Dam Removal Europe (running an information website, building a professional network, organising conferences), 239 dams were removed in 2021 in 17 European countries.

Bird habitat restoration with water conservation

In 2022, in Csongrád-Csanád county (HU), in the “[Baksi-puszta](#)”, interventions were carried out to build sluices, reinforce embankments and eliminate canals with EU (LIFE) funding with the aim of water conservation and management. A part of the “Baksi-puszta” is a wetland of international importance under the Ramsar Convention and a very important stopover for migratory birds. By controlling sluices, 100 hectares have been flooded, which has multiplied the bird movement in the area - with graylag goose, greater white-fronted goose, mallard, Eurasian teal and Northern lapwing arriving in abundance. In spring, it is mainly shorebirds - mainly godwits and sandpipers - while in autumn, beangoose and common cranes form large flocks. It is also important as a nesting and feeding site, with regular visitors including the black-winged stilt, pied avocet, black-tailed godwit and ferruginous duck. The area is characterised by well-preserved saline and loess grasslands, as well as small areas of saline marshes, reed beds and sparse groves of trees. Water conservation is important for the efficient functioning of the salt accumulation processes that maintain the saline character of the lakes, as well as for the flora and fauna of the surrounding areas.

Ecological restoration of Lake Vlascuta and Lake Pochina

The project aimed to improve the conservation status of waterbird species in the Lower Prut floodplain (Galati County, Romania) through a series of strategic interventions, including scientific inventories, monitoring activities, site restoration, awareness raising, implementation of the park management plan and the designation of four Special Protection Areas (SPAs) - Natura 2000 sites in Romania. In addition to the increase in biodiversity, the project has had a significant impact on the increase of groundwater levels in the area and the water quality of the lakes.

Read more about Lake Vlascuta [here](#) and Lake Pochina [here](#).



04 - NATURE-BASED SOLUTIONS IN TOWNS AND CITIES

Although they occupy only 2-3% of the Earth's land area, towns and cities are home to the growing majority of humanity, making their role a priority. Rapid urbanisation is putting increasing pressure on the ecosystem, but it also holds the promise of renewal - an opportunity to rethink the built environment. NBS can help towns and cities to realise this potential.

DID YOU KNOW?

Today, nearly 4.46 billion people, 57% of the world's population, live in towns and cities. By 2050, this figure could reach 68%, 6.7 billion people - **more than two-thirds of the population**. For many, urban nature is the only form of nature that can be directly experienced.

Towns and cities consume the largest share of the Earth's resources (75%), while they also produce three quarters of greenhouse gas emissions and half of global waste. At the same time, **towns and cities are the drivers of the world economy** - producing 80% of global GDP. They have the potential to drive the transition to a sustainable future with the gold reserves of their political, financial and social capital.

Many examples from around the world show that Nature-based Solutions can cost-effectively increase the sustainability, resilience and liveability of cities. Trees absorb pollutants, reduce noise and cool the air; rain gardens reduce the risk of flooding; green spaces promote recreation through physical and mental refreshment, sports and other community activities; and greenways support active tourism.

Towns and cities face many challenges as a result of climate change. This process is exacerbated by biodiversity loss and social inequalities. Cities around the world are taking the lead in implementing NBS, partly out of necessity, but also increasingly in recognition of their potential. There are many positive examples of the development of local policies and implementation frameworks that can have a systemic and far-reaching impact.

DID YOU KNOW?

Urban wildflower meadows are designated urban green spaces where nature is at work: instead of the usual 6-7 times, they are mown only once or twice, providing space for the various wildflowers that emerge and provide food for the large community of pollinators. There is an urgent need for a shift in attitude towards grassland: in the current climate of our region, a nice green English lawn is an ideal that is unrealistic and extremely wasteful to achieve. Taller grass retains dew and water much longer, is less prone to drought and does not necessarily require watering. The number of plant species in the urban public spaces created under the Wildflower Budapest programme has increased 2-4 times in 1 year.

REDUCING THE URBAN HEAT ISLAND EFFECT WITH URBAN GREEN SPACES

In order to select the most appropriate solution(s) for reducing the heat island effect, it is recommended that a heat map - or even a full-scale climate analysis if necessary - is carried out as a first step, which clearly shows where intervention is most needed.

An excellent way to reduce the heat island effect is to break up surfaces covered with different materials (asphalt, concrete, etc.) and partially replace them with natural materials; and to increase green areas, either in residential areas, along roads or in a continuous way in the form of afforestation. Other best practices include for example covering the noise barriers with vegetation, pergola-covered pedestrian areas, green street furniture and bus stops, community gardens, or so-called [pocket parks](#), which can be created by connecting the yards of neighbouring houses to form [refreshing urban oases](#). The small trees planted on the roofs of the underground car parks also help to keep the city cool.



Stone-breaking campaign as part of the implementation of the Urban Green Strategy - Aerial view of Nijmegen in 2020 (left) and a view of Nijmegen in the future (right).

Temperature reduction in buildings can be achieved through the installation of [green roofs](#), but also through the installation of green facades and the greening of balconies. Greening can be achieved with plant species planted in the ground or in a planter, with support panels and container elements fixed to the façade or in front of the façade, with vertical root zone systems or with integrated modular structures. "Small forests" created on balconies can significantly reduce the temperature of the home and the immediate living environment, as well as filtering air from pollutants. The use of green roofs also reduces the energy consumption of the building. The roof can even be used for [food production](#), as in Milan.

Green roofs are more expensive to build, but they can provide a range of community benefits: they reduce the energy consumption of the building, but can also clean and retain rainwater and sequester CO². Last but not least, it also brings the potential for new community and recreational spaces. Overall, green surfaces have a noticeable [cooling effect on a building and its surroundings](#) through evaporation, shading and air movement from chimneys.

