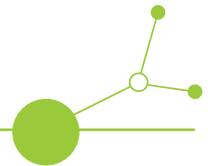


## 2.4.1. Position paper on NbS/GI policies and state of play in CE



Final Version

08/2025





## Table of Contents

A.Executive Summary .....	2
B.Identifying Policy challenges - Knowledge Gap in NbS/GI.....	2
C.State of the art .....	4
D.Policy Recommendations .....	5
1. Integrating NbS/GI into urban planning.....	5
2. Enabling a European NbS network through digital platforms and tools .....	6
3. Implementing a coherent monitoring system including indicators to measure the effectiveness of urban NbS/ GI .....	7
4. Creating a dedicated NbS Co-Financing Facility for Municipalities to ensure sustainable financing.....	7
5. Establishing and implementing a coherent NbS-based re-skilling program for public officials and practitioners .....	8
6. Integrating Citizen and community engagement in planning and maintaining of NbS .....	8
E.Conclusions .....	9
F. References.....	9



## A. Executive Summary

This position paper is developed within the framework of the [GreenScape CE](#). The project aims to promote the wider adoption of Nature-based Solutions (NbS) in urban areas by improving policy learning and strengthening multilevel governance structures to facilitate collaboration between decision-makers and local communities. To this end, this paper summarises experiences relating to the lack of data, knowledge or capacities for integrating NbS and Green Infrastructures (GI) into grey infrastructure, based on the experience of five Central European urban areas significantly affected by the urban heat island effect: Milan Metropolitan Area, Ptuj, Szeged, Warsaw and Zagreb. Furthermore, it provides recommendations on NbS/GI policies based on the experience of Partners from six countries participating in the project: Austria, Italy, Croatia, Hungary, Slovenia and Poland.

The **target audience** includes policymakers at national and sub-national levels, particularly local and regional public authorities, including public administration and urban planning departments, as well as other key stakeholders. The paper advocates facilitating a shift towards decarbonising urban areas, not only through NbS implementation, but also through a transnational cooperation to enable GI connectivity and accessibility. In this sense, the paper also targets policymakers at the EU level.

The **knowledge and capacity gaps** are recognized as obstacles to NbS uptake: a constant barrier to change is the unsystematic education in NbS and GI, as well as the weak connection between professions. A systematic Greenskilling and re-skilling training program should be launched. Furthermore, support to cities through regional centers of excellence and technical assistance should be provided, while citizens awareness and participation should be enhanced by education campaigns, including school programs, but also workshops, digital platforms, citizen panels and [Hackathons](#) to support the co-creation of green infrastructure projects.

**Fragmented governance** leading to a **lack of adapted legal regulations and uniform technical standards** are representing the second biggest challenge for NbS uptake. **Lack of data and tools, together with their connection** at national, regional and local levels is also quite significant, including a **lack of comprehensive guidance**. Further implications must be considered, like the **lack of integration of environmental and health indicators**. Spatial planning and building regulations should be amended to include enforceable standards for GI. In the context of growing climate risks, it is important to include NbS or so-called green and blue infrastructure in critical infrastructure protection policies too. The constant collaboration on a Platform for public and private NbS implementers at EU level could communicate to citizens, authorities and practitioners about existing GI but also enable the creation of a NbS transnational network and its further development. The use of the indicators would track the status of the implementation of national policies in compliance with climate adaptation targets too.

**Regulatory and financial barriers** impact drastically the NbS uptake. Establishing a national co-financing scheme (outside existing EU funds) that supports municipalities in preparing, implementing, and maintaining NbS projects is crucial to achieve financial sustainability.

## B. Identifying Policy challenges - Knowledge Gap in NbS/GI

The **knowledge and capacity gaps** are the first obstacle to NbS uptake. There is insufficient awareness among local government officials – for example, two-thirds of officials in Croatia are not familiar with the principles of NbS and their benefits for the climate and health. Moreover, a lack of experience in NbS



implementation among practitioners is often exacerbated by the prevalence of outdated planning mindsets, such as designing urban stormwater management systems based on traditional drainage approaches, as seen in Hungary.

