

5

Conclusions and recommendations to mainstream green infrastructure and nature-based solutions in Italy

Despite recent efforts to promote sustainability considerations in public investment decisions, green infrastructure (GI) and nature-based solutions (NbS) are not yet fully integrated in spatial planning and projects' appraisal instruments in Italy. For this reason, the OECD has developed a series of recommendations to promote the integration of GI and NbS in infrastructure governance in Italy. The recommendations build on international good practices and 3 main pillars: 1) creating an enabling policy and regulatory environment for the consideration and uptake of GI and NbS; 2) defining clear institutional roles and responsibilities, and establishing co-ordination mechanisms to boost collaboration among the actors responsible for GI planning and implementation of NbS; and 3) building a knowledge-base and technical competencies for planning and implementation of GI and NbS across all levels of government

5.1. Create an enabling policy and regulatory environment for the consideration and uptake of green infrastructure and nature-based solutions

Italy has a comprehensive policy and regulatory framework to promote the sustainability of infrastructure in the country. This framework is centrally initiated, but also includes specific instruments for local and regional infrastructure projects. Good examples are the sustainability requirements connected to the DNSH principle and climate risk and vulnerability assessments in the PNRR, which require environmental sustainability in order to allocate funding to infrastructure projects.

However, while Italy certainly has good sustainability requirements for infrastructure plans and projects, the notion of sustainability does not explicitly consider GI. Although indicators such as mitigation of greenhouse gases, noise and vibrations, and biodiversity are usually considered in infrastructure planning and appraisal, infrastructures' impact on ecosystem services, whether positive or negative, is not yet an integral part of the Italian policy-making practice. The Italian government could benefit from the creation of a policy and regulatory environment for the consideration and uptake of GI in infrastructure planning and NbS in project planning, including the full consideration of the ecosystem and long-term benefits that they have to offer.

The following recommendations are proposed to improve Italy's policy and regulatory environment for the integration of GI and NbS:

- **Promote a cultural paradigm shift to enhance the consideration of GI and NbS:** in the Italian infrastructure sector – including public building, housing, urban planning, mobility, etc. – most stakeholders have traditionally considered NbS exclusively as decorative or additional to grey solutions. Nowadays, this approach is gradually changing; infrastructure designers and developers and urban and landscape planners are increasingly considering NbS as core assets able to deliver significant benefits. Nonetheless, this transition is in its early days. There is still a long way to go to fully consider NbS as part of infrastructure projects, or even GI, as core solutions to today's climate, biodiversity, social, and economic challenges. An example where this could be observed is in the Bicocca-Catenanuova railway, where individual NbS have been added, but the full potential of GI has not yet been exploited because the full benefits of using GI to enhance and connect nature areas are not yet integrated into spatial strategies of the region. Therefore, it is critical to mainstream GI and NbS use in key national policy strategies such as Nationally Determined Contributions, Adaptation Communications, and greenhouse gas emission reduction strategies, as well as in sectoral policies and strategies.
- **Define an integrated policy framework for GI and NbS:** the existing proliferation of “green” strategies and policies – both at the national and sub-national level – can generate confusion and lead to inaction, especially for regional and municipal administrations that do not have enough capacity to keep up with the expanding set of these strategies and policies. Moreover, sub-national actors often lack awareness of GI, and the absence of central-level guidance makes planning, implementation and monitoring of GI and NbS even more challenging. For this reason, it is important to define a national strategy specific to GI and NbS, which clarifies their benefits, their characteristics, the underlying challenges and trade-offs, and the available tools for implementation. A dedicated strategy would also be crucial to mainstream GI planning and NbS into sectoral strategies and policies and to ensure consistency and synergy across different green infrastructure projects and initiatives. The strategy should take into account the needs of sub-national administrations and their capacities to integrate the strategies into their policy-making processes, as well as the specific characteristics of each territory, as has been pointed out in the case study on Urban Regeneration in Bari.
- **Establish legislative and regulatory requirements to promote the adoption of GI/NbS** by public authorities and project designers and developers. This can be achieved by strengthening

