



Green and blue infrastructure

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GREEN



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Summary

For a long time, European countries made decisions which were and still are degrading our natural capital, jeopardising our long-term sustainability and undermining our resilience to environmental shocks. Human society depends on the benefits provided by nature such as food, materials, clean water, clean air, climate regulation, flood prevention, pollination and recreation. However, many of these benefits, frequently referred to as ecosystem services, are used as if their supply is almost unlimited and treated as free commodities whose true value is not fully appreciated. Many public authorities turned to built infrastructure — grey infrastructure — as a substitute for natural solutions to problems such as flood prevention.

Fortunately, many cities are already turning away from these practices by adopting green and blue infrastructure (GBI) solutions in response to climate change and environmental degradation. These approaches aim to improve climate resilience and restore biodiversity in urban and rural areas. GBI refers to a thoughtfully organised network of natural and semi-natural spaces, which can vary in scale from rain gardens, green streets and parks to water elements such as rivers, lakes and wetlands. These areas provide a diverse array of environmental, economic, and social advantages. Among the numerous benefits is for example higher climate resilience through mitigation of floods and the urban heat island effect, enhanced biodiversity, or improved air and water quality.

Green and blue infrastructure is present in many significant EU policies such as the [Biodiversity Strategy to 2030](#), [Strategy on Adaptation to Climate Change](#) or the [Nature Restoration Law](#). Implementation of GBI can be executed on different scales and is very cost effective compared to traditional technological solutions and grey infrastructure. Local and regional authorities can use various fiscal and non-fiscal policies, including stormwater fees, grants, educational campaigns, and expedited permits, to promote green and blue infrastructure, fostering ecological resilience and sustainable development.

The following pages provide an overview of EU initiatives to inspire local and regional authorities and showcase policy recommendations, practical solutions and blue green infrastructure examples in various forms and scales. These include blue green infrastructure guidance for municipalities, urban greening on private sites, green infrastructure to enhance bee populations, interesting policy measures and action plans, water retention system, renaturalisation of a river delta, floodable parks and rain gardens. A number of good practices from the Interreg Europe projects [NBS4LOCAL](#), [NACAO](#), [GIFT](#) and [JUSTGREEN](#) are featured, with a high degree of replicability in other municipal contexts.

The knowledge, solutions and good practices showcased in this policy brief come mainly from Interreg Europe projects.

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Interreg Europe good practices

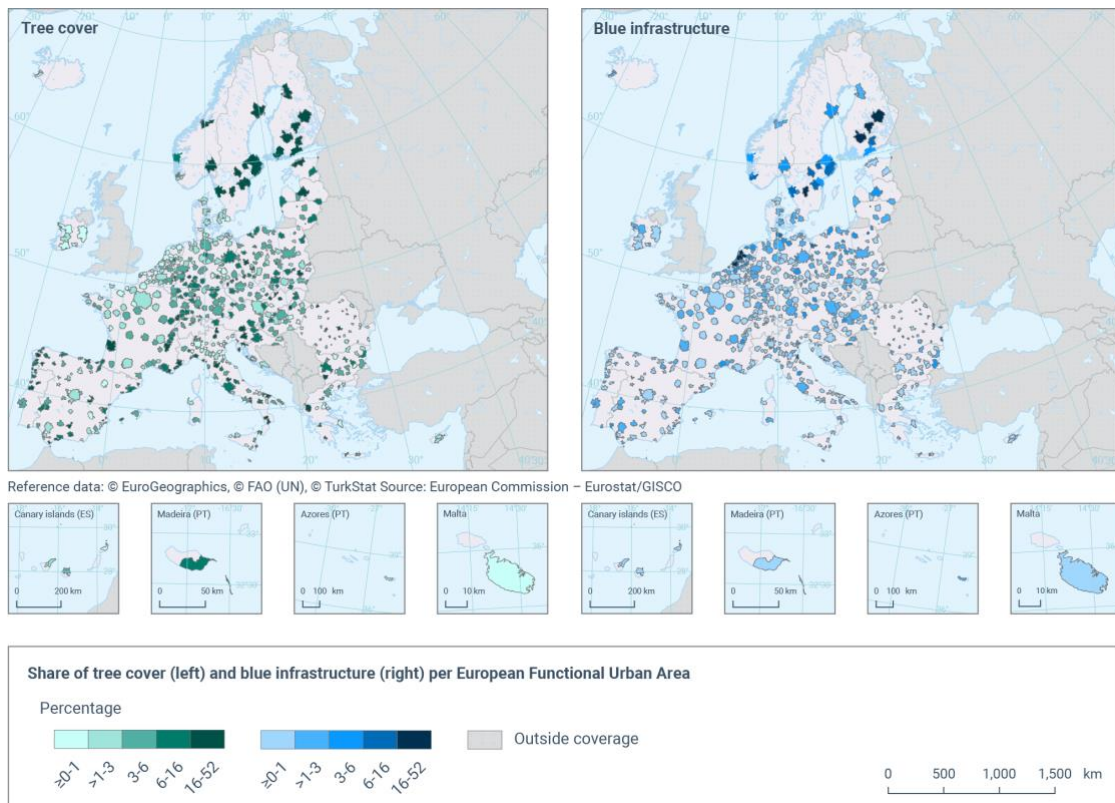
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Building resilience through blue-green infrastructure

Average temperatures in Europe are increasing at a rate that exceeds the global average, leading to more frequent and severe effects of climate change in European cities. Urban areas experience these impacts more acutely due to their design, dense infrastructure, and high population density. Artificial and sealed surfaces contribute to the urban heat island effect, which can cause surface temperatures to be up to 10-15°C warmer in urban areas than their surroundings. At the same time, similar surfaces contribute to higher surface water run-off, which makes cities especially susceptible to flooding during storms and heavy rainfall.

