

What is Green Infrastructure?

Green Infrastructure “is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.” Linked together, these strategically planned networks of green elements are able to provide multiple benefits in the form of supporting a green economy, improving quality of life, protecting biodiversity and enhancing the ability of ecosystems to deliver services such as disaster risk reduction, water purification, air quality, space for recreation and climate change mitigation and adaptation.

The European Green Infrastructure Strategy

The Green Infrastructure Strategy proposed by the European Commission, promotes the development of Green Infrastructure across the EU delivering economic, social and ecological benefits and contributing to sustainable growth. It guides the implementation of Green Infrastructure at EU, regional, national and local levels. A main feature of the Green Infrastructure Strategy is its integration into relevant policies through: ecosystem-based adaptation into climate change policies; nature-based solutions into research and innovation policies; natural water retention measures into water policies; and through its focus on delivering multiple ecosystem services and their underlying factor - a rich biodiversity - into nature policies. The Natura

2000 network in particular plays a major role in protecting many of the core areas with healthy ecosystems.

As Green Infrastructure can make a significant contribution to many sectors and EU policy objectives, Green Infrastructure is being integrated into many funding streams including Structural Funds (the European Regional Development Fund (ERDF); European Social Fund (ESF)), the Cohesion Fund (CF), the European Maritime and Fisheries Fund (EMFF), the European Agricultural Fund for Rural Development (EAFRD), LIFE+ and Horizon 2020 project funds and the Natural Capital Financing Facility (NCFF) of the European Investment Bank (EIB).

Costs & benefits of Green Infrastructure

Green Infrastructure can often provide more benefits at less cost than single-purpose grey infrastructure. A growing body of research and experience demonstrates Green Infrastructure’s high potential due to its multi-functionality, i.e. its ability to perform several functions and to provide several benefits in the same spatial area. These functions can be social (providing healthy environment or green space for leisure and sports), environmental (conserving biodiversity or adapting to climate change and related water issues), and economic (supplying jobs, raising property prices and reducing damage recovery costs). These benefits will however only be fully delivered if Green Infrastructure elements are functional: they need to be big enough, at the right place and well connected. At the same time, these multiple benefits need to be weighed against the costs of establishing and maintaining Green Infrastructure, ideally over the expected life cycle.

Green Infrastructure and the European Semester

Green Infrastructure can play a role in the European Semester, for instance through natural flood prevention or job creation. Floods are among the most common and most costly natural disasters in Europe, and flooding events are likely to become more frequent with climate change. Benefiting from nature’s own capacity to absorb large quantities of excess water is cost-effective and can play a major role in sustainable flood risk management. Investing in Green Infrastructure for flood protection typically yields benefits 6-8 times the costs. Investments in Green Infrastructure can help boost new markets in services, such as planning, implementing and monitoring Green Infrastructure.

Green Infrastructure in Poland

'Preserved natural wealth' and 'ecological corridors and networks' are the key elements of Green Infrastructure in Poland. For example, ecological corridors are natural determinants of the National Spatial Development Concept, the Spatial Development Plans of 'Voivodeships', the highest-level administrative subdivision of Poland corresponding to a province in many other countries, as well as studies of conditions and directions of spatial development. However, there is no obligation to include ecological connectivity in local plans, with the result that corridors are often absent. There are no uniform rules to determine corridors, and therefore, there is no consistent network of corridors and the degree of implementing ecological corridors varies in local plans. Poland also misses an integrated, multi-sectoral and coherent strategy for implementing Green Infrastructure. Furthermore, in the absence of a coherent spatial planning system,

Poland is increasingly losing its natural potential to create Green Infrastructure due to a growing fragmentation of ecosystems. The key condition for effective Green Infrastructure creation is therefore to fight the continued fragmentation. Currently, one of the major barriers is the lack of effective legal instruments, regulations and guidelines. Furthermore, the national Natura 2000 network, which should serve as the natural basis for Green Infrastructure is not yet spatially coherent because the inclusion of ecological criteria is not mandatory for spatial planning and definitions of ecological corridors are not harmonised (e.g., ECONET-PL definitions developed by IUCN Poland vs. Mammal Research Institute, Polish Academy of Sciences, etc.). The notion that Green Infrastructure helps to meet goals in other policy domains such as climate adaptation, water management, recreation and tourism, and food security is not yet fully incorporated.



Policy setting & ongoing implementation

The National Spatial Development Concept (NSDC2030) strategy acknowledges the importance of sound spatial ecological relationships for nature protection. One of the main ongoing (2014-2017) projects for implementing the NSDC2030 strategy is called "Protecting biodiversity through the implementation of land-based network of ecological corridors in Poland". It aims at: (a) verifying ecological corridors in cases of conflicts with grey infrastructure (ongoing); (b) indicating ecological corridors of reduced ecological continuity for priority action (ongoing); (c) assigning land for afforestation to improve ecological corridors (ongoing); and (d) developing guidelines and rules for designating regional and local ecological corridors (not yet started).

Action 5 of the EU Biodiversity Strategy to 2020 calls on Member States to work on the "Mapping and Assessment of Ecosystems and their Services" (MAES). Poland's Ministry of Environment launched the MAES process in 2014; it should be completed by the end of 2015. Furthermore, a pilot project to determine the value of ecosystem services for the Ramsar site Wigry National Park was completed in 2014. Both MAES and the valuation of the Wigry National Park help to understand the value of ecosystem services in the Polish context and contribute to filling up data gaps; they are also expected to help speed up the process of establishing Green Infrastructure in Poland.