Throughout Europe, green roofs have been installed in a number of cases, such as complex renovations of industrial plants, commercial buildings (shopping centres) or public buildings (cultural, social, educational, etc.), and are often a requirement for new construction

In Turin, [a tree-covered residential building](#) was inaugurated in 2012 as one of the flagships of this approach. The municipality has granted a 20% tax reduction to the investor.



Kitchen and herb garden on the roof of a house in Milan (left), and the view plan of residential building "25 verde" in Turin (right)
©Piuarch, The Gardens of Eden & lineeverdi.com

WATER CONSERVATION - OR URBAN RAIN REALLY IS WORTH ITS WEIGHT IN GOLD

There is either too much or too little water in our area. For example, in the extremely dry summer of 2022, city dwellers faced water shortages. This requires a change in attitude towards the wasteful use of water. To save water, experts have developed the sponge city concept. Whole city blocks are already being built to act as sponges, holding water or delaying run-off - protecting the capacity of the city's sewage system, which is not designed for flash floods

Green roofs on the buildings, with rain gardens and soakaways in between, capture the water, water tanks and cisterns catch the excess, and the pavement allows a significant amount of water to pass through. In this way, several cubic metres of water can be stored, and it is also possible to irrigate the planted vegetation and to operate an aquaponic system.

In countries where legislation does not regulate rainwater storage centrally, municipalities can regulate water saving locally - especially for newly built facilities.

Water-permeable paving surfaces are also spreading. They can be made of porous material that allows rainwater/snow to percolate through the pavement, or non-porous blocks that allow water to flow through the gaps and into the soil. Surface rainwater thus less affects the sewer system and it is recycled into the soil. In addition to reducing runoff, water-permeable pavement systems can also trap suspended solids, filtering pollutants from rainwater.

These solutions, like conventional technologies, can be used for roads, car parks and pedestrian walkways. Today, there are water-permeable concrete, asphalt, and compacted materials that can provide natural moisture absorption between paving stones or by the creation of zones around trees. Another benefit of permeable pavements is that they can significantly reduce the need for road salt by up to three quarters, and can reduce construction costs in residential and commercial developments by reducing the need for traditional drainage elements. Last but not least, this technology is also useful in reducing the urban heat island effect, as the water preserved in the soil cools its surroundings through evaporation.

Construction of rain gardens

A [rain garden](#) is a shallow natural depression planted with deep-rooted native flowers, shrubs and grasses. Its purpose is to collect and retain rainwater from drains, driveways and sidewalks, allowing the water to slowly evaporate and infiltrate back into the ground. Rain gardens can reduce rainwater run-off by 75-80% after a heavy rainfall event.

In Somerset in the UK, for example, almost every house has a rain garden as residents have realised that it is much more cost-effective than traditional drainage. Rain gardens also attract birds, butterflies, bees and other wildlife. Rain gardens can play a role not only in private gardens, but also as an integral part of urban drainage - in particular, they can capture excess water from flash floods, thus relieving the drainage system.



Rain Garden in Kecskemét ©FARKAS BARTA Kata

DID YOU
KNOW?

A unique and important feature of rain gardens is that they effectively remove up to 90% of chemicals and up to 80% of sediment from rainwater. Compared to a traditional lawn, a rain garden can return up to 30% more water to the soil. Because they drain out the collected water within 12 to 48 hours, mosquitoes cannot breed and they do not silt up because the ecosystem prevents it.



Rain Garden in Zalakaros ©CSUKA Veronika

What is Miyawaki Forest



Named after the Japanese ecologist Akira Miyawaki, the method can restore native flora to self-sustainability in up to 20-30 years - as opposed to centuries of natural regeneration. In order to establish a Miyawaki Mini Forest, even 10-20 m² is enough, but it must receive at least 8 hours of direct sunlight during the day. As many native shrubs and trees as possible are planted in the selected urban or suburban areas. Seedlings tend to move towards the sunlight, so there is competition between them and they grow at a much faster rate.

By greening urban spaces, providing shade and reducing air pollution, mini-forests can be a useful tool in the fight against the ecological crisis and climate change, but they also help insect and bird populations and have aesthetic value.

DEFINITIONS



Miyawaki forest planting in Tabán ©Fökert/Facebook

DID YOU KNOW?

A 50-year-old tree with a large canopy produces 50 kg of oxygen per year. This is enough to meet the annual oxygen requirements of one person. In addition, a similar tree processes 68.75 kg of carbon dioxide in one growing cycle. By contrast, an average car uses the annual oxygen needs of two people over 1000 km. In Lisbon, it was found that the money spent on urban trees has returned 4.5 times more - in terms of the economic benefits they bring, such as energy savings from shading and improved air quality.



PEACEFUL COEXISTENCE OF URBAN UTILITIES AND GREEN SPACES

An important element of the identification of a potential urban development action area is the accurate mapping of the city's existing green spaces, especially trees, and the types and location of the existing utility network. This will allow the identification of sites that can still be planted, the planning of appropriate vegetation planting and, last but not least, [the coordination of utilities and green infrastructure](#) planning. While the installation and maintenance of public utilities is clearly defined in the legislation, the same does not apply to green infrastructure: for example, there is usually no mandatory protection distance for tree lines.

URBAN SMOG REDUCTION THROUGH GREEN AND WIND CORRIDORS

Urban green and/or wind corridors also reduce temperatures and improve urban air quality through ventilation. The survival of wind corridors is threatened by the infrastructural development of large cities and the rapid growth of housing developments (e.g. multi-storey apartment blocks and office buildings), which are not (or not yet) restricted by local regulations, typically for economic reasons. The recovery of already closed urban wind corridors can be achieved through a major transformation of the existing built environment, which is radical and costly.

In the future, a town or city municipality can operate by implementing settlement planning that focuses completely on green transition and sustainability aspects, by planning, reviewing and correcting the relevant regulatory environment, and at the same time by introducing attractive incentives. In the short to medium term, a more successful objective could be to strengthen urban green corridors: this could be done by increasing existing green spaces, linking them to parks and cemeteries; but also urban waterbanks, the surroundings of railway lines, etc., offer a range of useful potential.