existing public procurement strategies and regulatory frameworks to incentivise and promote the integration of NbS and GI in public investments. To this end, it is critical to either define new Minimum Environmental Criteria or refine the existing ones to promote and valorise NbS. One suggestion could be that MASE takes the initiative and works with all the key relevant stakeholders and involve those regions and municipalities with extensive experience implementing successful GI/NbS (for example, the cities of Bologna and Milan or the regions of Lombardy and Emilia-Romagna) and translate their experiences and lessons learned into Minimum Environmental Criteria. Another solution is to favour the use of green infrastructures with innovative solutions in the public tenders that involve significant changes in spatial planning.

- **Integrate GI and NbS considerations in the existing national and sub-national instruments for infrastructure appraisal.** Italy has multiple evaluation procedures which are currently used at both the planning (e.g. SEA) and the project level (e.g. EIA, EIS), and related appraisal tools (e.g. CBA, MCA). These instruments already include GI and NbS-related indicators, such as biodiversity, and identify impacts such as impacts on vegetation, soil, groundwater and fauna (see, for example, this report's case studies for the transport sector). The existing set of appraisal procedures and instruments should not be made any more complex. However, it could be adjusted to better consider GI and NbS. Moreover, the use of the instruments could be adjusted to fully grasp the long-term benefits of GI and NbS.
 - It is recommended to make ecosystem services an integrated component of infrastructure plans and regional spatial planning, so they can be properly assessed by a SEA, such as was suggested for SUMP's in this report's case study on Milan's M4, or for regional transport planning and spatial planning integration in the Bicocca-Catenanuova case study. The SEA should also explicitly assess the infrastructure planning's impacts on ecosystem services, and spatial planning that enhances these services, e.g. by creating large green corridors with GI, should be preferred.
 - Additionally, NbS should be more explicitly considered in appraisal at the project level, for instance, ensuring that the project enhances existing green areas, throughout the full project life cycle (thus including an impact assessment for the operational phase). Moreover, environmental impacts should be included in the CBA, as NbS are able to create monetary benefits over time, e.g. through recreation or avoidance of infrastructural failure induced by extreme weather events by NbS' ability for climate adaptation.
- **Strengthen sustainability and GI and NbS considerations in the evaluation framework recently developed by MIT to promote sustainable infrastructure.** This framework already includes attention to different dimensions of sustainability of infrastructure projects: economic and financial, social, environmental, institutional and governance (see chapter 4 for a thorough elaboration on the full evaluation framework). These sustainability elements are well-integrated over the full infrastructure life cycle, from planning to prioritisation and implementation. Therefore, the framework offers an excellent opportunity to integrate considerations throughout the full infrastructure life cycle. The fact that the framework also includes updated guidelines on ex-ante evaluation of public projects makes it even more appropriate, as it provides an excellent tool to fully grasp the benefits of NbS and select the project that best enhances ecosystem services. However, the framework could still use more explicit consideration of GI and NbS. Therefore, it is recommended to define KPIs for GI for infrastructure planning and for NbS for project appraisal, such as climate resilience, continuity of biodiversity, fragmentation of habitats, and total surface of natural areas in the proximity of the infrastructure, as was also mentioned as recommendation in the case study for the Bicocca-Catenanuova railway line.
- **Establish economic and financial incentives to promote the use of NbS by public authorities and project designers and developers.** Financial incentives to adopt NbS in infrastructure projects can help strengthen the business case and facilitate decision-making. The economic and

financial instruments can take the form of subsidies and payments, grants, tax reliefs and exemptions, insurance and as well as risk transfer mechanisms, and other fiscal policies. Proper legislation and regulations must be put in place to support economic and financial incentives for NbS projects. In addition, to change the current predominance of public financing for NbS, it also needs greater private sector involvement through innovative economic and financial instruments