Green-blue infrastructure (GBI) refers to a network of natural and semi-natural elements that provide multiple environmental, social, and economic benefits. GBI emphasises the value that nature provides to human society and also helps to avoid relying on infrastructure that is expensive to build when nature can often provide cheaper, more durable solutions. It typically combines green infrastructure, such as parks, green roofs, and urban forests, with blue infrastructure, which includes water bodies like rivers, lakes, and wetlands. This integrated approach helps to manage stormwater, improve air quality, enhance biodiversity, and provide recreational spaces for communities.

It can also play a vital role in climate adaptation by mitigating the effects of flooding and urban heat. As of 2018, European cities were estimated to have 42% of their areas composed of green infrastructure (green and blue spaces), however with great variations between countries and cities, as can be seen on the picture below ([EEA, 2022](#)). According to [ARUP](#), we need to measure and place more value on green and blue infrastructure – trees, grass and ponds. Nature-based solutions to climate change are on average **50% more cost effective** than engineered alternatives and **deliver 28% more added value** than grey infrastructure, yet they received just 0.3% of overall spending on urban infrastructure in 2021.



EU policies on GBI

The EU promotes the use of green and blue infrastructure and nature-based solutions for the benefit of EU citizens and biodiversity. GBI contributes to achieving the goals of the [European Green Deal](#), specifically its sub-components; [EU Biodiversity Strategy](#), [EU Strategy on Adaptation to Climate Change](#), and the [Nature Restoration Law](#). It is supported by most policies in the EU environmental and climate change legislative framework.

Green Infrastructure Strategy

The [EU Green Infrastructure Strategy](#) is aiming “to promote the deployment of green infrastructure in the EU in urban and rural areas”. Adopted in 2013, the Strategy guides the implementation of green infrastructure (GI) at the EU, regional, national and local levels and promotes GI investments. The main aim was to mainstream GI into other relevant policies areas, whose objectives can be fully or partly achieved through nature-based solutions (Common Agriculture Policy, Water Framework Directive, Floods Directive, etc.).

According to the Strategy, GI should become a standard part of spatial planning and territorial development. The progress of the implementation has been [reviewed in 2019](#). The review concluded that while the Green Infrastructure Strategy had built some momentum, GI is still implemented at a small scale, not giving due recognition to the potential economic and social benefits of using green instead of grey infrastructure solutions. Wider integration of GBI across policies could be achieved with the help of the [Urban Agenda for the EU](#), which focuses on a more effective and coherent implementation of existing policies, legislation, and instruments.

Strategy on Adaptation to Climate Change

The [EU Strategy on Adaptation to Climate Change](#) emphasises the need to promote nature-based solutions and calls for their implementation on a larger scale thus increasing climate resilience and contributing to multiple Green Deal objectives. The Strategy identifies a need for better quantification of BGI benefits, and better communication of those benefits to decision-makers and practitioners at all levels. The Commission plans to develop a certification mechanism for carbon removals, which will enable robust monitoring and quantification of the climate benefits of many nature-based solutions.

EU Biodiversity Strategy for 2030

According to the [EU Biodiversity Strategy](#), green urban spaces provide a wide range of benefits for people and nature alike. They reduce air, water and noise pollution, provide protection from flooding, droughts and heat waves, and maintain a connection between humans and nature. The Strategy recognises planting trees and deploying GI as an effective tool to cool urban areas and mitigate the impact of natural disasters. It aims to stop the loss of green urban ecosystems and calls for green infrastructure and nature-based solutions to be systematically integrated into urban planning, including in public spaces, infrastructure, and the design of buildings and their surroundings. As part of the Strategy, the Commission calls on European cities of at least 20,000 inhabitants to develop ambitious Urban Greening Plans.

Nature Restoration Law

In June 2022, the European Commission adopted the proposal for a [Nature Restoration Law](#) aiming at restoring European ecosystems and to contribute to achieving the EU climate adaptation and mitigation objectives. To achieve this, legally binding targets for nature restoration are proposed. The aim is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures, and eventually extend these to all ecosystems in need of restoration by 2050. The target for urban ecosystems is “no net loss of green urban space and tree cover by 2030, and a steady increase in their total area from 2030”.

European financial support

The EU increased the spending target for climate action to 30% in its long-term budget for 2021-2027, with adaptation as a key component. The EU is working towards the ambition of dedicating **7.5%** of the [Multiannual Financial Framework](#) (MFF) adopted for the 2021-2027 programming period to biodiversity objectives as of 2024, and **10% in 2026 and 2027**. According to the EU Biodiversity Strategy, through EU structural and investments funds ([ESIFs](#)) and direct funding instruments such as [LIFE](#) and [Horizon Europe](#) programmes, around **€100 billion** will be available for biodiversity spending, including green-blue infrastructure. Products under InvestEU, targeted support under Cohesion Policy programmes, and support for investments, eco-schemes and advisory services in the Common Agricultural Policy should all help to finance nature-based solutions and GBI projects.

The [European Regional Development Fund](#) (ERDF) has supported projects related to a sustainable and circular construction sector. One example is the [Jamor River Green and Blue Axis](#) project, which revitalised the watercourse and integrated its ecosystem with the urban environment in the Lisbon metropolitan area. The investment fell under the priority “Sustainable urban development”.

LIFE programme: During the [2014–2020](#) programming period, the [LIFE programme](#) supported the implementation of Nature and Biodiversity projects with over EUR 2.2 billion. The [new regulation](#) governing the programme between 2021 and 2027 has allocated a budget of EUR 2,143 billion to the 'Nature and Biodiversity' subprogramme and EUR 947 million for the 'Climate Change Mitigation and Adaptation' subprogramme. Worth mentioning is the [LIFECOOLCITY](#) project, aiming to increase the adaptive capacity of at least 10,000 EU cities by implementing two innovative IT systems (remote sensing) for blue-green infrastructure management. The system should be able to precisely identify areas with the highest priority for action, link them to most effective Nature-based Solutions (NBS) interventions, and monitor their performance after implementation.