Green corridors in Lisbon

BEST PRACTICES



Community garden in Iași

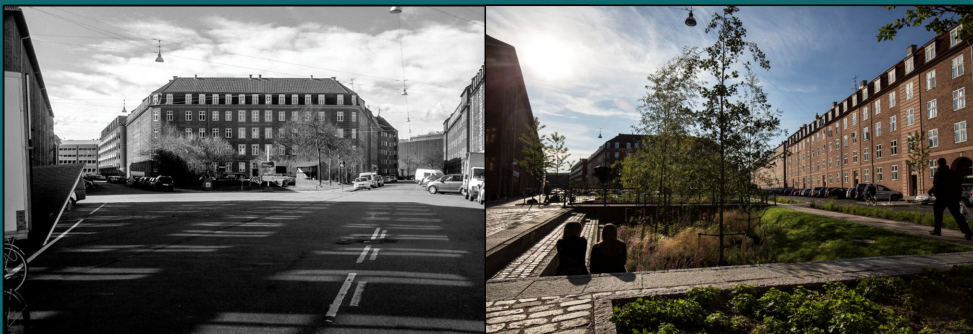
A nature-based solution is the community garden, which aims to provide a green oasis for the people of Iași, but also has an awareness-raising role. The garden is mainly run by volunteers who help with the food growing process and also gain practical skills and knowledge about healthy living. This garden can provide shelter and relaxation from the stresses of city life, while also providing a sense of local community cohesion. To read more about the community garden in Romania, [click here](#).

Rainwater capture and storage in Dublin

A good solution for storing rainwater at a lower cost and volume is, for example, to distribute boxes to the public that can hold rainwater and continue to function as flower boxes placed right in front of the sewer outfall - as in Dublin. You can find out more about this initiative [here](#) and [here](#).

Urban rain garden

A good example of an urban rain garden is Tåsinge Square in the centre of Copenhagen, where a [rain garden has been built on a previously car- and asphalt-dominated area](#) to capture rainfall from the surrounding rooftops and pavement - providing recreation for residents and increasing the liveability of the city. It is also important to point out that while most sponge city concepts are applied in new neighbourhoods, this solution is applied in the existing building stocks.

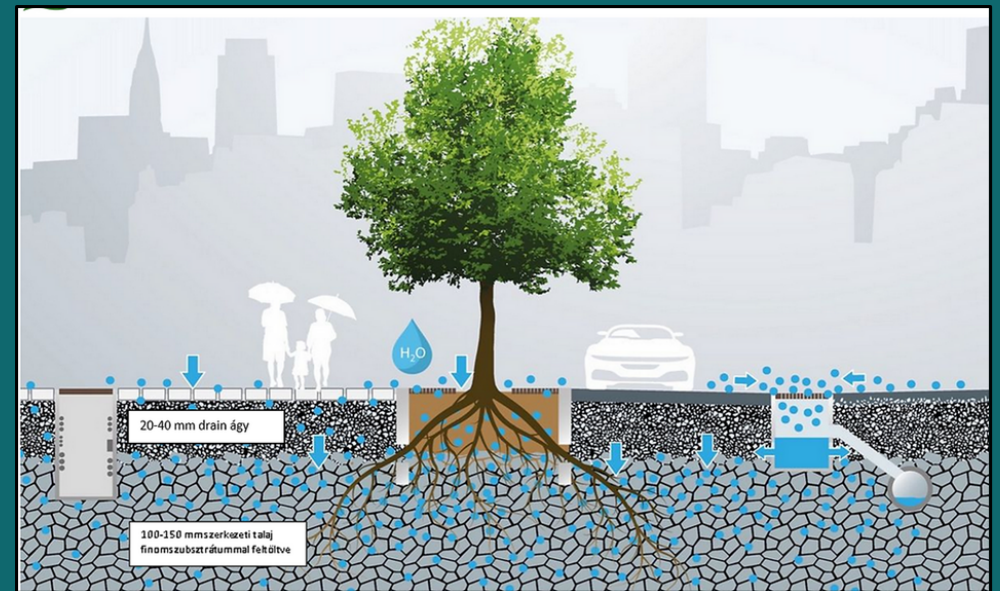


The former image of the square (left) and Tåsinge Square today with the rain garden (right)
©State of Green & International Water Association

The Stockholm Tree Planting Scheme

The optimal technology from a horticultural point of view is the Stockholm Tree Planting Scheme. In the Swedish solution, all paved surfaces (except roads) are designed with open pores. All surface water can penetrate into the root zone of trees, where it can be stored. All utility lines for inspection and maintenance are accessible via an accessible utility tunnel. Each tree is given at least 30 m³ of space for its roots. As a result, each tree can store around 5 000 litres of water per year. This allows the trees to grow healthier and reach their natural age. To read more about The Stockholm Tree Planting Scheme, [click here](#).

The Municipality of Budapest protects the trees by declaring them [a public utility](#).



Stockholm Tree Planting Scheme ©agrofutura.hu

Creation of protective forest belt in Timisoara

Lowland towns and cities are exposed to winds, dust from drought in the city - and the effects of climate change are not sparing them. In response to this, 23 hectares of woodland have been planted along the outskirts of Timisoara, protecting the city from these factors and providing new green spaces for the city and its surrounding area. Among others, ash, linden, elm and maple trees make up the protective forest belt, which is planned to be further enlarged.

Green corridor system in Lisbon

Thanks to the planting of trees, which started 10 years ago, Lisbon has now successfully [connected green corridors](#), increasing the proportion of urban green spaces by 19%. The scale of the green corridors has been defined to ensure that they are linked to Lisbon's urban area as far as possible, and that the most ecologically sensitive areas can develop. This not only increased the natural values, but also reduced the urban heat island effect. The nature-based elements of Lisbon's urban development plans and strategies complement each other well, reinforcing synergies. The city was awarded the title of European Green Capital in 2020.