Regarding the national Country-Specific Recommendations from the European Semester, the two projects above may contribute to ensuring compliance of road investments with the environmental acquis, particularly with biodiversity conservation requirements. Given the number of planned road investments and the number of EU environmental infringement cases related to road construction, Polish authorities should ensure that the investments do not have a negative impact on protected habitats and species. In this context, implementing the EU Green Infrastructure Strategy should be one of the highest priorities.

Good practices in Poland

Łódź becoming a Blue-Green City

Łódź is located between the basins of the Vistula and Oder Rivers. Most rivers in the area were channelled and integrated into the sewage systems as a result of the rapid development of industry in the nineteenth century. To deal with environmental challenges, Łódź intends to develop and implement the so-called blue-green network, which aims at harmonising the functions of urban rivers while restoring the valley's potential for self-regulation and at integrating planning and management of green and blue areas. The project included the re-naturalisation of the rivers resulting in healthier populations of aquatic plants and animals and multiple other benefits. The project cost is EUR 2.3 million.

Benefits of the project include:

- Improvement of the quality of life and health of inhabitants (recreation, environmental security);
- Contribution to environment management and lowering its costs (storm water management: vegetation maintenance, flood protection, operating costs of waste water treatment plants, re-investment in infrastructure);
- Contribution to city redevelopment and integrated revitalisation;
- Contribution to sustainable development (increased system flexibility, GCC adaptation, sustainable transport); and
- Improvement of the city's appeal, thus potentially retaining talents and capital by attracting professionals and creative individuals who tend to choose attractive places to live and work.

Pomerania –Wetlands restoration providing multiple benefits

In the Pomerania wetlands in the North of Poland, a wetland restoration project for removing invasive trees and old draining systems was initiated by various local, regional and national stakeholders and funded by various EU and national sources. The restored bogs in the river valley act as sponges and protect against floods, increase water quality and reduce surface water runoff. As a result of the wetland rehabilitation, the conservation of certain species (including endangered marsh plant species) was ensured as well as genetic diversity. The areas can act as important storage sites for CO₂. The project cost is EUR 1.8 million.

Benefits of the project include:

- Reduction of excessive run-off and of consecutive flooding of the area and agricultural lands;
- Inhibition of mineralisation and eutrophication of the surface layer, resulting in improved water quality;
- Halting the loss of biodiversity of alkaline fen habitats;
- populations of the extremely endangered species *Saxifraga hirculus*; and
- Protection of alkaline fens as CO₂ accumulating areas and supporting climate change mitigation.

“Green Karkonosze” – tourism development on the Czech-Polish border

The Green Karkonosze project shows how investment in Green Infrastructure may result in tangible environmental, economic and social benefits, mainly through improved access to green areas. Urban parks in the close-to-border cities of Jilemnice, Karpacz and Kowary were revitalised and trails and paths were created. Furthermore, better access to the nature attraction Raven Rocks in Karpacz was ensured. As a result, the project substantially contributed to the accessibility of the regional

Green Infrastructure, thus enhancing the benefits of nature for both inhabitants and tourists. Revitalisation of urban parks also benefited the environment and biodiversity in the city. As a result, the Czech-Polish border area attracted more visitors, which in turn increased income, jobs and sales. The project cost is EUR 777,000. Benefits of the implemented Green Infrastructure measures are expected to be higher than the costs of the project, especially in the long run.

Benefits of the project include:

- Improved access for tourists visiting the border area, thus enabling both inhabitants and tourists to benefit more from urban and suburban ecosystem services;
- Increased benefits from cultural ecosystems services and strengthened regional economy through expanded tourism, increased income, jobs and higher sales; and
- Increased environmental awareness, improved local environments and better protection of the biodiversity in the cities.



wetland restoration

Challenges and opportunities

- There is a lack of figures on benefits to convince decision makers of the opportunities of investing in Green Infrastructure.
- There is a lack of awareness and public participation to gain a broader buy-in for Green Infrastructure efforts.
- Limited capacity is a major barrier to improved Green Infrastructure implementation in Poland.
- Legal instruments still need to be harmonised with integrating spatial planning processes; these are currently limited as local plans are carried out for distinct projects, but spatial planning is not coordinated across a district or county area.
- Analysis of available funds is a necessary step, followed by technical assistance facilitating the use of various available funds.
- Promotional efforts should emphasise socio-economic growth benefits of Green Infrastructure, not only environmental benefits.
- Capacity building and training of relevant stakeholders are necessary to improve interaction across disciplines and sectors

relevant for 'mainstreaming' Green Infrastructure.

- The MAES process in Poland is useful for spatially-explicit prioritisation and problem identification in relation to Green Infrastructure uptake.
- Poland should build upon key lessons learned from implementing the Infrastructure and Environment Operational Programme (OP), integrating biodiversity and nature conservation issues into its different sectors. In particular, the project 'Increasing retention and preventing floods and droughts in forest ecosystems in lowland areas' is a good basis for exploring possibilities for nature-based water management that yields both biodiversity and economic benefits. The Infrastructure and Environment OP represents a good example of integrated policy planning that addresses both environmental and economic development objectives.



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