A constant barrier to change is the unsystematic education in NbS and GI, as well as the weak connection between professions. However, it is also triggered by the rapid adoption of European and global regulations without the necessary knowledge. These factors strongly impact the willingness of urban planners, decision-makers and designers to consider the possibilities offered by NbS. Insufficient understanding of and experience in the implementation of NbS/GI means that projects are often carried out on a one-off basis without being permanently incorporated into urban strategies, and without the active participation of residents and stakeholders. This reduces their effectiveness and sustainability. In the long term, this reduces the quality of life in urban areas. Furthermore, technical capacity appears fragmented: in Slovenia, for example, only a few larger municipalities employ landscape architects or hydrology experts in-house, while smaller municipalities rely on consultants and struggle to develop robust NbS projects. In Croatia, although measures in GI/NbS are considered highly important for urban resilience and climate adaptation, they are only partially implemented, mainly in a few more active cities (Zagreb, Koprivnica and Karlovac). There is also no binding national-level mechanism for their inclusion in spatial planning.

**Fragmented governance** leading to a **lack of adapted legal regulations and uniform technical standards** are representing the second biggest challenge for NbS uptake. Climate adaptation, health and spatial planning policies are indeed not sufficiently coordinated at national, regional and local levels. At national level, like in the case of Italy, multiple ministries (Infrastructure, Environment, Culture) and levels of government share overlapping responsibilities, often without coordination. While cities like Milan and Bologna lead with advanced plans, smaller municipalities struggle without national guidance or standards, again demonstrating a huge disparity between large and smaller cities.

The Croatian strategic framework for Green Infrastructure and Nature-based Solutions is based on several key documents - [Guidelines for the development of Green Urban Renewal Strategies](#), [Green Infrastructure Development Program until 2030](#), [Application manual for green infrastructure](#), [Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070](#) - but there is still a need for stronger integration into comprehensive public policies and regulatory instruments. The legal basis for GI and its role in spatial planning is still insufficiently standardized. Although the Spatial [Planning](#) Act mentions the importance of preserving natural values and sustainable use of space, there is no binding methodology for including NbS in spatial plans.

Currently, the approach through sectoral and project interventions dominates, while horizontal integration with spatial planning, climate adaptation, public health and natural resource management is still under development. In the case of Poland, the Water Law, which regulates water resource management, does not refer to NbS/GI solutions, and their definitions do not exist in Polish legislation. For this reason, there is no clear legal regulation concerning NbS, which makes the development of small retention elements in cities a complicated and lengthy process.

**Lack of data and tools, together with their connection** at national, regional and local levels is also quite significant. For example, in Croatia the [National Green Infrastructure Register and the Geographic Information System platform](#) are still under development, which makes planning difficult insufficient. In Hungary, due to utility protective distances and similar regulations, there is often a lack of space, and GI is frequently not protected or provided for: urban planning often fails to address this adequately.

The Slovenian experience shows a **lack of comprehensive guidance and data**: National guidelines exist for example for green roofs but not for raingarden sizing, permeable paving or vertical greening. Interviews with Ljubljana officials within the Project's activities reveal unclear responsibilities and a lack of procurement templates for vertical green infrastructure too. At the Central European scale, the exchange



of good practices between countries with established NbS and GI initiatives and those still in early stages of implementation is notably limited.

Further implications must be considered, like the **lack of integration of environmental and health indicators**: there is indeed no system for monitoring the impact of GI on citizens' health (e.g. impact on mortality and incidence of selected diagnoses, including indicators of mental health, resilience to heat waves, etc.). From the Slovenian experience a Monitoring void is highlighted too: apart from Natura 2000 site, there is no nationwide indicator set to measure NbS performance, making it hard to prove cost-effectiveness and secure maintenance funds.

