



European
Commission

Building a Green Infrastructure for Europe

Environment

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ISBN 978-92-79-33428-3

doi: 10.2779/54125

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Printed in Belgium

Printed on recycled paper that has been awarded the EU eco-label for graphic paper (<http://ec.europa.eu/ecolabel>)

Cover photo: Eco building, © Eugene Sergeev/Shutterstock

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Green Infrastructure (GI): a smart solution for today's needs

Investing into Green Infrastructure (GI) makes sound economic sense – a single area of land can offer multiple benefits, provided its ecosystems are in a healthy condition. Such healthy ecosystems, which are powered by the diversity of life within them, provide society with a stream of valuable, economically important goods and services such as clean water and air, carbon storage, pollination etc. They also play a central role in fighting climate change impacts by protecting us against floods and other environmental disasters.

If these natural powerhouses are damaged, it is not just our biodiversity that suffers but society as a whole. Although ecosystems do constantly evolve, the recent pace of change in Europe has been unprecedented and has led to increased competition for space, especially in the more populated regions. The repercussions of such a fragmented and degraded landscape go well beyond the mere loss of biodiversity – nature will only deliver few and depleted benefits to people.

In contrast, by focusing on nature-based solutions to improve our Green Infrastructure, we might be able to maintain healthy ecosystems, reconnect fragmented natural and semi-natural areas and restore damaged habitats, so they can provide us with more and better goods and services.

Above all, GI offers us a smart, integrated way of managing our natural capital. All too often, the challenges we face today are approached in a highly segregated manner with little consideration for the complex interactions between major land use activities such as housing, agriculture, transportation and biodiversity.

GI promotes dynamic forward-thinking solutions that enables us to tackle diverse and often competing land management issues in a spatially coherent manner, whilst at the same time enhancing the potential for multiple co-benefits and win-win solutions. GI investments finally create both high- and low-skilled jobs, such as in planning, engineering and building its elements as well as in restoring and maintaining urban and rural ecosystems.

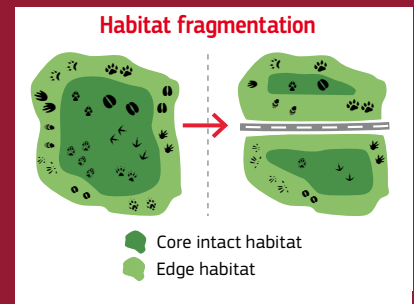
Green Infrastructure brings multiple benefits to both rural and urban areas.

Europe: a fragmented continent

Over the last few decades traditional land use activities, such as farming, have, on the whole, become more intensive. Vast areas of Europe have also been transformed into urban zones or cut up by an increasingly dense transport network.

Recent statistics from the European Environment Agency illustrate just how significant these changes are. In a single decade around 5% of EU territory was covered with concrete or otherwise converted into artificial areas.

Europe's motorways have also increased in length by almost 41% (15,000 km) within that same period and are set to increase by a further 12,000 km in the years to come. In densely populated countries like Belgium, the average size of contiguous land units not cut through by major transport routes has been reduced to just 20 km² (EU average is 130 km²).



Habitat fragmentation (EEA, 2011).

Benefits provided by Green Infrastructure



Environmental benefits

- Provision of clean water
- Removal of pollutants from air and water
- Pollination enhancement
- Protection against soil erosion
- Rainwater retention
- Increased pest control
- Improvement of land quality
- Mitigation of land take and soil sealing



Social benefits

- Better health and human well-being
- Creation of jobs
- Diversification of local economy
- More attractive, greener cities
- Higher property values and local distinctiveness
- More integrated transport and energy solutions
- Enhanced tourism and recreation opportunities



Climate change adaptation and mitigation benefits

- Flood alleviation
- Strengthening ecosystems resilience
- Carbon storage and sequestration
- Mitigation of urban heat island effects
- Disaster prevention (e.g. storms, forest fires, landslides)



Biodiversity benefits

- Improved habitats for wildlife
- Ecological corridors
- Landscape permeability



What is Green Infrastructure?

Green Infrastructure can be broadly defined as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings.

