



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.

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 Malta

Currently, Malta's Green infrastructure is seen as a holistic framework for resource planning and conservation. This involves improving the ecological coherence of Natura 2000, via its integration into the broader landscape and as a result curbing habitat fragmentation; improving adaptation to climate change; and aiding in integrated flood management.



Policy setting & ongoing implementation

Green Infrastructure and connectivity are still relatively new concepts in Malta. The national Strategic Environmental Assessment legislation (L.N. 418 of 2005) did not include any specific reference to the coherence of ecological and / or protected area networks or to fragmentation. However, Malta's National Biodiversity Strategy and Action Plan 2012-2020 explicitly address Green Infrastructure and connectivity. The government has introduced various policies to preserve Malta's biodiversity, as the small island is home to a "varied and interesting array of habitats and hosts endemic, indigenous, and migratory species", as stated in the National Environment Policy. The policy outlines measures to halt the loss of biodiversity by 2020. Yet Malta's biodiversity continues to be threatened by land development, invasive species, over-exploitation of species and climate change.

At the national level, there is a policy to protect ecological corridors in the form of rubble walls in agricultural areas, which enhance connectivity while providing refuge for fauna. These walls are found everywhere in Malta and serve as borders between fields and farms. These structures also allow excess rainwater to drain from the fields, both benefiting agriculture production and minimising soil erosion. They are a good example of how integrated design of Green Infrastructure helps to deliver multiple benefits such as storm water management, maintenance of the water table and interconnected wildlife refuges.



Good practices in Malta

EcoGozo

The 'EcoGozo' vision document, released in November 2009, is a compendium of ideas and measures to turn the Maltese island of Gozo into an eco-island by 2020. Key actions are distributed into four main priority areas: economy, environment, society and identity. Environment related proposals include nature conservation initiatives, such as tree planting and establishing marine Special Areas of Conservation to improve Gozo's natural heritage. Other proposals include more efficient irrigation techniques, more sensible use of pesticides and other actions to make agriculture more sustainable. The ideas and measures in 'EcoGozo' have the potential to restore habitats for biodiversity and to improve the delivery of ecosystem services; they should also make local farming practices more sustainable and create new tourism and new job opportunities. Thus, Gozo can become a multifunctional Green Infrastructure area capable of combining farming, tourism and recreational activities.

Alter Aqua Water Programme

Malta has limited freshwater resources. The Alter Aqua Programme, initiated in 2011, aims to mobilise non-conventional water resources in order to secure water availability and facilitate sustainable development. It is a multi-stakeholder initiative, financed by Maltese Ministries and The Coca Cola Foundation. It was launched in November 2011, in Gozo, and expanded to the Island of Malta in January 2014. The Programme's activities include rainwater harvesting, greywater reuse systems and storm water management in the Ramla Valley. The latter involves reconstructing rubble walls in Ramla Valley to increase water availability for irrigation, allow aquifer replenishment and prevent soil erosion. As mentioned above, rubble walls also serve as an important ecological corridor and a refuge for a number of endangered terrestrial fauna.

Cost: EUR 1.14 million

Benefits of the project include:

- Increased water availability;
- Prevention of soil erosion; and
- Increase in connectivity and biodiversity.

The LifeMedGreenRoof Project

The LifeMedGreenRoof Project, set up within the Faculty for the Built Environment of the University of Malta and co-financed by LIFE, aims to demonstrate how Green Infrastructure can enhance the quality of life in urban areas, delivering multiple benefits. In particular, the project is constructing two demonstration green roofs to experiment with growing media and choice of plants. It serves as a pilot to investigate how green roofs perform in a Mediterranean climate. It tests the potential of green roofs as insulation against heat, especially in the summer months, and



the reduction of the use of air conditioning and the potential of green roofs for mitigating local flooding. The project proposes a holistic approach, including insulation, the generation of alternative energy and the creation of wildlife habitats.

Benefits of the project include:

- Amenity and recreational space and thermal insulation of the underlying rooms.
- Reduction of the carbon footprint of buildings and energy bills.
- Mitigation of localised flooding as the growing medium absorbs rainfall and delays water run-off.
- Plants attract wildlife, which in turn provide ecosystem services.
- Green roofs make photovoltaic panels more efficient by reducing the ambient temperature above the roof.
- The installation of a green roof increases property value.



Challenges and opportunities

- Implementation of Green Infrastructure policy has only recently started.
- Analysis of available funds is a necessary step, followed by technical assistance facilitating the use of the various available funds.
- Financial incentives by local or central governments or legislation are needed to encourage green roof technology.
- Structures to promote public-private partnerships to find additional finance are needed.
- Lack of figures on benefits to convince decision makers of the opportunities of investing in Green Infrastructure.
- Lack of awareness and public participation to gain broader buy-in for Green Infrastructure efforts.
- Limited capacity presents a major barrier to improved Green Infrastructure implementation.
- Promotional efforts should emphasise socio-economic growth benefits of Green Infrastructure, not just environmental benefits.
- Capacity building and training of relevant stakeholders to improve interaction across disciplines and sectors relevant for 'mainstreaming' Green Infrastructure.
- Starting up a MAES (Mapping and Assessment of Ecosystems and their Services) process would be useful for spatially explicit prioritisation and problem identification in relation to Green Infrastructure uptake.

References

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