From a rust belt to a linear park

New green spaces are being created on the site of a former railway corridor in Tallinn. The linear park, called "Insect Field" because of the diverse pollinator community found there, will be 13.5 km long and will connect different parts of the city, settlements and green spaces with Tallinn's Old Town. The planned development will provide a pleasant recreational area for pedestrians and cyclists, as well as an ecologically coherent green corridor for pollinators. Read more about other projects being implemented at local level [here](#).

Complete renewal of an avenue with green and recreational complex development

In Barcelona, [a green corridor has been created](#) along both sides of a 50-metre wide avenue (Passeig de Sant Joan). On one side, a large pedestrian walkway has been created, while on the other, new trees have been planted - while also preserving the already existing 100-year-old tree line. The complex development, conservation, redesign and extension of the green space involved the following actions: increase of the width of the pavement from 12.5 m to 17 m; creation of a separate 4-metre-wide two-way cycle lane along the axis of the road; reduction of the number of traffic lanes; and provision of water-permeable layers.



A renovated part of Pg. de St. Joan in Barcelona ©Adrià Goula/Landezine



Community garden on the roof of the apartment building in Milan ©Piuarch, The Gardens of Eden

05 - THE ROLE OF NATURE-BASED SOLUTIONS IN PREVENTING NATURAL DISASTERS

DID YOU KNOW?

90% of [natural disasters](#) are caused by weather-related events. Over the past 50 years, the number of natural disasters worldwide has increased fivefold. In 2020, for example, more than 50 million people were affected by a natural disaster.

Climate change increases the likelihood, frequency and magnitude of natural disasters such as heat waves, droughts and floods, and poses increased risks to society. Nature-based Solutions help to prevent natural disasters and mitigate their effects when they occur.

A good example is when dams and embankments are removed in order to return rivers to their floodplains, reducing the risk of flooding. It is also clear that a hillside covered with vegetation, especially forest, slows down run-off, thus reducing the chance of landslides. The richer and more diverse vegetation not only sequesters carbon dioxide, but also promotes rainfall through evaporation, reducing the severity of droughts.

DID YOU KNOW?

In most of Hungary, more water evaporates than precipitation falls. The historic drought in the summer of 2022 caused very significant material damage, amounting to thousands of billions of euros. According to researchers, our country will turn into a forest steppe if we don't do something about the reduction of soil moisture levels and the decline in groundwater levels.

Overall, therefore, natural and Nature-based Solutions (complemented even by conventional engineering measures) are cost-effective and [reduce the risk and impact of disasters](#). Nature-based Solutions also create local employment and economic opportunities, reducing the need to import technical expertise and labour.

BEST PRACTICES



Forest management

Switzerland invests 150 million Swiss francs a year in forest management, as it is 5-10 times cheaper than the cost of technical solutions designed to reduce the risks of landslides, rockfalls and avalanches.

Log dams against flash floods

The village of Püspökszilágy (Pest County, Western Cserhát) used to experience flash floods at least once a year, causing an average of tens of millions of forints in damage per event. Instead of force-majeure subsidies and drainage, the municipality, thinking in terms of [slowing down runoff and retaining water](#), built so-called “seeping log dams” and a side reservoir. The simple solution has eliminated damage and created a wetland habitat, which has also stabilised groundwater levels in the vicinity of the settlement.

River bank restoration

Along the Dutch-Belgian border, 45 km of the [Meuse river bed and bank](#) have been restored. As a result, flood defences are more successful than in the past, when it was difficult to defend against floods on a river that was dammed. Not only has the intervention reduced the risk of disaster, but it has also significantly increased biodiversity and the number of tourists visiting the area.

Planting vegetation

In France, in the Southern Alps, heavy summer rains cause serious damage to settlements located at the foot of the mountains, so over the last 20 years more than 2,000 protective walls made of bushes have been installed to successfully trap sediment accumulated during the rain, and encourage vegetation to grow.

Floodplain restoration

Along the Vistula in Poland, floodplains have been returned to the river in several places, reducing flood damage and increasing biodiversity and the quality of soils and groundwater bodies. You can find more information and relevant best practices [here](#).



06 - NATURE-BASED SOLUTIONS IN AGRICULTURE

In addition to the ecological benefits, Nature-based Solutions can also help sustain and develop agriculture. Today, a large part of the world's population is in a favourable situation concerning food, but we are paying a high price for it: agriculture is now a major contributor to soil and ecosystem degradation, water depletion and biodiversity loss.

At the same time, the global population is predicted to continuously grow in the upcoming decades, so we will need more and more food, while soil moisture is decreasing in large areas of arable land, soil erosion is increasing and soil quality is rapidly deteriorating. One of the main explanatory factors behind the negative trend is the formation of a dense, low-permeability layer 20-30 cm below the surface called 'plow pen', which is the result of large-scale farming, and it prevents water from seeping into the ground.

Furthermore, deep plowing significantly destroys the rich biodiversity and humus in the soil, and carbon dioxide is released into the atmosphere from the disturbed soil. [Radical changes in farming practices](#) could provide solutions to the major problems agriculture faces, such as drought, inland water and soil nutrient depletion. Regenerative agriculture also has a huge climate impact and does little or no soil disturbance, while using continuous soil cover (with cover crops or mulching) to reduce evaporation losses - contributing to water conservation this way.

There is a common denominator between the preservation of soil quality and the improvement of the food situation, and that is sustainable agriculture using Nature-based Solutions.

Soil is one of the most complex ecosystems, containing billions of microorganisms (bacteria, fungi, algae and protozoa) in every gram. Soil erosion is one of the most serious ecological crises, and one that is still relatively under-reported. According to the FAO, more than 25% of arable land worldwide is degraded. As a result of population growth, the ecological footprint of agriculture is also expected to increase.

The latest report from the Intergovernmental Panel on Climate Change (IPCC) predicts that droughts, heat and water scarcity will make production impossible on a third of the world's arable land by the end of the century. Soil moisture in nearly 50% of European farmland has declined substantially in recent decades, but soil erosion and soil quality have also deteriorated dramatically. Some experts say we are now in the last moment.