Horizon Europe: With a [budget of EUR 95.5 billion](#), it is the EU's key funding programme for research and innovation. It dedicates funding to [protecting and restoring ecosystems and biodiversity](#) and managing sustainably natural resources on land and at sea, and achieving climate neutrality and adaptation. The topic of blue-green infrastructure falls directly under two Horizon Missions (Climate Neutral and Smart Cities and Adaptation to Climate Change). The [Restore4Life](#) project highlights the numerous socio-economic benefits of taking a comprehensive and interdisciplinary approach to restoring freshwater and coastal wetlands in the Danube Basin. This initiative aims to facilitate the development of new blue-green infrastructure, enhancing the region's resilience to climate change and its impact. Restore4Life will carry out demonstrations at four sites and monitor six sites in the Danube Basin to showcase the advantages of improved delivery of essential ecosystem services such as water and pollutant retention, carbon sequestration and tourism opportunities.

The [EU Just Transition Fund](#) is a new programme running from 2021 to 2027, created to **support regions transitioning away from fossil fuel industries**. The Just Transition Fund has EUR 55 billion to facilitate the implementation of the European Green Deal, by supporting the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs.

European Territorial Cooperation also provides considerable support for regional and local authorities wishing to learn how other peer organisations across Europe implement blue-green infrastructure measures in their policies. In the following chapters of this brief, several good practices selected from Interreg Europe's framework will be highlighted. [Interreg Europe](#) provides opportunities for exchanging experience on any policy objective, including the possibility to test out solutions through pilot actions.

Policy solutions for green blue infrastructure

Maintaining, restoring and creating new parks and urban forests, planting individual trees, greening buildings with green roofs and facades, and improving urban water management through natural water retention measures are key urban nature-based solution measures ([European Environment Agency, 2023](#)).

Some examples of green and blue infrastructure can be seen in the table on the right:

Sub-KTM	Elements	Urban examples
Green options	Creation of new/ improvement of existing green infrastructures	<ul style="list-style-type: none"> • afforestation • revegetation • green roofs and facades • urban farming
	Natural and/or semi-natural land-use management (Brown Options)	<ul style="list-style-type: none"> • avoidance of soil sealing • soil remediation
Blue options	Creation of new/ improvement of existing blue infrastructure	<ul style="list-style-type: none"> • retention ponds • blue-green roofs • aquatic buffer strips • rainwater harvesting • sustainable urban drainage systems
	Natural and/or semi-natural water and marine area management	<ul style="list-style-type: none"> • wetland restoration • flood plain restoration

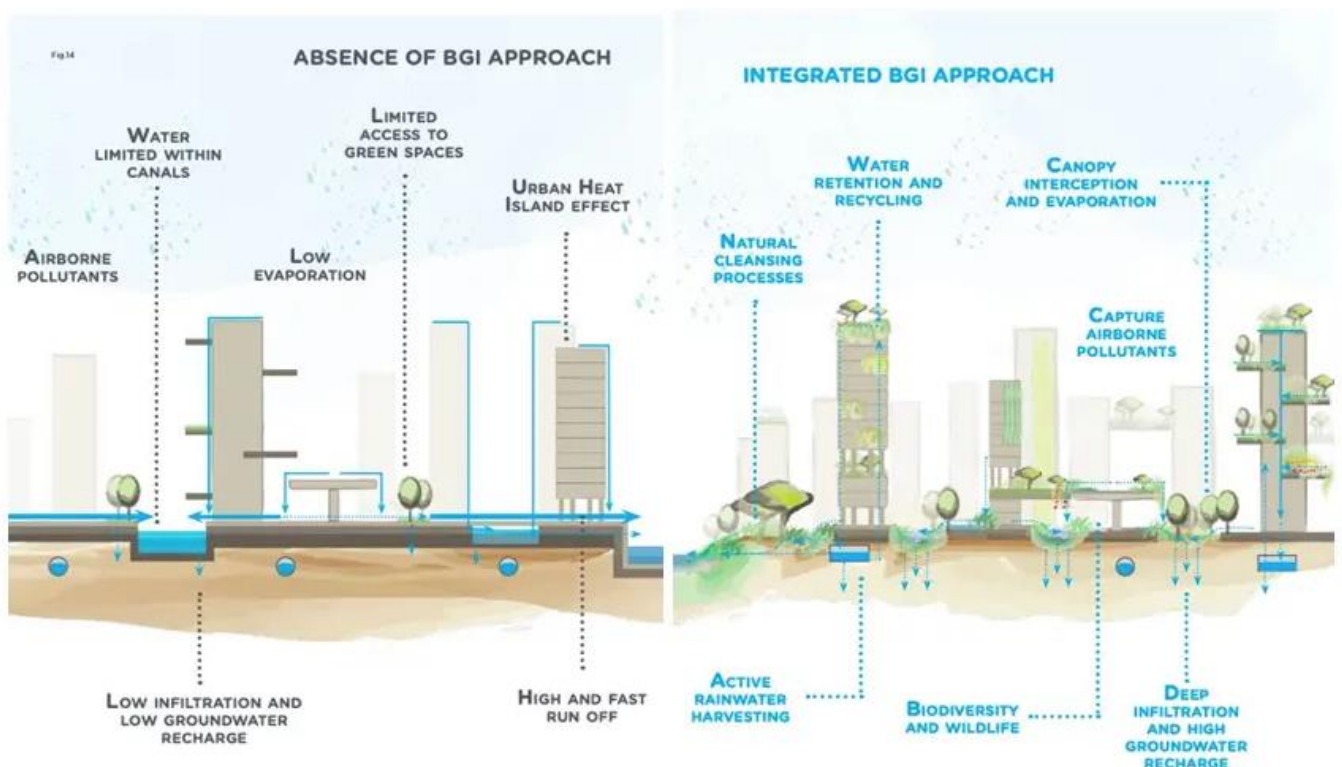
Policy solutions for promoting blue-green infrastructure can help effectively integrate these systems into urban planning and development. As you will see from the solutions on the following pages, blue-green infrastructure has many benefits and provides numerous ecosystem services to urban environments. Among the most important ones are:

1. **Flood Mitigation:** By incorporating natural water retention areas, green-blue infrastructure can help manage stormwater and reduce the risk of flooding.
2. **Biodiversity Enhancement:** These natural areas create important habitats for various species, promoting biodiversity within urban and rural settings. Even small patches of vegetation like green roofs can provide habitat for a variety of insects and birds. Green and blue infrastructure elements can often function as eco-corridors, which are crucial to ensure defragmentation of landscape and ecosystems, and natural passages for various species.
3. **Improved Air Quality:** Vegetation filters pollutants from the air, leading to better air quality for communities, having direct positive impact on respiratory health.
4. **Climate Resilience:** Green-blue infrastructure can help cities adapt to climate change impacts, such as increased rainfall and rising temperatures. Green and blue areas significantly reduce air temperature during warmer months. GBI can mitigate flood risk by slowing and reducing stormwater discharges.
5. **Recreational Spaces:** Parks, green roofs, and water bodies provide spaces for recreation and relaxation, improving the quality of life for residents.
6. **Aesthetic Value:** Incorporating nature into urban design enhances the visual appeal of areas, making them more attractive to residents and visitors.
7. **Economic Benefits:** These infrastructures can increase property values and attract tourism, contributing to local economies.

Green infrastructure in cities

Numerous studies have shown that nature-based solutions can provide cost-effective solutions that have multiple benefits for people and the environment, such as reducing urban heat, providing shade to buildings, and thus reducing demand for air conditioning, and absorbing storm surges. Green infrastructure can make cities more resilient to extreme weather events, control pollution, act as flood prevention measure. It can provide cities with a number of environmental, social and economic benefits, including opportunities for recreation, improved mental and physical wellbeing, increased property price, lower air pollution, better local microclimates, higher biodiversity and flood resistance.

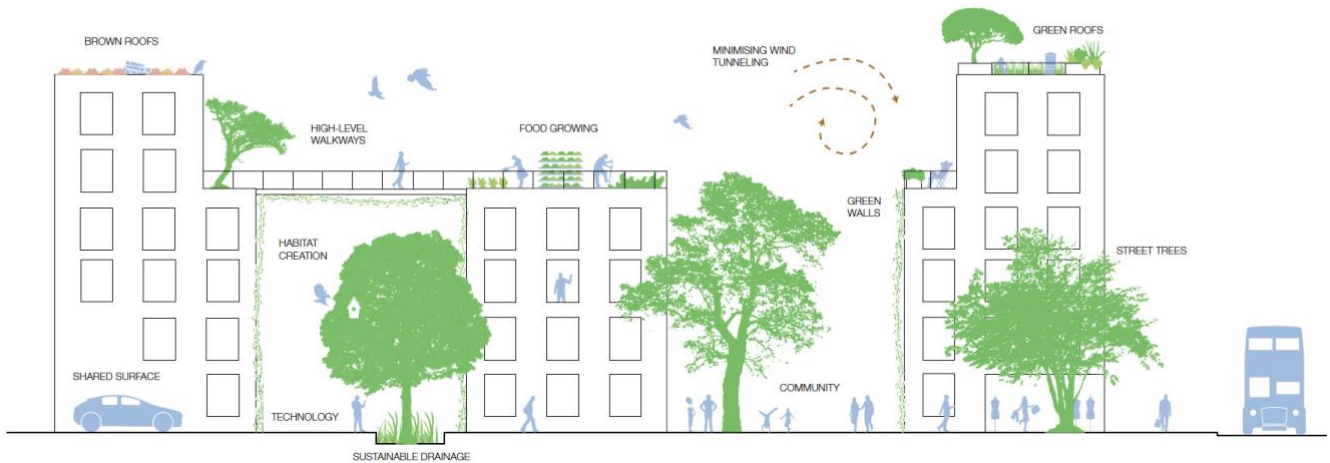
The effects of climate change are becoming increasingly visible in the urban environment. Recent natural disasters in Europe showed the lack of preparedness of many urban environments to climate change. Urban Green Infrastructure planning (UGI) is a strategic approach to develop interconnected and multifunctional networks of blue and green spaces that will increase climate resilience of a city. The European Commission recommends development of green spaces at different spatial scales (from neighbourhood to a city-wide level). The picture below shows the benefits gained from green infrastructure implementation, including reducing pollution, improving rainwater and flood management, mitigating the urban heat island effect and reducing the impact of storm surges.



Source: [Architects Diary](#)

Green infrastructure in cities includes many different components and types of spaces, which have an ability to mitigate climate change impacts. These components may include open spaces, natural areas, urban woodland and parks; urban trees and gardens, green squares and public realm; sustainable drainage systems, ponds, rivers and waterways; cycling and pedestrian paths; and smaller scale interventions such as green roofs, walls and facades.

To create more green spaces in densely built-up areas, the City of Berlin developed the '[Biotope Area Factor](#)' (BAF), a regulation which measures the proportion of green spaces to the entire development. The strategy aims to retain high densities of development, while simultaneously developing the city's green infrastructure. BAF has been introduced into spatial planning as a nature conservation measure and is implemented through Landscape plans.