More specifically GI, being a spatial structure providing benefits from nature to people, aims to enhance nature's ability to deliver multiple valuable ecosystem goods and services, such as clean air or water.

This will in turn:

- **Foster a better quality of life** and human well-being, for instance by providing a high quality environment in which to live and work.
- **Improve biodiversity**, for instance by reconnecting isolated nature areas and increasing the mobility of wildlife across the wider landscape.
- **Protect us against climate change** and other environmental disasters, for instance by alleviating floods, storing carbon or preventing soil erosion.
- **Encourage a smarter, more integrated approach** to development which ensures that Europe's limited space is utilised in as efficient and coherent a way as possible.

One of the key attractions of GI is its ability to perform several functions in the same spatial area. In contrast to most 'grey' infrastructures, which usually have only one single objective, GI is multifunctional which means it can promote win-win solutions or 'small loss-big gain' combinations that deliver benefits to a wide range of stakeholders as well as to the public at large. However, for this to happen, the ecosystem must be in a healthy condition.

Green Infrastructure encourages a more sustainable and resource efficient development process in line with Europe's 2020 Strategy. It can act as a catalyst to economic growth by attracting inward investments and generating employment, reducing environmental costs and providing health benefits amongst others. Experience has shown that investing in Green Infrastructure can contribute to the recovery of Europe's economy by fostering innovative approaches and creating new green businesses. Green jobs already represent around 5% of the job market.

GI can also support different EU and nationally driven policies and actions, including those in the fields of agriculture and rural development, forestry, biodiversity, water, climate change, green growth, transport and energy, sustainable urban development, health and spatial planning.