**Regulatory and financial barriers** impact drastically the NbS uptake showing a labyrinthic path for the implementation to succeed. Local government units often lack financial stability and institutional support to implement and maintain NbS, while innovative financing mechanisms still insufficiently recognize NbS. In Italy, planning codes still favour traditional infrastructure. Public procurement rarely encourages innovative green design, and funding—often limited to short-term EU grants—lacks long-term guarantees, especially for maintenance. The undervaluation of NbS benefits in economic terms (e.g. avoided flood damage or cooling effects) further hampers investment.

In Hungary it is unfortunately not different. Financial calculation deficiencies are experienced: there is no widespread, unified value calculation method for ecosystem services and their changes or value increase. Such a method would help improve NbS acceptance and support broader implementation, as deviations from existing standards require substantiated calculations. Furthermore, municipalities can almost exclusively develop green infrastructure using European Union funds (through national operational programmes and direct EU funding).

The strict implementation and payment requirements of the projects often lead to professionally poor solutions, e.g., planting during the summer. For the same reason, due to rigid funding conditions, planning structure is often top-down and overregulated. Another obstacle can restrict NbS feasibility: the difficulty of obtaining ownership consent within private land.

Finally, strong societal support through **Citizen engagement** can be difficult to achieve even though awareness raising actions and educational activities are often offered, the implementation of a co-creation model is still limited.

## C.State of the art

NbS and GI have become central strategies within the EU Green Deal, playing a crucial role in enhancing **urban resilience, biodiversity, and climate adaptation**. Their importance is reflected in key EU policy frameworks, particularly the [EU Biodiversity strategy 2030](#) and the [EU Adaptation Strategy](#)—which emphasize the widespread implementation of NbS across all landscapes to support biodiversity and strengthen Europe's climate resilience. ([D1.5.1 Joint Strategy - GreenScapeCE](#)) Their application may be uneven if comparing members States, who are mainly responsible for its follow-up and maintenance. Furthermore the [EU Urban Agenda \(Partnership on Sustainable Land Use and Nature-Based Solutions\)](#) - local / partial level - should be mentioned for its scope of exchanging best practices, although its voluntary nature limits its impact.

At **national level** disparities within cities often occur. In Croatia, measures in GI/NbS are assessed as highly important for urban resilience and climate adaptation. However, their coverage is partial, as implementation mainly occurs in a few more active cities (Zagreb, Koprivica, Karlovac), while there is no binding mechanism at the national level for their inclusion in spatial planning.



In the case of **Greenskills and the NbS related re-skilling**, [NBSEduWorld](#) serves as a unique pillar by providing and continuously its platform with relevant tools, best practices, business models and all relevant material to engage at local level and implement NbS Projects. At national level it is crucial to mention the [TeAM HUB - Hungarian Network of Nature-Based Solutions](#) which operates an online knowledge platform as methodological support, providing one of the best practices of knowledge sharing. The Municipality of Budapest, moreover, publishes the series titled “[Green Infrastructure Booklets](#)”, currently consisting of eight editions, which offers practical, example-based solutions to the most pressing professional challenges of GI development and maintenance.

At the **local level**, NbS and GI measures can be included in Municipal Adaptation Plans (MPA) like in Warsaw. This is a strategic document, mandatory for larger cities in Poland, which can be integrated with other municipal plans and strategies. Their aim is to assess vulnerability to climate change and plan appropriate adaptation measures for identified threats. MPAs are not mandatory to be developed at EU level. The MPA does not have the status of a local law, which means that it has no legal power to make administrative decisions or directly influence investment processes.

In addition, the high costs of development and implementation may be a barrier for smaller cities. MPA financing is possible through European Funds, Regional Operational Programs and funds from national and provincial Environmental Protection and Water Management Funds. The Metropolitan City of Milan has embedded GI into its Metropolitan Territorial Plan (PTM), introducing a “Metropolitan Green Network” as a climate adaptation strategy. In Slovenia regulations make NbS obligatory for new public school and campus projects - Nationwide - and public buildings: still limitations are linked to the narrow sectoral scope, since the budget tied to education ministry.