DID YOU KNOW?



Soil erosion on sandy soil @magro.hu

It is estimated that there are roughly 300,000 hectares of arable land in Hungary where economically significant results can only be achieved at the cost of environmental damage, using significant amounts of synthetic nutrient.

The conditions for using the funding available under the EU's Common Agricultural Policy are set out in the [CAP Strategic Plan 2023-2027](#), which takes a major step forward in promoting sustainable agricultural practices. Recognising, among other things, the important role that edges, field protecting forest strips, wooded/shrub strips, uncultivated riparian strips of watercourses, marshy-, waterlogged-, tussocky-, and intermittently water-covered areas play in protecting soils, improving water balance, maintaining the local microclimate and preserving biodiversity, farmers also become eligible for agricultural subsidies even for these above-mentioned areas that are not actively used for production. In addition, the [Agro-ecological Programme](#) has been launched, under which farmers who adopt best agricultural practices that contribute to the preservation of the environment and nature, such as mulching, crop diversification, pollinator control, no-tillage, etc., can access additional funds.

BEST PRACTICES



In the Sand Ridge of the Danube-Tisza Interfluve, one of the most drought-affected areas in Hungary, the staff of the "Dongér-Kelőér" Water Association used easily installed and removable plank dams at the inland drainage channels [to retain excess water](#) and channel it to the deeper floodplains. After the installation, a higher water level was also measured under the meadow, which is located almost 1 km from the canal. In another action, members of the association flooded a low-lying area for three weeks and then measured the change in green mass of the grassland located at higher level. After the procedure, they were able to mow 8 times the amount of green mass they had before the water conservation, and they calculated that the water generated a profit of nearly 120 thousand forints per hectare.

In Rákócziújfalu, in the Central Tisza Region, water surpluses are being retained after [the local dam system was rebuilt](#) to meet growing water demand. A deeper area has been created next to the canal, into which the excess water from the canal can be diverted. Crop yields in the surrounding areas have increased, most likely due to the increased groundwater levels resulting from the intervention.



The reservoir lake in Rákócziújfalu @LIFE-MICACC project website

07 - COMMUNITY PARTICIPATION, AWARENESS RAISING AND CAPACITY BUILDING IN RELATION TO NATURE-BASED SOLUTIONS

As an effective awareness-raising tool, we recommend to project planners some participatory planning methods based on community involvement, which are also applicable to the NbS theme area. Both simple, more familiar and more complex methods are briefly presented with examples - and some related international good practices to illustrate them.

FOR IDEA GENERATION AND/OR SITUATION ANALYSIS

The simpler methods already widely known and used, which can be applied in parallel - e.g. SWOT analysis, questionnaire survey, interview, focus group - can also be used for NbS projects.

However, there are more complex, highly effective methods that may be particularly suitable for participatory planning of NbS developments and are therefore highly recommended:

- **Hangulattábla (Moodboard):** the end result is a visual collage of ideas (images, texts, materials) that helps to collect and shape the emotions and moods of the participants around a given theme.
- **World Café:** a participatory process that can collect opinions from a very wide range of participants (up to 20-100 people) in a time-efficient and structured way. It can be used to create an open and close relationship between participants in connection with the evaluation of a topic - in rotation like a revolving stage. The combination of the ideas presented helps the participants to see and understand a given topic from a number of different perspectives, with the help of each other. Here the focus is not specifically on solving problems, but on elaborating, exploring and sharing innovative ideas on specific topics. The name café refers to the creation of an inviting, welcoming, relaxed environment. The maximum recommended duration is 3 hours. Its great advantage is that it can be successfully applied at any stage of a decision-making/development process, on any topic and in any sector. It is also about the ability to reconcile different points of view in a short period of time in heterogeneous groups that are united by a common theme.
- **Open-air workshop:** any urban green space can be (re)interpreted as a community meeting point and a place for brainstorming. An open-air green space encourages community use of public spaces, while suggesting solutions to related problems.

- **Idea fair:** a simple, practical and democratic method, which can be linked to any idea generation or situation analysis method, where the collected suggestions are put into a common list - or into a basket item by item, where each participant can express his or her opinion by an individual vote. One playful way to do this, for example, is to give everyone 50 coins (or discs) to distribute as they wish between the different theme baskets. With your vote, everyone can have an equal say in the final prioritisation of ideas - with a common, consensus solution.

RAISING AWARENESS AND MOTIVATION

- **Deactivating opinion leaders who always take the opposing view:** in the case of predictable, opposing opinions, it is recommended that comments are moderated and predefined in time - i.e. all commenters can use the same limited time period in total. Speakers who are likely to oppose may be invited in advance as critics, opponents (invited commenters) and/or in addition to their negative opinion, to formulate a concrete proposal for a solution, or to indicate how they can participate in it.
 - **Minority group empowerment:** a moderator/chairman from an under-represented group at a meeting or gathering can help to create balance and enhance the socio-community sensitisation of participants.
 - **Strengthening intergenerational links:** organising regular occasions for intergenerational dialogue facilitates practical, active cooperation, sharing skills and identifying common ideas.
 - **Social events, competitions:** a market, a picnic, a family day and a competition (e.g. a quiz or a drawing competition) could be organised to attract a targeted audience, e.g. a wider group of the population concerned, and could include actions, forums, surveys related to NbS.
 - **Placemaking:** method that encourages people to collectively rethink and reinvent the public spaces they use, which form the heart of their town/neighbourhood. The joint planning activity makes use of the creative resources of the local community and at the same time strengthens the cooperation processes. Using this method, particular attention is usually paid to the physical, cultural and social identities that define a place and whose development improves people's health, happiness and well-being.
- **Community Consultative Assembly:** this method is well-suited to issues that affect many people and require compromises and long-term solutions (e.g. the fight against climate change). A community assembly is a direct representative forum where:
 - a randomly selected representative group of local citizens,
 - in a consultation process independent of the decision-maker, with the involvement of experts,
 - after acquiring direct information and (professional) knowledge, form a common opinion on a pre-defined topic (e.g. increasing urban green spaces or waste management) through discussion and joint reflection,
 - which is integrated into the municipal/government decision-making processes
 - and to which the decision-maker responds publicly.