Source: [ARUP, Cities Alive: Rethinking green infrastructure](#)

Green infrastructure also creates oxygen, sequesters carbon, and creates wildlife habitat. Urban forests and trees mitigate the urban heat island effect. "Peak air temperatures in tree groves are 5 degrees cooler than open areas without trees. Furthermore, suburban areas with mature trees are [2 to 3°C cooler](#) than new suburbs without them". The [Nature Restoration Law](#) recommends a minimum of 10% tree canopy cover for European cities, while other studies have recommended that urban neighbourhoods should aim for [30% tree coverage](#) to improve microclimate, air quality and health and even prevent heat related deaths. Urban trees are also relatively simple and cost-effective to implement, and a single tree can remove more than 135 kg of CO₂ from the atmosphere annually.

Green roofs are another widely adopted GI component. They help to regulate temperature inside the building, catch up to 60% of stormwater, thus reducing water runoff and mitigate the urban heat island effect. Moreover, they are important for increasing biodiversity and can be used for urban food production. Green roofs make up for a significant economics savings. They can double a roof's lifespan by preventing wear and tear from extreme heat and generate energy savings [up to 25%](#) during summer months. **Green walls** include most of the benefits of green roofs. Additionally, they can reduce surface temperature of the building behind them by as much as ten degrees Celsius, reduce sound reflections and lower energy costs of cooling in summer months by over 20%.

Urban farming on rooftops, gardening and vertical farms have been gaining popularity in cities worldwide. Food security and local food production are increasingly relevant topics, particularly in the context of climate change and population growth. The concept of urban farming is to contain food production in a closed system in one building, with limited requirements for distribution and transportation. The production is of course limited to specific crops such as herbs, salads, tomatoes, cucumbers and generally crops that do not have a substantial root system. The grown products are also impacted by seasonality. Nevertheless, it is an important part of urban green infrastructure.

GOOD PRACTICE 1: Green infrastructure guidance for municipalities (Hungary)

The Green Infrastructure Guidance serves as an interprofessional, clear, and educational tool designed to assist decision-makers in implementing effective green infrastructure (GI) interventions. It provides a structured approach to addressing various environmental and climate-related risks, including droughts, flash floods, pluvial floods, urban heat islands, soil erosion, and air pollution. The guidance outlines a comprehensive process that is divided into two main stages, each featuring detailed tasks:

1. **Strategic preparation:** coordination, identifying local challenges, strategic foundation regulatory environment and funding opportunities.
2. **Project development:** project preparatory study, planning and realisation, maintenance and management, knowledge transfer and monitoring.

While municipalities are the primary stakeholders of this guide, it also offers a set of criteria for evaluating proposals and fostering collaboration among planners. The effectiveness of the guidance will be assessed based on the number and quality of green infrastructure projects that are prepared, submitted, and successfully implemented as a result of utilising this resource. By enhancing the capacity for GI development, the guidance aims to promote more resilient and sustainable urban environments.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 2: Urban greening on private sites through regulatory standards and funding programs (Germany)

As a city-state, Bremen holds significant potential for nature-based carbon offsetting through the enhancement of urban green infrastructure. To bolster urban greenery for climate change mitigation and adaptation on privately owned properties, Bremen has recently implemented regulations that mandate the installation of green roofs on new buildings with flat roofs that cover an area of 50 square meters or more. Additionally, the city has enacted a ban on gravel gardens, set to take effect by the year 2027.



These initiatives are supported by various funding programs aimed at promoting the unsealing of surfaces, the installation of green roofs, and the greening of building facades on privately owned properties. Currently, these measures are under review, particularly in relation to urban biodiversity conservation, with a focus on protecting insect populations.

Both the green roof mandate and the ban on gravel gardens are directly connected to two specific actions outlined in Bremen's Climate Action Plan, which aims to achieve climate neutrality by 2038. By integrating these policies, Bremen is not only enhancing its urban landscape but also contributing to broader environmental goals, including the preservation of biodiversity and the reduction of carbon emissions.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 3: Revalorisation of local public green infrastructure to enhance bee population and biodiversity (Italy)

Since 2020, the Municipality of Montecopiolo has implemented several good practices aimed at enhancing green areas, raising awareness about environmental issues within the community, and promoting biodiversity.

1. A specific biodiversity trail has been established, featuring shelters designed to protect pollinating insects and local endangered species from predators and adverse weather conditions.
2. The municipality has identified areas where natural grassy patches can thrive, allowing wildflowers to proliferate, which in turn boosts biodiversity and enhances pollination processes.



Additionally, a comprehensive mapping initiative was launched to document tree species, wildflowers, and spontaneous orchids. This mapping effort enables the municipality to assess the impact of their conservation actions on these plant populations. These interventions have been particularly focused on the municipal park, Monte Montone, and its surrounding areas, with the goal of promoting native species. The park has undergone cleaning and reorganisation to make it more accessible to local residents and visitors. It now serves as a venue for educational events for children and various recreational activities that encourage interaction with nature. Through these initiatives, Montecopiolo is fostering a greater appreciation for biodiversity and environmental stewardship within its community.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 4: Rotterdam Goes Green Programme (the Netherlands)



The Rotterdam Goes Green: the 2023-2026 Green Agenda Action Plan aims to create a city, which can absorb the consequences of climate change, with measures to prevent heat stress and improve rainwater storage. The Municipal Council sets a goal within the action plan to add twenty hectares of additional green spaces. Additionally, the city will be implementing fifty climate adaptation projects, installing forty hectares of bee landscape, improving fifteen city squares and working on four green routes along the water.

The city undertakes a number of initiatives to add green infrastructure. One of their strategies is to align with other projects, such as plans for improving streets and squares, sewage system works, traffic circulation improvement works or the creation of streets with 30 km/hour speed limits. To support biodiversity, a variety of trees, shrubs and herbs, which are appealing to animals, are selected when planting greenery. The Municipality invests in parks, supports community gardens and green-blue school playgrounds.