5.2. Define clear institutional roles and responsibilities, and establish co-ordination mechanisms to foster collaboration among the actors responsible for GI planning and implementation of NbS

The current institutional set-up governing GI in Italy is puzzling. Many actors are involved in planning and implementation - both at the national and sub-national level -, but their roles and responsibilities often overlap. **Defining a common reference framework that assigns clear tasks and responsibilities to the relevant players is key.** It helps to clarify the main processes, actions, and actors that are necessary for the effective design and implementation of GI.

Moreover, currently there exists just a few opportunities for this wide range of actors to meet and exchange, and this represents another obstacle. Co-ordination is important to promote coherence and synergy across the different initiatives relevant for GI, as well as to address the trade-offs between them, where necessary. GI planning and implementation build on regulations, policies and actions that go beyond a single agency's responsibility, and green infrastructures often cross sectors, territories, and jurisdictions. For this reason, **a cross-sectoral and cross-governmental approach** is needed to raise awareness, enhance technical capacity, as well as to improve the policy and regulatory environment.

Given these premises, these are the suggested recommendations for Italy to improve the institutional arrangements governing GI planning and implementation:

- **Central-level institutions, such as MIT and MEF should start promoting more actively ecological connectivity, protection of biodiversity and ecosystem services in their policy and financing instruments.** This is essential to ensure the alignment of the actions (e.g. projects, policies, regulations) taken by other national and sub-national actors, especially those involved in land-use and territorial planning.

To date, MIT has not taken full advantage of its leading role to support the integration of GI in infrastructure and territorial development. GI should be mainstreamed in all the policies and regulations of the Ministry, and projects' impacts on ecological connectivity, biodiversity and ecosystems should be considered and inform the allocation of funds.

MEF also has an important role to play. The ministry is responsible for coordinating and planning public investments, and it could start promoting GI and NbS through its financing instruments. For example, it could make public financing conditional on the integration of considerations relevant for GI in public investments projects. Effective financial schemes can also incentivise the economic contribution by private actors to scale-up available finance for NbS. These can include land stewardship or payment for ecosystem services schemes.

- **Develop horizontal co-ordination mechanisms, both at the national (i.e. across ministries) and sub-national levels (i.e. across regional, provincial, and local administrations).** This is particularly important as GIs often cut across jurisdictions and sectors. At the central-government level, Italy should provide platforms where the different ministries (e.g. MIT, MASE, MoC, MASAF) and other key stakeholders specialised in climate and environmental issues (e.g. ISPRA) can meet, exchange knowledge, and inform sectoral policymaking (i.e. biodiversity, water resources, transport, energy, etc.). This ensures coherence and synergies across sectoral initiatives and helps bringing silos and addressing potential trade-offs in a more comprehensive and effective way. This

is particularly relevant as GIs are most effective when integrated into comprehensive plans (Ozment, Ellison and Jongman, n.d.^[11]). One solution could be to refine existing co-ordination mechanisms and institutions, for example CIPESS or the PINQuA's High-Commission, to extend the participation to all relevant actors (e.g. including MASE and ISPRA in the PINQuA's High-Commission) and pay more attention to matters related to GI, such as ecological connectivity and biodiversity protection.

At the sub-national level, it is also important to develop co-ordination mechanisms and platforms for regional and local authorities, especially for land-use and territorial planning. GI cannot be sustained by managing individual sites in isolation, as their associated benefits (e.g. protection, restoration, and enhancement of ecosystem services) often depend on processes taking place on a larger scale. To ensure GI reach the expected results, it is necessary to take a wider perspective and coordinate with other administrations operating across the national territory. This promotes coherence and synergies between sub-national regulations and plans for territorial development, as well as between individual infrastructure projects.