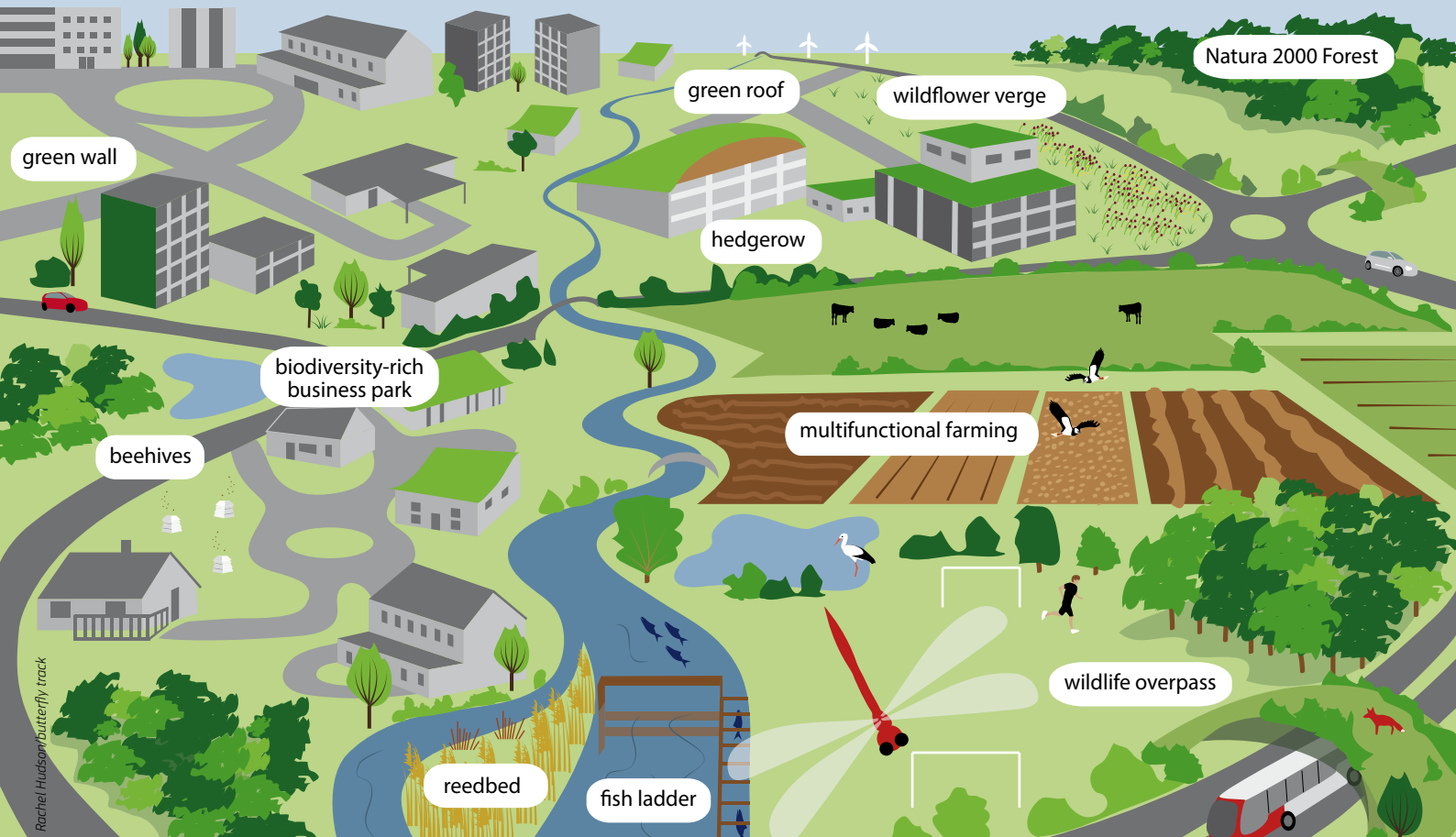
Multifunctionality of GI

A typical example of a multifunctional GI area would be one that is capable of combining farming, forestry, housing, as well as tourism and recreational activities in the same space whilst at the same time keeping our freshwater systems clean, our air healthy and our wildlife safe.



Another classic example of GI is a healthy floodplain ecosystem which, unlike an artificial dike, not only provides flood prevention but also delivers water filtration and maintenance of the water table, as well as recreation possibilities, carbon storage, timber and interconnected wildlife refuges.





Potential components of a Green Infrastructure



- Core areas of high biodiversity value which act as hubs for GI, such as protected areas like Natura 2000 sites



- Core areas outside protected areas containing large healthy functioning ecosystems



- Restored habitats that help reconnect or enhance existing natural areas, such as a restored reedbed or wild flower meadow



- Natural features acting as wildlife corridors or stepping stones, like small watercourses, ponds, hedgerows, woodland strips



- Artificial features that enhance ecosystem services or assist wildlife movement such as eco-ducts or eco-bridges, fish ladders or green roofs



- Buffer zones that are managed sustainably and help improve the general ecological quality and permeability of the landscape to biodiversity, e.g. wildlife-friendly farming



- Multi-functional zones where compatible land uses can join forces to create land management combinations that support multiple land uses in the same spatial area, e.g. food production and recreation



What does a Green Infrastructure consist of?

Green Infrastructure is made up of a wide range of different environmental features which can operate at different scales, from small linear features such as hedgerows or fish ladders or green roofs to entire functional ecosystems, such as intact floodplain forests, peatlands or free-flowing rivers. Each one of these elements can contribute to GI in urban, peri-urban and rural areas, inside and outside protected areas.

It is important however to be aware that not all green spaces or environmental features necessarily qualify to be part of GI. In addition to being of high quality they must also form an integral part of an interconnected GI network and be capable of delivering more than simply 'a green space'. An urban park inside a city, for instance, might well be considered an integral part of Green Infrastructure if it acts as a cool air corridor, absorbs excess water run-off and offers an attractive outdoor area for recreation and wildlife. On the other hand, a patch of uniform grass that contains no other environmental features is unlikely to qualify as GI.

In rural areas, intensively managed farmland would also not normally form part of a GI network unless it were specifically managed in a way that supports local biodiversity or that encourages a more multifunctional land use which combines food production with other benefits, like recreation or water purification.

Small is beautiful but big is better!

Whilst elements of a GI network can operate at different scales, they must normally have a certain critical mass and connectivity potential to be able to contribute effectively to a Green Infrastructure. An individual tree may be an element of Green Infrastructure, but it will only be of value if it forms part of a larger habitat or ecosystem that services a wider function.