**Pilot projects** are significantly providing room for validation of solutions. The [LIFE Metro Adapt](#) project provided Milan’s metro area with tools like an NbS catalogue which was integrated in the Metropolitan Territorial Plan and mapping platforms. It also influenced official planning documents and won the 2023 EU LIFE Award for Climate Action. Furthermore EU level initiatives provide Cities with Guidance on climate adaptation including NbS in the planning like the [SECAP Template](#) provided by the Covenant of Mayors - Europe.

## D. Policy Recommendations

### 1. Integrating NbS/GI into urban planning

In European countries where NbS and GI elements are commonplace, the implementation process is multi-level and, above all, based on integrated strategies and comprehensive legal regulations. Combined with a high degree of cross-sectoral integration, public participation and the use of appropriate financial tools, they support the protection and development of green infrastructure. A good solution would be to create a formal legal framework for NbS and GI by implementing these solutions into the spatial planning system, into local spatial development plans and water management. Moreover, spatial planning and building regulations should be amended to include enforceable standards for green infrastructure (e.g. minimum permeable surface ratios, maintenance obligations, and integration of NbS in public tenders).

**Incorporating green roofs, vertical gardens, stormwater infiltration systems and other NbS into building regulations** would enable their wider application and recognition in permit procedures and would strengthen institutional support for their maintenance.

In addition, it is important to include NbS or so-called green and blue infrastructure in critical infrastructure protection policies. In the context of growing climate risks (floods, heat waves, droughts), solutions that



increase the resilience of urban networks and facilities should be recognized as an integral part of the civil protection and risk management system. Only through such an integrated framework is it possible to achieve long-term resilience to climate risks, improve the health and well-being of the population and preserve environmental and built values in urban areas, which are particularly vulnerable areas.

## 2. Enabling a European NbS network through digital platforms and tools

Fragmentation and accessibility of green spaces are an important issue in European cities and an important aspect of urban planning. The constant collaboration on a Platform for public and private NbS implementers at EU level can communicate to citizens, authorities and practitioners about existing GI but also enable the creation of a NbS transnational network and its further development.

The GreenScape CE [Visual Mapping Platform](#) provides with a **tested solution** supporting the idea that a digital tool like a Platform should be constantly updated with NbS implemented by public and private stakeholders. The Visual Mapping platform provides three tools: accessibility, NbS and connectivity. The geoprocessing simulation tools of the GVMP support the analysis of population accessibility to green infrastructure, the analysis of NbS and the analysis of green space connectivity in the [five pilot areas](#) to increase the effectiveness of the proposed nature-based solutions in the partners' local action plans. This will support the **development and monitoring of planned nature-based solutions and pilot actions**. The approach will provide other CE cities with the basis and resources for reuse within their urban planning process and ensure transferability. The GVMP includes also an interactive web-based map with basic GIS functions such as zoom, identify and pan, as well as numerical and graphical data such as charts, histograms and graphs, providing a comprehensive overview of the situation in a specific geographical area on a single page ('dashboard').

The key functions that define the value of this tool are outlined below. The **data** used in developing GVMP for each pilot area was unified to the maximum to ensure that the user, especially a layperson, can easily understand the content of the display without having to deal with various legends and functions.

The **GVMP Accessibility Tool** is an excellent resource for the identification of accessibility issues, facilitation of discussions with stakeholders and the exploration of alternative solutions. The tool provides detailed information on the number and age structure of inhabitants in a particular catchment area. This allows cities to plan green spaces to meet the needs of different age groups of potential users.

The **GVMP NbS tool** establishes a data infrastructure for handling NbS data for each pilot area. The database design is compatible with that of the [Urban Nature Atlas](#), which will simplify the transfer of data to the [European NBS database](#) after the project's completion. This tool allows direct consultation of data on climate conditions (European Environment Atlas) and potential climate changes. The collected data allows for a systematic analysis of NbS data and its connections with GI.