Climate adaptation subsidies are offered to residents and businesses, who wish to introduce measures on their roofs or in their gardens to mitigate the consequences of climate change. This may be adding plants to a tiled garden, creating a green roof, installing water storage or disconnecting rainwater drainage from the sewage system. Residents who want to make their surroundings greener can use up to EUR 10,000 for their public green infrastructure projects.

[Click here to find out more about this practice.](#)



Nature-based solutions and ecosystem-based approaches in an urban context

Interview with Ine Vandecasteele, European Environment Agency

Why are nature-based solutions such an important tool for urban climate adaptation?

The urban heat island effect can lead to temperatures 10-15°C warmer in dense urban areas as compared to their surroundings. There has also been a significant increase in the population living in floodplains in urban areas over the last 10 years. Nature-based solutions are effective adaptation measures, providing additional cooling and water retention in cities if implemented well. As well as providing many other benefits, such as space for recreation and reducing pollution. Due to the magnitude of current and future expected climate impacts, however, nature-based approaches may need to be combined with other types of actions, including urban planning and building codes, economic incentives and insurance, early-warning systems and information campaigns.

What policy measures and initiatives could European regions and cities adopt in order to support the implementation of blue green infrastructure?

NBS should be prioritized as 'no regret' adaptation measures with multiple co-benefits in dedicated local adaptation plans, both at the regional and city level. 51% of Europe's larger cities now have dedicated local climate action plans also with clear objectives on adaptation. The majority of these plans (91%) include specific provisions or requirements for the implementation of nature-based solutions. Peer-to-peer learning and involvement in European networks can also be highly valuable in inspiring and supporting the implementation of NBS projects. Information on relevant networks can be found on [ClimateADAPT](#), which has a specific section tailored to the subnational level. The Covenant of Mayors and the Mission on Adaptation are both EU-level initiatives that support cities and regions in the necessary steps towards climate resilience.

Can green blue infrastructure replace all grey infrastructure?

There is now greater recognition of the need to use grey or physical infrastructures with green, particularly in the face of extreme weather events that increasingly surpass green infrastructure's capacity to manage them. There is increasing consensus around the greater effectiveness of hybrid infrastructure approaches, particularly those that bring together infrastructural, nature-based and institutional solutions, in comparison to siloed approaches (UNEP, 2022). There is also an increasing economic case being made for integrating grey with green. Grey solutions usually entail high upfront capital investments and longer-term annual maintenance costs over the project's life compared to solutions with green components (Green-Gray Community of Practice, 2020). When the broad co-benefits from nature-based approaches are taken into account, nature-based infrastructure is, on average, estimated to be 42% cheaper and create 36% more value than infrastructure solutions that are fully grey (Bechauf et al., 2022).

What are some of the barriers to implementing nature-based solutions and blue green infrastructure in urban areas?

The main barriers to the implementation of NBS reported by cities are financial and long-term political support. The importance of NBS, not only for climate adaptation but also for its multitude of co-benefits, needs to be recognized and supported by a long-term political vision and financing plan. Another common barrier to successful implementation is the technical know-how on NBS. Specific knowledge and expertise, for example: which species to use, how to ensure water quality standards and proper integration within the existing built environment is essential. Examples of successful NBS projects can be found on the [ClimateADAPT](#) platform, which describes a wide range of adaptation options and showcases also specific case studies. The EEA's recent [Urban Adaptation report](#) also includes examples of 'what works' in the implementation of such projects.

Water management in urban environment

Blue infrastructure refers to the network of water bodies and water management systems in urban and rural areas. It refers to natural bodies such as rivers, lakes, ponds, wetlands, and other water features, as well as the engineered structures, such as drainage systems, canals and flood control mechanisms. The presence of water in a city can provide a cooling effect and mitigate the urban heat island. Similarly, the proper management of blue infrastructure can significantly contribute to reducing the severity of both flooding and water scarcity. Increased rainfall is one of the effects of climate change already faced by many European cities. Directing more rain into surface water drainage systems can often overflow them, but natural systems slow down and hold rainwater and allow it to infiltrate back to the watercourses.

Natural water features (rivers, lakes, wetlands) can filter pollutants and improve the overall quality of water in urban areas. Water bodies provide essential ecosystem services, including habitats for various aquatic and terrestrial species, promoting biodiversity. Lakes, rivers, and ponds offer aesthetic value and spaces for recreational activities such as fishing, boating, and swimming, contributing to the well being of communities. Economically, blue infrastructure is more **cost-effective** in the long run compared to traditional infrastructure.

In less dense urban areas, wetland and floodplain restoration as well as larger retention ponds are an option. Some municipalities are also opening up canals and making efforts to renaturalise and reintegrate rivers and natural water flows. More information on wetland restoration, including examples, can be found in the Interreg Europe Policy Brief on '[Nature based solutions for climate adaptation](#)'.

In denser urban areas, where natural spaces become more limited, cities can build water retention ponds, water roofs (roof reservoirs), permeable surfaces in the streets, sustainable urban drainage systems, rainwater harvesting and smaller natural water retention basins or overflow areas. In particular, the separation of sewage and rainwater collection systems, in combination with natural overflow areas, can significantly increase local water quality and reduce the amount of wastewater needing to be treated.

When talking about flood resistance, the term “sponge cities” is used to describe urban areas with abundant natural areas such as trees, lakes and parks or other good design intended to absorb rain and prevent flooding.