Ecosystems are complex and dynamic living structures that require a minimum size and connectivity to function properly and to remain resilient to change. If they are reduced to below a critical threshold they may no longer be capable of regeneration and their social, economic and biodiversity value will fall dramatically.

Not all green spaces qualify for GI, only those of high quality and that form part of an interconnected network.



What is the relationship between GI and Natura 2000?

The EU has set itself an ambitious target of halting the loss of biodiversity in Europe by 2020. At the heart of its efforts, is the establishment of an EU-wide network of protected areas spanning all 28 EU countries – called the Natura 2000 network. Today, there are over 27,000 sites included in the network, covering approximately 18% of EU land territory as well as important marine areas.

Natura 2000 lies at the very core of Europe's Green Infrastructure. It not only acts as an important reservoir for biodiversity and healthy ecosystems, which can be drawn upon to revitalise degraded environments across the broader landscape but also delivers many ecosystem services to society, the value of which has been estimated at €200–300 billion per annum.

In forming the hubs of a European Green Infrastructure, Natura 2000 sites provide a strategic focus for improving our natural environment and enhancing the quality of our lives. At the same time, implementing a Green Infrastructure beyond protected areas will help to strengthen the coherence of the Natura 2000 network by making the core areas more resilient, providing buffers against impacts on the sites, and offering practical real-life examples of how healthy protected ecosystems can be used in a way that provides multiple socio-economic benefits to people as well as to nature.

The Natura 2000 viewer: <http://natura2000.eea.europa.eu>



Natura 2000 sites for protected species like the lynx and the Cyprus bee orchid act as biodiversity-rich hubs for the GI.



How is a Green Infrastructure built up?

In practice, one of the most effective ways of building a Green Infrastructure is through spatial planning. This enables interactions between different land uses to be investigated over a large geographical area.

Strategic level spatial planning will help to:

- **locate the best places** for habitat enhancement projects (e.g. involving restoration or re-creation of habitats) to help reconnect healthy ecosystems, improve landscape permeability or improve connectivity between protected areas;
- **guide infrastructure developments** away from particularly sensitive nature areas and instead towards more robust areas where they might additionally contribute to restoring or recreating GI features as part of the development proposal; and
- **identify multi-functional zones** where compatible land uses that support healthy ecosystems are favoured over other more destructive single-focus developments.

Using a strategic approach to building Green Infrastructure ensures there is a clear focus for individual initiatives and local-scale projects so that these can be scaled up to the point where, collectively, they will make a real difference. In this way Green Infrastructure becomes much more than the mere sum of its parts. It is also a means of bringing different sectors together in order that they may decide together on local land use priorities in a transparent, integrated and cooperative way.

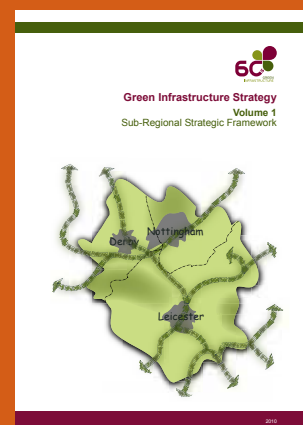


Building a Green Infrastructure for Europe

The 6Cs Green Infrastructure Strategy

The 6Cs GI Strategy presents a long-term vision and strategic framework for implementing GI across the three counties (Derbyshire, Leicestershire and Nottinghamshire) in the East Midlands, UK. It aims to maintain, enhance and extend networks of green spaces and natural elements in and around three cities, connecting them with their surrounding towns and villages.

It also aims to facilitate a major step-change in the scale, quality and connectivity of GI assets across the entire sub-region, to match the scale of new growth proposed and provide a focus for attracting and retaining sustainable development and investment.



Several sectors worked together under a LIFE-funded project in Austria to construct a 150 metre-wide motorway overpass for bears and other fauna in a key Natura 2000 site.