The **GVMP Connectivity tool** is ideal for quickly measuring the connectivity of green spaces in a pilot area. It serves as a means of alerting stakeholders and guiding discussions on how to deal with the connectivity of green spaces at a detailed local level.



### 3. Implementing a coherent monitoring system including indicators to measure the effectiveness of urban NbS/ GI

Monitoring the benefits, co-benefits, and potential drawbacks of NbS in urban areas is crucial for assessing their effectiveness and cost-efficiency compared to more traditional infrastructure solutions. A comprehensive set of evaluation indicators must be embedded into a national spatial data platform and require their use in municipal spatial plans and impact assessments. ([D.2.1.3 Overview-of-socio-economic-long-term-benefit-of-NBS](#)) The indicators should address several areas related to the challenges that NbS aim to mitigate in the urban scope, including human health and well-being, economic impacts, environmental benefits, and social benefits.

The use of the indicators would track the status of the implementation of national policies in compliance with climate adaptation targets. Like in the Netherlands' "Nature Inclusive Building" dashboard, municipalities should be provided with spatial performance indicators to monitor urban biodiversity and water retention. In Slovenia, indicators for Natura 2000 are well-developed; in addition to that, there is an urban NbS monitoring system for Ljubljana.

This solution would support EU Biodiversity Strategy 2030 and the upcoming [Nature Restoration Law](#), which call for regular reporting on urban GI quality, but also create a bridge between fragmented monitoring landscape between national level and municipalities. Furthermore, it would enhance accountability in the implementation of national climate adaptation plans.

### 4. Creating a dedicated NbS Co-Financing Facility for Municipalities to ensure sustainable financing

Sustainable implementation of NbS depends on access to stable funding sources and the alignment of financial incentives with environmental goals. Establishing a national co-financing scheme (outside existing EU funds) that supports municipalities in preparing, implementing, and maintaining NbS projects is crucial to achieve **financial sustainability**. National programs should require long-term upkeep plans and allow budget allocations for **maintenance** over a project's life cycle.

The [German Promotion of Urban Development Program](#) offers co-financing up to 90% for small cities to green public spaces, with embedded maintenance funds. A comprehensive funding strategy supports all other recommendations. It ensures that municipalities can comply with new planning rules, motivate urban planners to adopt greener designs, and helps local governments sustain NbS beyond the initial implementation phase. Moreover, it encourages the use of innovative financial tools such as green bonds, resilience funds and health bonuses. Finally, it supports the prioritizing of smaller and mid-sized towns which are lacking the administrative capacity to apply for EU funds, so it impacts the uneven implementations which have been seen while comparing cities.

At operational level it can work in synergy with the Recovery and Resilience Plan (RRP) and Cohesion Policy investments, serving as a match-funding mechanism.



## 5. Establishing and implementing a coherent NbS-based re-skilling program for public officials and practitioners

A systematic Greenskilling and re-skilling training program should be launched at EU level, offering training on urban ecology, sustainable drainage, green design, and monitoring targeting public officials and practitioners: for spatial planners, health professionals and engineers, to change the philosophy of urban space design. The program could be implemented at National level through partnerships with universities, regional environmental agencies and [NBSEduWORLD](#) - which could coordinate at EU level the knowledge standards. Accessible guidance materials—such as an online “NbS Handbook” tailored at national level—should provide practical examples, cost-benefit data, and design templates. Standardized metrics and monitoring protocols are also needed to evaluate NbS performance and inform decision-making. Furthermore, capacity building should include the use of an open-data NbS/GI platform mapping existing green assets, climate risks, and NbS potential zones thanks to satellite data, municipal records, and citizen science. Indicators like number of professionals trained annually, number of cities with technical assistance, level of user satisfaction should be included in the monitoring process of the training program.

[GreenScape CE Package Pitch](#) for potential replicating urban areas is the ideal toolkit for municipalities and practitioners to be disseminated and constantly updated and can serve as best practice.