- **Develop vertical co-ordination mechanisms.** Sub-national administrations are critical drivers of GI planning and implementation. They can promote GI through regulations and strategies (e.g. land-use plans, building regulations, plans for territorial development, urban development strategies, etc.) and they are often responsible to carry out individual infrastructure projects. It is thus important to ensure their initiatives align with the strategic objectives defined by central-level ministries, especially MIT. This can be achieved in three main ways, which are not mutually exclusive: (i) Through funding mechanisms. For example, funds by MIT for sub-national infrastructure projects should be provided on the condition that projects align with GI criteria and strategic objectives. (ii) Through technical support. Under the existing framework, ARPAs are involved in the environmental assessment of sub-national plans for territorial development and individual infrastructure projects. They can take advantage of this role to strengthen considerations relevant for GI, such as plans' impacts on biodiversity and ecosystem services and their potentials to strengthen ecological connectivity across existing green and protected areas. (iii) Through strengthened environmental monitoring. Environmental monitoring of plans and projects is often disregarded, but it is key to ensure plans and programmes comply with the recommendations identified in the SEA/EIA process, as well as to identify in a timely manner unexpected environmental impacts (e.g. loss of animal or plant species, disruption of ecosystem services, land or habitat fragmentation) and intervene with corrective actions to safeguard ecological connectivity.
- **Engage non-government actors and define their roles and responsibilities.** Non-governmental actors can be engaged at different stages of the process, from planning to financing to implementation. Private actors (e.g. private landowners such as farmers) can contribute to funding NbS, and citizens, urban planners, and designers can be involved in the design process (i.e. co-design approach). For example, public administrations responsible for the implementation of NbS can launch consultation initiatives with the local community, offering citizens the opportunity to share proposals and actively contribute to the design of NbS. As in most Italian metropolitan cities available surfaces to host NbS are missing, co-operation with the private sector and citizens can offer new opportunities to make space for nature, for example by greening existing grey infrastructures (e.g. through green roofs) or de-sealing currently sealed surfaces. Moreover, local communities have often an important role in the long-term maintenance and sustained performance of NbS (e.g. urban farming, green urban spaces, green walls, etc.).

Collaboration with local actors also foster awareness raising, information exchange and new designs. It promotes the consideration of a wider set of needs, perceptions, and perspectives, which is important to make the final project effective. For this reason, Italy should promote ownership of NbS by non-government actors by engaging them from the very beginning (i.e. in the design phase), and throughout the entire decision-making and implementation process. This will

also help local communities and citizens to gain a good understanding of all the challenges and trade-offs involved in infrastructure planning and NbS projects.

Engaging local stakeholders in an efficient way requires the development of innovative tools and mechanisms, as well as the definition of clear roles and responsibilities for non-government actors for NbS.

5.3. Build a knowledge-base and technical competencies for planning and implementation of GI and NbS across all levels of government

Information plays a key role in identifying new opportunities and triggering action for the integration of GI NbS. Italy seems to suffer from different levels of knowledge-base and technical capacities among people working in different levels of governments. Uncertainty around these solutions bring us to turn in favour of traditional grey infrastructure so it's fundamental in the Italian context to generate and disseminate information on GI and NbS performances where they are still not well known. Information on their maintenance needs and on their effectiveness over time is crucial for their development and for their consideration in Italian planning and design processes conducted by local governments. There is also a need to spread information on hybrid solutions, when green elements complement traditional engineered solutions or grey infrastructures. Italy misses tools to well communicate and disseminate the available information on existing projects, good practices and performance data to support policy makers and urban planners in the use of GI and NbS and improve their consideration in the decision-making process.

To successfully plan and develop measures to address climate and environmental risks, public and private stakeholders rely on existing technical information. Italian actors need to be aware of GI and NbS potential and limitations on their territory. Before thinking about new solutions, it's fundamental that Italian authorities and agencies develop specific analysis on the natural assets of the Italian territory, map the risks local territories need to face consider how future scenarios could affect the effectiveness and existence of nature-based-solutions and GI and build methods to monitor their life cycles.