Creating a large multi-functional landscape

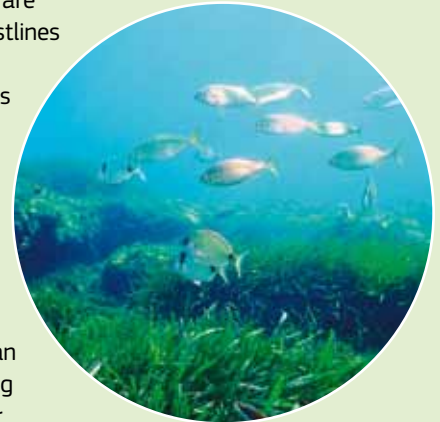
Situated in the heart of Wales, UK, the Pumlumon area is the largest river catchment area in Wales, supplying water to four million people. Agriculture is the main land use but, as with most of the uplands, overgrazing by sheep has resulted in biodiversity loss as well as soil compaction, which is contributing to increased flooding of the lowland areas. Poor socio-economic conditions have also meant that many of the rural communities here are now struggling to remain viable.

To address these issues in an integrated manner, a strategic framework project was launched in 2007 over an area of 40,000 ha. The vision is to work with local people to guide a major change in the way the land is managed and to give the local communities a better future. A series of measures are being undertaken within this framework in close collaboration with local stakeholders, authorities and NGOs all working together. They aim, amongst others, to restore habitats for biodiversity and to improve the delivery of ecosystem services, as well as diversify local farming practices and increase the value of their produce, create new tourism products and provide skills training to attract more income to the area and create new job opportunities.



Green Infrastructure for coastal engineering

Marine vegetated habitats are effective at protecting coastlines from sea level rise and stormier weather conditions resulting from climate change. Not only are marine plants as efficient for coastal protection as cement-based solutions but they have a number of other advantages too: as living organisms they can grow and adapt to changing conditions as well as repair themselves. They do not produce CO₂ emissions during their installation but instead act as natural carbon sinks.



Another important benefit of seagrasses is that they provide important nurseries for commercially valuable fish. In the frame of the BEST project on submersed marine vegetation (BEST-2012-33) the economic value of *C. nodosa* seagrass meadows as a habitat for coastal fishes targeted by local fisheries in Gran Canaria (Canary Islands) has been estimated to have a mean monetary value of over €600,000 a year.

Using plants instead of air conditioning – and saving money

Urban areas generally have a lower humidity level than the surrounding countryside due to the absence of vegetation and the increased absorption of energy from the sun caused by dark asphalted or concrete surfaces. This also explains why inner city areas are often many degrees warmer than their surroundings. This phenomenon, known as the urban heat island effect, can have serious consequences for vulnerable people, such as those who are chronically ill or the elderly, particularly during heat waves.

The moist air generated by natural vegetation helps to counter this phenomenon. Humidity levels could also be artificially increased using electricity to evaporate water, but this would cost significantly more than using natural vegetation (around €500,000 per hectare). Working with nature and using GI in an urban environment, for example by incorporating biodiversity-rich parks, green spaces, green roofs and walls and fresh air corridors, is generally a much cheaper and more versatile option to help mitigate the urban heat island effect. It can also help to absorb CO₂ emissions, improve air quality, reduce rainfall runoff and increase energy efficiency.



Protecting people against floods whilst improving recreation and nature conservation

In order to protect the Schelde basin against floods caused by the North Sea, the Flemish government has drawn up a large scale flood protection plan (SIGMA II) in close consultation with all economic sectors and stakeholders in the region.

Whilst the primary objective is flood protection the plan also deliberately sets out to meet other policy objectives, including those of agriculture, sustainable water management, nature conservation and recreation.



All projects identified within the SIGMA plan have been developed on the basis of detailed technical analyses which not only examine their effectiveness but also their potential to deliver win-win solutions. In total around 5,000 ha of wetlands are being restored to absorb flood water, improve biodiversity and provide additional recreational areas for the local population. The SIGMA plan is also part of a larger cross-border project with the Netherlands which aims to develop a healthy and multi-functional estuarine water system that can be utilized in a sustainable way for human needs along the entire length of the Schelde.



The EU's Green Infrastructure Strategy

In May 2011, the European Union adopted a Biodiversity Strategy to halt biodiversity loss in Europe by 2020. The strategy is built around six mutually supportive targets which address the main drivers of biodiversity loss. Target 2 aims to ensure that 'by 2020, ecosystems and their services are maintained and enhanced by establishing Green Infrastructure and restoring at least 15% of degraded ecosystems'.