GOOD PRACTICE 5: Urban distributed controlled micro-retention system (Poland)



Traditional water retention basins require rainwater to be directed to them through a sewer network, which decreases their effectiveness. During heavy rainfall, the combination of intense downpours and impermeable surfaces leads to rapid runoff, often overwhelming the existing rainwater sewer systems. Many urban water and sewer networks are out-dated, having been designed for different rainfall patterns in terms of intensity and frequency.

The SQUARES installation features a vertical tank, a lower tank, a photovoltaic (PV) panel system, a submersible pump, and an energy generation system. It functions as a peak-pump system that is managed based on weather forecasts. The vertical reservoir, supported by a self-supporting structure against the building's gable wall, collects rainwater from the roof slopes. Once the rain stops, it is replenished with water from the lower reservoir, which is pumped by solar-powered pumps. The lower tank captures rainwater from the immediate vicinity of the building and is covered with a layer of vegetation that acts as a natural filter to purify the water. This water can either be pumped back to the vertical tank or redirected to irrigate the vegetation. This solution aligns well with the concepts of sponge cities and smart cities. The system is designed to mitigate the effect of flash floods, requires no additional land, is autonomous and allows for reuse of the collected water.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 6: Renaturalisation of the inland delta of Nida river (Poland)

Interreg
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Co-funded by
the European Union

NACAO

The unique inland delta of Nida River is a geomorphological structure of European importance and one of the richest natural areas in Poland. However, it has been degraded due to past misguided melioration works and it was therefore crucial to renaturalise the water conditions of the area and restore the valuable ecosystem of the river valley and wetland. The project maintained ca. 15 km of waterways, created a 3 million m³ water reservoir and directly reduced CO₂ emissions by halting wetland degradation. The project focused on restoration of natural hydrological flows, offering a sustainable and potentially cost-effective approach.



Furthermore, unique methods for the renaturalisation of the entire degraded area were developed, mostly for the protection, breeding and reintroduction processes of endangered flora and fauna species. These actions include the protection of riparian forests through the reestablishment of waterflow processes to regenerate degraded habitats, reintroduction and active protection of the *Unio Crassus* (thick-shelled river mussel) and *Anisus Vorticulus* (mud snail) and a large-scale animal grazing on ca 250 ha in the Nida River valley, aimed at protecting natural habitats. Solutions for restoring ecosystem functions were deployed and a gene reservoir for endangered plants was created. Its implementation increased the tourist attractiveness of the entire region. On this basis, new agritourism farms were established, creating jobs for the local community.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 7: Blue Deal and River contracts in Flandres (Belgium)

Interreg
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Co-funded by
the European Union

NBS4LOCAL

Among all European regions, Flanders tops the list in terms of water scarcity and drought risks. To combat this, the Flemish Government has created the [Blue Deal](#). This program consists of more than seventy actions divided over three main themes: smart and sustainable water use, restoration of wetlands, and nature-based solutions. During the first three years of the programme 5000 ha of new wetlands have been created, 20 km of rivers have been meandered and 48 little dams were made on agricultural land.

Another policy measure developed by the Flanders Environment Agency are so called '[River contracts](#)'. The central goal of this initiative is to create more space for water in municipalities and to support the implementation of natural infrastructure for water management. Through the river contracts, local governments collaborate with citizens, companies and associations in a participative approach.

[Click here to find out more about this good practice.](#)

GOOD PRACTICE 8: La Marjal floodable park (Spain)

The urban park of 'La Marjal' is designed to temporarily accumulate rainwater, storing excess water that exceeds the capacity of the existing drainage system. When the drainage system is able to manage the flow again, this excess water is discharged into the sea. Additionally, the park functions as a reservoir for water used in activities such as garden irrigation.

Covering an area of 36,700 m², the park was developed on land designated as a green zone in the city's Urban Development Master Plan. A public-private corporation responsible for water supply and wastewater management in Alicante carried out its construction, along with the installation of two large collectors. During intense rainfall events, water flows through the existing drainage network. If the capacity of the collector system is exceeded, water will begin to fill the park, overflowing into the designated side channel designed for this purpose.



The park's environment mimics a wetlands ecosystem, featuring a pond surrounded by a fringe of aquatic and marsh vegetation that supports bird nesting and creates a natural marsh landscape. The floodable area of the park includes riverine tree species, while the higher sections showcase a Mediterranean landscape with native plant species. Additionally, informative panels throughout the park serve as educational resources for visitors.

[Click here to find out more about this practice.](#)

GOOD PRACTICE 9: Rain gardens in the city of Pula (Croatia)

Increasingly frequent heavy rains, storms and floods in many places in Croatia bring major problems in terms of stormwater management, which further threatens the safety of citizens and their property. To address these issues, the city of Pula designed and implemented so called rain gardens, i.e. natural infiltration systems that protect against flooding using natural structures such as gardens. Rain gardens act as natural filtration systems, removing pollutants and sediments from stormwater. This reduces the amount of pollutants entering local water bodies and protects aquatic ecosystems. By allowing rainwater to infiltrate the soil, rain gardens also contribute to the restoration of groundwater, thereby maintaining the long-term availability of water. It also increases the visual appeal as it involves the inclusion of green spaces and vegetation that contribute to urban greening and create a pleasant environment for residents and visitors.



The purpose of 'rain gardens' is to minimise the amount of rainwater by retaining it on green areas and, after treatment, further infiltrating the terrain. This nature-based stormwater drainage system has been selected for its adaptation to climate change, multiple financial and economic impacts and socially acceptable solutions in line with environmental protection and biodiversity enhancement.

[Click here to find out more about this practice.](#)

Policy recommendations

Examples from Interreg Europe projects and the wider Interreg community can be a source of inspiration for many and can provide real benefits for those who wish to transform the construction sector at local and regional level.