Community assembly is a longer process that allows for genuine dialogue, the integration of different opinions and a sense of shared decision-making in the local community.

- **Participatory budgeting:** members of a given community can directly influence how it spends part of its budget (e.g. social organisation or a local municipality). Members of the community concerned can submit development ideas on a specific topic, for example, according to pre-defined conditions and a timetable. The ideas that are submitted typically go through a multi-stage filtering and development process, where local experts and volunteer residents/members form a mixed working group to examine the content and feasibility of the ideas and then estimate the cost. Similar ideas are merged, unified and a list of proposed ideas is compiled on a voting sheet/online platform. The citizens/members concerned can prioritise them and ultimately vote on their implementation and their order.

AWARENESS RAISING, CAPACITY BUILDING AS HORIZONTAL ACTIVITIES

Climate change adaptation activities often appear horizontally in projects. It is worth integrating climate change awareness-raising activities into different training, education and information days, depending on the target groups.

Proposed awareness-raising training and information activities

- **Capacity building for the urban public sector** - training for managers, middle managers and civil servants, focusing on the key linkages between sectoral decisions and climate change
- **To raise public awareness** of the causes, the risks and the ways to combat climate change, including the health aspects. The organisation of events and campaigns are proposed (e.g. climate month, climate change competitions for kindergarten/school children) or the integration of climate change into regular events (e.g. health check-ups, car-free day)
- **Consulting and training** for public building designers and maintainers, property developers, apartment buildings on climate change risks and how to manage them - including Nature-based Solutions, biodiversity conservation/enhancement, energy efficiency.

BEST PRACTICES



Community Consultative Assembly

In Cambridge, the [Climate Assembly UK](#), led by the Sortition Foundation, brought together representatives of all shades of opinion to discuss how the United Kingdom could achieve net zero greenhouse gas emissions by 2050. Over 100 volunteers representing the population of the United Kingdom met over four weekends at the community meeting.

In France, the [Citizens' Convention on Climate](#) (Convention Citoyenne pour le Climat) aims to give citizens a voice to speed up the fight against climate change. Their task is to identify measures that will reduce greenhouse gas emissions by 40% by the year 2030. The 150 members of the independent and impartial Convention, selected by lot and representing the diversity of society, were involved in the preparation of the relevant legislation. The President of the Republic has committed to submit the Convention's regulatory proposals to an unfiltered referendum, parliamentary vote or direct implementation. The meetings are open to the public and are broadcast online at [this](#) website.

Public debate on air quality

In Lille (FR), the widest possible active involvement of local society was sought in the development and implementation of a new Local Action Plan to improve urban air quality and well-being. Initially, an online consultation was launched, where residents could suggest measures to improve air quality. The 329 suggestions submitted were first discussed by a team of experts and then discussed by a panel of 52 local residents, who drafted a manifesto. The manifesto of the citizens' panel, which consisted of 48 proposals, resulted in 112 actions on 6 themes. The document was finally presented to the city's elected representatives, where the Mayor of Lille announced his commitment to implementing the proposals.

Tallinn - European Green Capital 2023 - mutually reinforcing best practices

The city involves citizens in the preparation of strategy documents through various media (city website, local newspapers, etc.) and through brainstorming. In 2020, awareness-raising on the links between climate change and biodiversity (pollinators, invasive species) was held. The environmental awareness and attitudes of the population are assessed using data from the Environmental Awareness Survey. It shows that 83% of city residents are satisfied with the state of green spaces and parks in Tallinn.

The Green Yard programme finances the landscaping (lawns, planting) and maintenance of residential areas and yards. Between 2013 and 2019, the city's budget was used to clean up the environment of 661 homes.

"Let's Do It" community clean-ups are municipal measures that provide grants to residential communities for on-site rainwater management, green spaces, playgrounds, sports fields, litter bins and parking areas in common yards, among other things. Over the past ten years, nearly €7.5 million has been allocated from the city's budget to clean up the yards of 1015 housing associations and improve their liveability.

Community workshops are regularly organised in the protected and green areas, which involve a walk together with the city's residents. A total of 6 700 people took part in the 113 walks in 2019.

A children's and youth flower festival is being organised, with two of the four main streets being made greener together with schoolchildren. The programme explained to them the importance of urban greening. So far, 1200 students from 30 schools have learned how to plant perennial flowers and roses, and a total of 7 700 m² of flower beds have been planted.

To better involve residents, the Tallinn City Planning Authority has started to use web-based and map-based Idea Collection Platforms (AvaLinn). For the first time in North Tallinn, residents could directly mark problem areas on a map and make suggestions for improving their neighbourhood. Urban planners have analysed the received proposals and re-consulted with residents on the most controversial sites. A total of seven brainstorming sessions on park reconstruction and street redesign were held. The aim of the consultation is to reach a social agreement on how to organise a public space.

You can find more details and examples of successful community participation and engagement on [this](#) website.



08 - SUCCESS CRITERIA FOR THE USE OF NATURE-BASED SOLUTIONS

To summarise the main message of the previous chapters: the use of NbS is a clever way of working with nature, based on a combination of five key factors

- **Maintaining biodiversity:** preserving, restoring and enhancing habitat diversity.
- **Achieving climate adaptation and mitigation:** reducing the release and sequestration of greenhouse gases that cause climate change, mitigating the negative impacts of climate change, reducing dependence on fossil fuels and their emissions.
- **Providing social and economic benefits:** supporting livelihoods, creating jobs, contributing to recreation, health - improving the quality of life and well-being of society and individuals.
- **Achieving cost-effectiveness:** generating income and savings in the long term, and making expenditure economical.
- **Participatory planning:** involving different local groups/communities, learning from each other, sharing local best practices widely. In practice, this means that the needs and values expressed at the local-community level must be taken into account from the very beginning, but also that different, critical opinions must be dealt with.