Furthermore, cities should be supported through regional centers of excellence and technical assistance. These entities could support the development and updating of the reskilling training program, as well as providing ad hoc advice.

Enhancing capacity enables the more effective implementation of regulations and funding programs. It also builds institutional confidence in Nature-based solutions (NbS) and supports performance-based public investment, strengthening the position of local and regional authorities. This approach addresses the lack of institutional capacity at local level and strengthens implementation mechanisms without changing the legislative framework.

Additionally, there is a need to focus on developing and promoting continuous research into the effectiveness and impact of measures to adapt to adverse climate change. New solutions based on NbS and GI must be sought and developed.

## 6. Integrating Citizen and community engagement in planning and maintaining of NbS

Citizens and communities need to be informed, engaged and to participate in the different phases of an NbS life. A public media campaign to inform about the health and climate benefits of GI should be launched at national and local level. The [GreenScapeCE DIY Guide](#) and its dissemination can be taken as an example.

Effective and lasting NbS require strong societal support. At policy level forums should be planned to enhance citizens participation. [European Green Deal 2.0](#): the forum which successfully engaged a diverse range of European citizens, from various socio-economic backgrounds actively engaging with complex topics. [The REAL DEAL Handbook](#), moreover, includes a range of the existing legal and institutional frameworks for citizen engagement in relation to the EGD: tools to be implemented should be selected at local level in order promote citizens' participation.

Cities should use workshops, digital platforms, citizen panels and [Hackathons](#) to support the co-creation of green infrastructure projects. Furthermore, education campaigns, including school programs, and co-design activities (e.g. tree planting) can enhance public ownership, which can impact the maintenance



too. Corporate sponsorships and citizen engagement in **maintenance** should be incentivized: for example adopt-a-tree program in [Erlangen, Germany](#) and [Milan's Forestami](#) - expands capacity and ensures local relevance. This approach strengthens the social sustainability of NbS and ensures they address the needs of diverse communities, especially in under-served or climate-vulnerable urban areas.

Participatory models from the [INPLAN](#) and [NECPlatform](#) projects represent a significant solution too, providing guidance and a multi-dimensions research platform, including best practices and potential stakeholders to be involved (see IN-PLAN digital practice). These should be disseminated for a wider use.

The number of citizens involved per project, level of engagement, and percentage of local proposals integrated into project solutions are indicators to be considered to monitor the citizens' engagement as a whole.

The recommended framework of actions aligns with the principles of the EU Green Deal and the [Aarhus Convention](#), connects the health, urban and environmental sectors through common social goals, increases the effectiveness and acceptance of public policies.

## E. Conclusions

Raising awareness of the benefits of Nature-based Solutions is increasingly impacting spatial planning, policies and funding opportunities at all levels. Due to the urgent need for wider uptake and coordination at policy, technical and financial levels, specific action must be taken.

Further research and proposals for new NbS are needed, as are further tests of funding opportunities. The level of citizen participation should also be enhanced through existing and new engaging methodologies.

The existing Knowledge Platforms mentioned above should collect and disseminate further knowledge and best practices to target groups that have not yet been involved. Coordination at the EU level is essential to benefit from project experiences, and to make knowledge, methodologies and regulations available.

To gain an in-depth understanding of the current situation and recommendations at a national level, the six position papers developed within the GreenScape CE project for Austria, Italy, Hungary, Slovenia and Croatia are recommended.

## F. References

- 2.4.1. Position paper on NbS/GI policies and state of play - Hungary
- 2.4.1. Position paper on NbS/GI policies and state of play - Austria
- 2.4.1. Position paper on NbS/GI policies and state of play - Italy
- 2.4.1. Position paper on NbS/GI policies and state of play - Croatia
- 2.4.1. Position paper on NbS/GI policies and state of play - Slovenia
- 2.4.1. Position paper on NbS/GI policies and state of play - Poland