Policy and finance

- Provide **financial incentives** such as grants, tax breaks, or subsidies for residents, developers and property owners who incorporate blue-green infrastructure into their projects. Get inspired by the [City of Bremen](#), that has funding programs aimed at promoting the unsealing of surfaces, the installation of green roofs, and the greening of building facades on privately owned properties. Or the [City of Rotterdam](#), which offered subsidies to residents and businesses, who wish to introduce climate adaptation measures on their roofs or in their gardens. (JUSTGREEN, NACAO)
- **Set specific targets** with regard to blue green infrastructure in your policies. Establishing regulations that require or encourage the use of green-blue infrastructure in new developments can ensure its widespread adoption. Again, an example from the [City of Bremen](#), which has recently implemented regulations that mandate the installation of green roofs on new buildings with flat roofs that cover an area of 50 square meters or more. The [City of Rotterdam](#) set goals to add twenty hectares of additional green spaces, adopt fifty climate adaptation projects, install forty hectares of bee landscape, improve fifteen city squares. (JUSTGREEN, NACAO)
- Develop an [Action plan for blue green infrastructure](#), such as the City of Rotterdam. (JUSTGREEN)
- Facilitate collaboration and increase impact with tools such as the Flemish [Blue Deal](#) and the [River contracts](#). (NBS4LOCAL)

Integrated planning and monitoring

- Promote collaboration between urban planners, environmental agencies, and water management for more cohesive and effective blue-green infrastructure projects.
- Establish systems to monitor the effectiveness of blue-green infrastructure projects to assess their impact.

Actions on the ground

- Develop Green Infrastructure Guidance, as in [Hungary](#). (NBS4LOCAL)
- Use nature-based solutions to mitigate flooding and improve water management. Implement innovative water retention systems as in [Poland](#), restore wetlands and rivers such as the [Nida river](#), create parks that can accumulate rainwater as in the [Province of Alicante](#), build rain gardens as in [Croatia](#). (NBS4LOCAL, NACAO)

Community engagement and education

- Educate and raise awareness. Educating the public and stakeholders about the benefits of blue-green infrastructure can foster community support and participation in these initiatives, as in the [Municipality of Montecopiolo](#). (GIFT)
- Involve local communities in the planning and implementation of blue-green infrastructure projects. Make sure the solutions meet the needs and preferences of residents.

Interreg Europe resources

The Interreg Europe Policy Learning Platform experts provide a tailored set of resources, contacts, or in-depth analyses to help you find the answers you are looking for. Explore our services that can help you solve regional policy challenges.

Interreg Europe Policy Learning Platform information

- Policy brief on [Nature based solutions for climate adaptation: wetlands, peatlands and grasslands](#)
- Policy brief on [Nature restoration: Forest ecosystems](#)
- Policy brief on [preserving and restoring biodiversity](#)
- Policy brief on [Rivers and wetlands: drivers of sustainable regional development](#)
- Webinar recordings from the climate adaptation series on [wetland restoration](#) and [coastal restoration](#)
- E-workshop on [Boosting forest ecosystems](#)
- Workshop on [bringing back nature to the city](#)
- Stories on [Flood prevention and damage restoration](#), [Restoring ecological diversity of forests](#), and [Planting trees the right way](#)
- News on [“Dam removal: Towards 25,000 km free flowing rivers”](#)
- News on [“Bringing back nature across Europe”](#)

Other resources

- [The European Green Deal](#)
- [The EU Biodiversity Strategy](#)
- [The EU Nature Restoration Law](#)
- [European Environment Agency: Urban Adaptation in Europe: what works?](#)
- European Commission's [Guidance on supporting the deployment of strategic EU level green and blue infrastructure](#)
- EU guidance on integrating ecosystems and their services into decision-making ([Summary](#), [Part 1](#), [Part 2](#), [Part 3](#))
- EU [Mapping and Assessment of Ecosystems and their services: An EU ecosystem assessment](#)
- [ARUP: Cities Alive: Rethinking green infrastructure](#)
- The World Bank: [Assessing the Benefits and Costs of Nature-Based Solutions for Climate Resilience](#)

Interreg Europe Programme

Interreg Europe is an interregional cooperation programme co-financed by the European Union. With a budget of 379 million euros for 2021-2027, Interreg Europe helps local, regional and national governments across Europe to develop and deliver better policies through interregional cooperation projects and its Policy Learning Platform services. The programme promotes good practice sharing and policy learning among European regions in 29 countries – the EU27, Norway and Switzerland. Interreg Europe contributes to the EU cohesion policy together with the other European Territorial Cooperation programmes known as Interreg.

Interreg Europe Policy Learning Platform

The Policy Learning Platform is the second action of the Interreg Europe programme. It aims to boost EU-wide policy learning and builds on good practices related to regional development policies.

The Platform is a space where the European policy-making community can tap into the know-how of regional policy experts and peers. It offers information on a variety of topics via thematic publications, online and onsite events, and direct communication with a team of experts.

Interreg Europe Policy Learning Platform expert services

Our team of experts provide a set of services that can help you with regional policy challenges. Get in contact with our experts to discuss the possibilities:



Via the [policy helpdesk](#), policymakers may submit their questions to receive a set of resources ranging from inspiring good practices from across Europe, policy briefs, webinar recordings, information about upcoming events, available European support and contacts of relevant people, as well as matchmaking recommendations and peer review opportunities.



A [matchmaking session](#) is a thematic discussion hosted and moderated by the Policy Learning Platform, designed around the policy needs and questions put forward by the requesting public authority or agency. It brings together peers from other European regions to present their experience and successes, to provide inspiration for overcoming regional challenges.



[Peer reviews](#) are the deepest and most intensive of the on-demand services, bringing together peers from a number of regions for a two-day work session, to examine the specific territorial and thematic context of the requesting region, discuss with stakeholders, and devise recommendations.

Discover more: www.interregeurope.eu/policylearning

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