Some practical examples of when an intervention cannot be considered as a Nature-based Solution:

- Afforestation with simultaneous planting of the same tree species, where biodiversity and climate adaptation criteria are not met, cannot be considered NbS.
- Covering a concrete structure with grass is not NbS, nor is planting flowers on the edge of a concrete drainage ditch.
- Likewise, landscape interventions that are purely aesthetic and/or recreational, costly and not climate-friendly (such as decorative gardens, lawns with high water and maintenance requirements, planting non-native and non-drought-tolerant trees and shrubs in urban public spaces, etc.) will not be successful NbS.

MAIN STEPS IN THE NBS PLANNING AND IMPLEMENTATION PROCESS

The planning of Nature-based Solutions is proposed in six main steps, which need to be coordinated in a synchronised way. If necessary, it is worth going back to an earlier step and replanning the process.

01 INITIAL COORDINATION

- a) Harmonising the different expectations related to the objectives
- b) Initial agreement on what counts as a successful project and how to measure success in the future

02 PROBLEM IDENTIFICATION

- a) Identify and define environmental and climate problems
- b) Data collection (also key for maintenance and monitoring!)
- c) Identify NbS that meet the objectives

03 STAKEHOLDER INVOLVEMENT

- a) It is important to identify and involve stakeholders at an early stage of the project, and to ensure that the project plan is understood and agreed by all stakeholders
- b) Preparation of a communication plan

04 PLANNING WITH STAKEHOLDERS

- a) Turning basic ideas into action plans, modifying initial plans as necessary
- b) Identification of funding sources (mix of sources is proposed e.g. combination of municipal budget, public funds, EU funds)
- c) Economic planning - financial and social cost-benefit analysis

05 IMPLEMENTATION

a) The involvement of stakeholders and/or relevant parties and proper coordination of cross-sectoral cooperation are crucial

b) Demonstrate support and flexibility throughout the duration of the project to overcome any imbalances or differences of opinion that may arise between stakeholders/relevant parties

06 OPERATION, MAINTENANCE AND MONITORING

a) The roles of operation and maintenance and their financing should be defined at the planning stage

b) Ongoing cooperation with stakeholders is needed. This should include mutual support and assistance

c) Monitoring should be built into the planning process in advance, as monitoring is needed throughout the process, at every step

INTERNATIONAL STANDARDISATION OF THE PROFESSIONAL PRINCIPLES OF NBS

Nature-based Solutions can also be seen as a framework for ecosystem services, aiming to provide an integrated response to an important societal challenge. According to IUCN, the followings are currently considered major societal challenges:

- mitigating or adapting to climate change,
- reducing the occurrence of natural disasters,
- reversing ecosystem degradation and biodiversity loss,
- the state of human health,
- socio-economic development,
- and water and food security.

DID YOU KNOW?

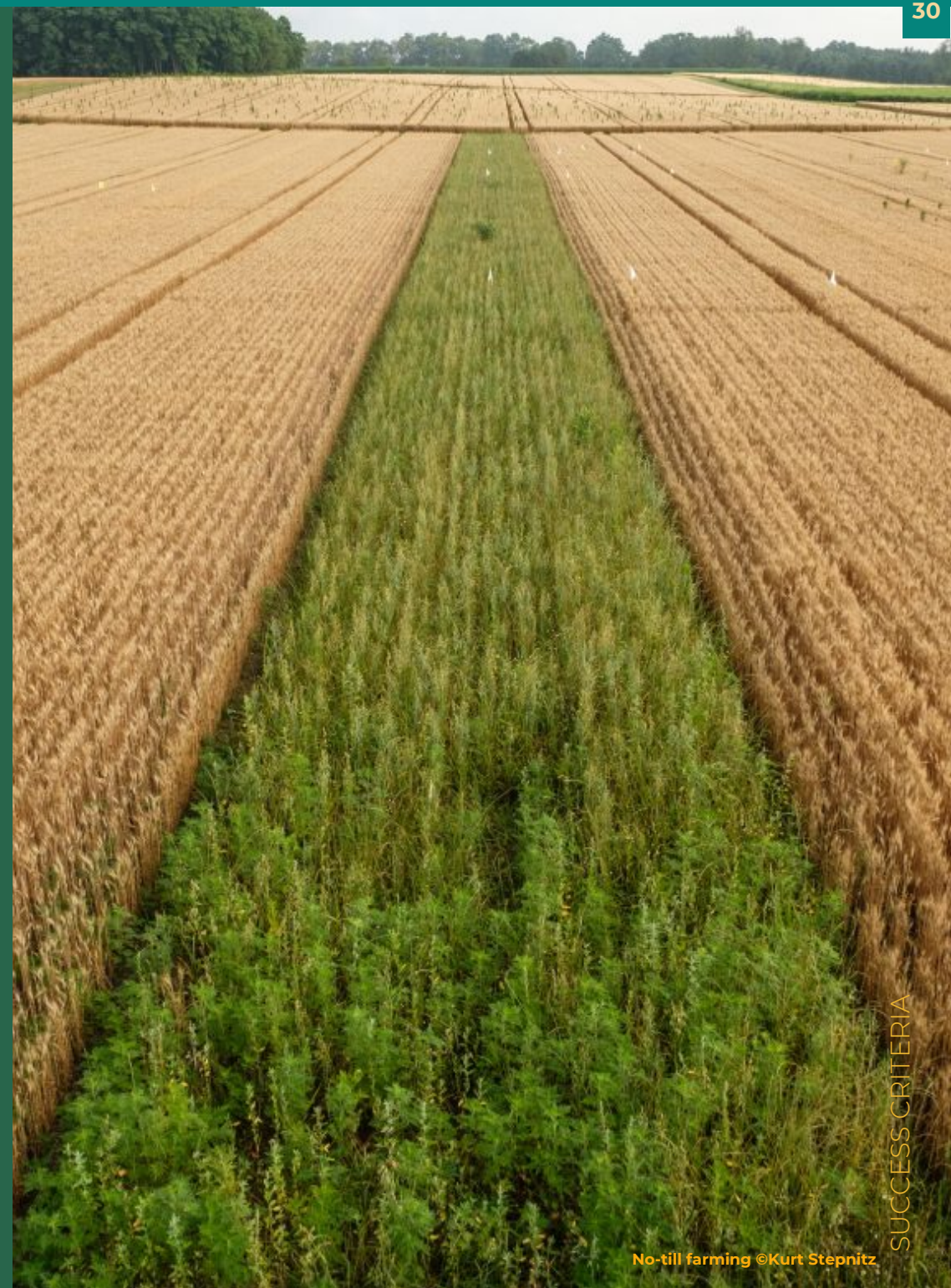
If a project is only intended to address ecosystem degradation, it is not in itself a NbS. In order to distinguish Nature-based Solutions from purely conservation-based interventions, it is necessary that the project addresses a societal challenge. So the beneficiaries of Nature-based Solutions are not only the environment or the living world, but also humans themselves, who cannot be separated from the environment around them.