The following recommendations are proposed to improve Italy's knowledge and technical capacities on GI and NbS:

- **Understand natural assets and how GI and NbS can be better integrated in the territory (cost-benefit analysis).** Technical information related to existing ecosystems is crucial to design GI and NbS that are most appropriate to the territory. Even if evaluating the natural resource stock of a country is not easy as it seems, Italy could develop an **inventory of natural capital and assets** that can help estimating the values of GI and NbS services and benefits they could provide if implemented in a specific area taking into consideration its natural characteristics. For example, the United Kingdom performed a National Ecosystem Assessment and wrote guidelines on how to apply the natural capital approach in decision making processes to be sure that natural strengths play a role in the analysis conducted ex-ante during the infrastructure planning phase. Additionally, in Italy there is a need of building awareness of green elements' strengths and limitations to better adapt them to a specific natural habitat. Developing **new indicators** to assess and measure the benefits and costs of green infrastructures and NbS can help future policy makers and urban planners in the design of new interventions. Information on positive and negative **environmental impacts** of these interventions needs to be included in the above cost-benefit analysis in order to fully consider their relevance, costs and benefits over their lifetime, e.g. the repopulation and growth of economic activities induced by the presence of a strategic GI and so on. Italy could also consider **involving universities and academia** in helping with cost-benefit analyses given their experience on that and promoting the work they are conducting. As an example, the School of Architecture Urban Planning Construction Engineering at the Politecnico of Milan published a [catalogue on NbS for urban regeneration](#) and Stanford University developed a model called

InVEST (Integrated Valuation of Ecosystem Services and Trade-offs) which maps and values goods and services from nature and helps to quantify trade-offs and identify natural environments that can most benefit from investment in order to enhance natural capital and deliver ecosystem services.

- **Enhance data on existing ecosystem for effective GI and NbS planning and implementation.** Information on the location, composition and condition of ecosystems could help in GI/NbS planning and implementation across all levels of government. This information can facilitate the assessment of the suitability of green elements in specific places, as well as the monitoring of project impacts. At the same time, these data are also critical to avoid maladaptation, e.g. by avoiding using invasive or non-native species that can disrupt local ecosystems or enhance climate risks (e.g. planting flammable vegetation in fire-prone areas). To achieve this technical knowledge, Italy could create and maintain national and sub-national **ecosystems databases & maps which can serve as a basis for policy makers and urban planners for project planning**. This means that Italy needs to invest in data gathering and monitoring of **geospatial** information on land cover and use types, green spaces, biodiversity hotspots, ecosystem connectivity, habitat fragmentation, etc. The Italian administration should also increase the involvement of **ISPRA** as it gathers environmental data on the national territory, including data on GI and NbS planning and implementation and develops guidelines and recommendations for public authorities and administration (both at national and sub-national level).
- **Understand future scenarios, including climate scenarios, and how these affect the effectiveness of GI and NbS.** In addition to information related to ecosystems, there is a need to inform policy makers and planners regarding future scenarios and climate risks to better understand where, why and how GI and NbS need to be planned and/or implemented. Italy could include **climate change risks maps** in the **National Adaptation Strategy** they are working on. In this way they can provide valuable information to local governments to help them understand the risks they need to face and on what risk they should focus. Italy is experiencing many natural disasters causing deaths and problems to the natural capital of the territory. To help decreasing these risks, Italian policy makers should start using scaled-down climate and **environmental scenarios** that represent projected **climate-related natural hazards** at the national and local level in combination with information on local exposures and **vulnerabilities** affecting the population and the natural ecosystems.
- **Monitor information on GI.** Information on the effects of NbS and GI is fundamental to ensure their effectiveness and to show the positive and negative impacts. However, benefits from GI and NbS can take years to show up. To help bridge this gap, monitoring should be a requirement in each strategy or plan related to infrastructure planning and implementation. In order to achieve this objective, Italy could **involve private actors** such as financial institutions and insurance company that can cooperate in monitoring these effects and helping in building a good knowledge of performance information. Moreover, Italian strategies on planning infrastructure could include **new indicators** which can feed into **risk and impact assessments**, to be undertaken at different stages of the project lifecycle and helping the monitoring process considering all aspects. These assessments should include ecological and climate impacts in the vicinity of the GI and NbS site to be more accurate, as well as on other ecosystems that might be affected.
- **Encourage the consideration of GI and NbS and improve technical capacity across all levels of government.** Technical knowledge among GI and NbS practitioners need to be strengthened. In particular, at municipal level, there seems to be a lack of technical competences on NbS, as well as widespread uncertainty about their effectiveness. Hence, local administrations often tend to opt for solutions, such as grey infrastructure, they are more familiar with. To help bridge this gap and raise awareness around this topic, Italy could encourage universities and technical/professional schools to **promote GI and NbS in education programmes** maybe involving the Ministry of Education in the discussion and mainstreaming the word also among them. This could force urban

