Green Infrastructure in **Spain**

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 adaption.

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.

The Green Infrastructure approach features also in regional and cohesion policies, disaster prevention and the greening of the Common Agriculture Policy.

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 Spain

Spain has no Green Infrastructure Strategy as such, but the concept of Green Infrastructure is incorporated quite explicitly in various places in existing national legislation. Law 42/2007 (Natural Heritage and Biodiversity) imposes a general obligation for the autonomous regions to take measures aimed at ensuring environmental connectivity, while various regional laws focus on connectivity of natural areas. Prior to adopting Law 42/2007, autonomous communities had already introduced some initiatives to develop corridors. The focus of Spanish policy is to implement measures ensuring connectivity between existing protected areas rather than promoting the development of a comprehensive and coherent ecological network.

Policy setting & ongoing implementation

Green Infrastructure is acknowledged in several laws on ecosystem service delivery, such as Law 9/1995 on territorial, soil and city planning policy measures in the Autonomous Community of Madrid. The Ministry of Environment and Rural and Marine Affairs is implementing the 'Projects of National Plan for River Restoration in Confederación Hidrográfica del Cantábrico', which connects Green Infrastructure to the Water Framework and Flood Directives and correlates positively with ecosystem service areas and green urban areas. The Spanish Strategy for its Coastal Zone relates to Green Infrastructure through two fundamental challenges: restore physical functionality in the natural coastal zone and adapt to climate change.

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). Spain has completed a national assessment following the concepts of the Millennium Ecosystem Assessment (MA).

Good practices in Spain

The Barcelona Green Infrastructure and Biodiversity Plan 2020

Barcelona is one of the most densely populated cities in Europe. Whilst it has a relatively low ratio of green space per inhabitant, it has more street trees than most other European cities: currently around 161,423 trees of 150 different species line the streets of Barcelona. The 'Barcelona Green Infrastructure and Biodiversity Plan 2020', which was released in 2013, lists over 70 projects and actions with the following aims: provide environmental and social services, introduce nature into the city, increase biodiversity, increase connectivity among patchy Green Infrastructure and make the city more resilient. Ongoing Green Infrastructure projects and biodiversity projects are: Green Corridors Network, urban allotments with eco-gardening, habitat conservation (artificial reefs) and species conservation (protection of amphibians in urban ponds and protection of urban birds). There are artificial reefs in the Mediterranean Sea south of Barcelona to restore marine biodiversity; this pioneer project aims at facilitating the reproduction of species and benefitting traditional fishing methods.

Benefits of the project include:

- Trees have a positive impact on health since air pollution is a major environmental challenge for the city; and
- Health and educational benefits from gardening and contact with nature

Green Infrastructure in **Spain**

Vitoria-Gasteiz

Vitoria Gasteiz is located on the Mediterranean slope of the Basque Country, in the Ebro River Basin. In the early 1990s, Vitoria-Gasteiz started an ambitious project to restore and recover the outlying areas of the city, creating a Green Belt: a group of peri-urban parks of high ecological and landscape value strategically linked by eco-recreational corridors. The project aimed to restore the Vitoria urban periphery, both from an ecological and a social point of view, with a focus on flood prevention. Vitoria-Gasteiz and its peripheral areas (surface area of 645 ha) now have five parks and a further two are planned. There are also Wetlands of International Importance according to the Ramsar Agreement and four areas are declared Sites of Community Importance (SCI) and included in the Natura 2000 network. There are still some degraded areas around the city that need to be restored to their natural state. Moreover, work is underway on the system that will link these green spaces with ecological corridors, strengthening the existing green belt. In 2012, the city received the title of European Green Capital.

Two examples of projects involving the Green Belt that have already been carried out are:

1. Transforming a section of the Zadorra riverbanks into a large natural park integrated in the Green Belt, as a leisure area and at the same time as a flooding space for the river; and
2. Diverting the southern streams away from the sewage system into the Salburía Wetland to recover the wetland and integrate it in the Green Belt.

Benefits of the project include:

- Increased opportunities for leisure;
- Flood prevention; and
- Ecological restoration.


Vitoria-Gasteiz

Deva River

The Deva River in Northern Spain flows through the Autonomous Communities of Cantabria and Asturias to the Cares River and then to the Atlantic Ocean. The right bank of this fluvial reach was experiencing intense erosion, which in turn had degraded the existing riparian forest. The presence of meadows has reduced the space of fluvial mobility. The aims of the project were to avoid further erosion of the right bank of the Deva River while promoting the development of the riparian forest. The ideal situation is to achieve a continuous riparian forest. The project was designed by the Confederación Hidrográfica del Cantábrico and executed by TRAGSA with funding from the Spanish Ministry of the Environment. Bio-engineering techniques were chosen to promote the development of the riparian forest: the Green Infrastructure element protecting the banks from water erosion. This included re-profiling the banks, lowering their slope to give them more stability and facilitating the establishment of the vegetation. The project cost EUR 186,389.


Vitoria-Gasteiz

Challenges and opportunities

- A polarised approach to territorial planning has often resulted in social conflicts between conservation authorities and resource users, with largely negative consequences for biodiversity and ecosystem services. Natural areas under strict conservation programs are embedded in a broader matrix of intensively managed land uses (mostly for food production).
- Further integration of industrial and nature conservation policies.
- Integration of biodiversity into economic sectors, e.g., tourism, to promote the development of multifunctional Green Infrastructure areas.
- Integration of sustainable agriculture and a network of protected areas within broader production landscapes to promote the development of multifunctional Green Infrastructure areas.
- Further integration of the Green Infrastructure approach into landscape and urban planning processes.
- Promotion of commitment for Green Infrastructure in regions where commitment is currently low.
- Incorporation of conclusions and recommendations from MAES/MA into decision making.
- Further development of sub-regional plans (still lacking in some regions).

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