As defined by the IUCN, the standards for NbS comprise of eight process-oriented criteria that summarise the most important planning and implementation aspects. The emphasis on process is important because the design of NbS always implies the possibility of change and variation. The process itself provides a framework and an opportunity to test the assumptions made along the way, thus facilitating the all-important mutual learning.

THE INTERNATIONAL STANDARD FOR NBS

The [IUCN Global Standard for Nature-based Solutions](#), developed by the International Union for Conservation of Nature (IUCN), sets out 8 basic criteria for the successful implementation of NbS. For the application of the 8 criteria, the IUCN also defines a set of indicators and illustrates their application with case studies.

- 01 NbS effectively address societal challenges
- 02 Design of NbS is informed by scale
- 03 NbS result in a net gain to biodiversity and ecosystem integrity
- 04 NbS are economically viable
- 05 NbS are based on inclusive, transparent and empowering governance processes
- 06 NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits
- 07 NbS are managed adaptively, based on evidence
- 08 NbS are sustainable and mainstreamed within an appropriate jurisdictional context



09 - USEFUL LINKS

GENERAL INFORMATION ABOUT NBS

In Hungarian:

- TeAM HUB - Hungarian Network of Nature-based Solutions - [Link](#)
- Nature-based solutions for better adaptation - A publication of the TeAM HUB - Hungarian Network of Nature-based Solution - [Link](#)
- Nature-based solutions to combat climate change - an unexploited opportunity - [Link](#)
- Soil = Life (video) - [Link](#)

In English:

- Almassy, D (2022) Realising the Potential of Nature-Based Solutions for a Transformative Societal Change, The British Academy, London – [Link](#)
- IUCN (2020). Guidance for using the IUCN Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of Nature-based Solutions. Gland, Switzerland: IUCN - [Link](#)
- IUCN - The NbS-focused subpage of the International Union for Conservation of Nature - [Link](#)
- NetworkNature - a knowledge-sharing platform bringing together the NbS projects of Horizon 2020 and Horizon Europe - [Link](#)
- Oppla – Comprehensive EU knowledge collection on NbS - [Link](#)

RELEVANT EU STRATEGIES

- European Green Deal - [Link](#)
- EU Biodiversity Strategy for 2030 - [Link](#)
- EU Strategy on Adaptation to Climate Change - [Link](#)

ECOSYSTEMS, ECOSYSTEM SERVICES, HABITAT RESTORATION

In Hungarian:

- Ecosystem basemap of Hungary (NÖSZTÉP) - [Link](#)
- Ecosystem services - [Link](#)

In English:

- Network Nature: Semester on Ecosystem Restoration – Outcomes - [Link](#)
- UN Decade on Ecosystem Restoration - [Link](#)

TOWNS AND CITIES, BUILT ENVIRONMENT

In Hungarian:

- Green City - Movement for Greener Cities - [Link](#)
- Green infrastructure booklets - [Link](#)

In English:

- IUCN - Nature-based Solutions for Cities - [Link](#)
- Urban Nature Atlas (UNA) – NbS best practices from around the world - [Link](#)

NATURAL DISASTER PREVENTION, WATER RETENTION

In Hungarian:

- Water retention on uplands, regulation of small rivers with semi-natural solutions, "Small-scale" water retention, small settlement-scale water retention solutions - [Link](#)
- Integrated practical application of innovative water management methods at river basin level with municipal coordination (LIFE LOGOS 4 WATERS project) - [Link](#)
- Natural Water Conservation Solutions for Municipal Climate Adaptation (LIFE MICACC project) - [Link](#)

In English:

- Green Infrastructure and Flood Management Promoting cost-efficient flood risk reduction via green infrastructure solutions. European Environment Agency. EEA Report, 14/2017. - [Link](#)
- IUCN - Nature-based solutions to disasters - [Link](#)
- PEDRR - Partnership for Environment and Disaster Risk Reduction (PEDRR) - [Link](#)
- Supporting the advancement of nature-based solutions in the water management of hillside settlements - [Link](#)
- UNDRR – Words into Action. Nature-based Solutions for Disaster Risk Reduction - [Link](#)

COMMUNITY PARTICIPATION, AWARENESS-RAISING

In Hungarian:

- Community participation toolkit - [Link](#)
- Community development methodological guide - [Link](#)

In English:

- Nature4Cities - Step-by-step guide for co-production and co-creation of Nature-based Solutions – [Link](#)
- URBACT Toolbox - [Link](#)
- Urban Governance Atlas - A collection of good practice policy instruments supporting nature-based solutions and ecosystem restoration - [Link](#)

Interreg



Co-funded by
the European Union

Created by: HBH Strategy & Development LLC.
Commissioned by: Ministry of Foreign Affairs and Trade of Hungary