planners' new generation to be aware of climate risks and new solutions that can help in facing new challenges. To encourage the consideration of GI and NbS among current practitioners, MIT should organize **compulsory training programmes**, with the help of **ISPRA or regional ARPAs**, for construction experts, employees of municipalities, regions, national authorities and private stakeholders involved in the implementation of infrastructure (the so-called "participated companies", such as MM Spa in Milan).

- **Compile best practices and performance data on the planning and implementation of GI and NbS.** To help raise awareness and build knowledge among policy makers and urban planners, Italy could edit **handbooks and technical guidance documents** with case studies showcasing successful practices making the case for NbS / GI (from other municipalities, regions, private actors) both on the Italian territory. This will help in showing evidence on GI/NbS effectiveness and provide practical examples. To increase the communication of these best practices, Italian ministries might want to develop **online platforms** to facilitate the knowledge exchange and help co-ordination among stakeholders at the national and local levels of administration. Promoting peer learning at both national and international level would be valuable. Italy could also further benefit from the already existing EU platforms on climate adaptation, GI, and NbS, to further scale up capacity building on the experience of other countries that may have faced similar risks (Climate ADAPT, Urban Nature Atlas, URBACT).
- **Create a National Competence Centre on GI and NbS.** This would be a real asset in the future development of these new solutions. Most notably, it could **connect** municipalities, key public and private stakeholders (such as environmental agencies, enterprises, academia, and community associations) and administrations at higher levels. It might be involved in helping with a lot of the recommendations listed above in order to increase information and technical competences among the Italian territory. Firstly, conducting a first **assessment of municipalities' needs** to understand their major challenges and guide the creation of toolboxes with the required information would be crucial since it can be the starting point to fill the knowledge gap existing among the key actors working on these subjects. After having done a preliminary analysis, the National Competence Centre could group the **relevant datasets, tools, handbooks, websites, platforms** needed to have a solid information base and create a good **communication strategy** to share them with policy and decision makers, urban planners, GI and NbS practitioners. In a later stage, it might also be useful at the ministry and government as an advisory body that might help in developing new strategies and laws.

Reference

Ozment, S., G. Ellison and B. Jongman (n.d.), *Nature-based solutions for disaster risk management*, World Bank Group, <http://www.naturebasedsolutions.org>. [1]



From:
Developing an Integrated Approach to Green Infrastructure in Italy

Access the complete publication at:

<https://doi.org/10.1787/d84bb8e4-en>

Please cite this chapter as:

OECD (2023), “Conclusions and recommendations to mainstream green infrastructure and nature-based solutions in Italy”, in *Developing an Integrated Approach to Green Infrastructure in Italy*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/8bd451a2-en>

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.