Responding to this political ambition, as well as the Resource Efficiency roadmap, the European Commission published a new strategy in May 2013 to promote the use of Green Infrastructure across Europe. The strategy aims to create a robust enabling framework in order to promote and facilitate GI projects within existing legal, policy and financial instruments.

It recognises that GI can make a significant contribution to the effective implementation of a wide range of EU policies where some or all of the desired objectives can be achieved through nature based solutions. It also places the use of GI firmly in the context of the Europe 2020 Growth Strategy which calls for a smart, sustainable and inclusive growth agenda across the EU.

In their attempts to revive industry, job markets and competitiveness, European governments are seeking more innovative and sustainable ways of promoting economic activities, whilst tackling environmental challenges. A coherent and effective Green Infrastructure can play an important role in this new approach.

The new GI strategy is made up of four main elements:

- Promoting Green Infrastructure in the main EU policy areas
- Supporting EU-level GI projects
- Improving access to finance for GI projects
- Improving information and promoting innovation.

GI contributes to a low-carbon economy by naturally sequestering and storing carbon and delivering a number of ecosystem services which would otherwise require CO₂ producing technologies.

Investing in GI makes economic sense

In addition to being cost effective, GI projects often provide a high return on investments. The Mersey Forest Objective 1 project, funded through ERDF, involved investments of €7.8 million aimed at creating a substantial Green Infrastructure across the Merseyside area of north-west England. This area was heavily industrialised in the past and was notably short of green spaces for local inhabitants.

The socio-economic benefits of these investments are already estimated at €2.2 million per annum. This gives a present value of benefits of €79 million over 50 years, suggesting an overall cost/benefit ratio of more than 1:10. Landscape, recreation and tourism benefits accounted for the majority of the total, though provisioning services and regulation of air quality and climate were also important.

Restored Mersey forest.



Commission guides to investing in GI through EU funds

The Commission has produced a series of guides to assist authorities and stakeholders to invest in GI under the new ERDF and the Cohesion Fund for 2014–2020. The first is a guide to 'multi-benefit cohesion policy investments in nature and green infrastructure'. It looks at the values of nature and how they are important for cohesion policy objectives, and offers a useful toolkit and information source for the development and implementation of GI investments under the cohesion policy for 2014–2020.

The second guide 'connecting smart and sustainable growth through smart specialisation' aims to assist ERDF managing authorities across the EU to integrate sustainable growth objectives linked to eco-innovation, ecosystem services and sustainable energy into their research and innovation strategies (RIS3).

http://ec.europa.eu/regional_policy/information/brochures/index_en.cfm#. Other guides coming soon: see <http://ec.europa.eu/environment/nature/ecosystems/>



Promoting Green Infrastructure through the EU's main policy areas

GI can make a significant contribution to the implementation of many of the EU's main policy objectives, especially as regards regional and rural development, climate change, disaster risk management, agriculture/forestry and the environment. The new GI strategy advocates the full integration of a Green Infrastructure into these policies so that it becomes a standard component of territorial development across the EU.

For instance, the EU cohesion policy supports Member States and regions to improve social, economic and territorial cohesion. In this framework, programmes and measures that target innovative and sustainable solutions can have a major role to play, such as through the development and implementation of Green Infrastructure solutions. It will positively impact the preservation of natural assets in regions but also provide new opportunities for sustainable regional development.

Similarly, the Common Agricultural Policy (CAP) reforms have introduced a number of important greening elements that will help develop a more coherent GI across the wider rural landscape. This includes, for instance, the requirement for farmers receiving payments under the first pillar of the CAP to have 5% of their arable land as Ecological Focus Areas and new opportunities to invest in landscape features such as hedgerows, particularly through the use of agri-environment measures.

GI contributes to a low-carbon economy by naturally sequestering and storing carbon. Furthermore, many climate change adaptation measures are based on GI solutions.

The EU's main policies and their accompanying financial instruments will be vital for mobilising the potential of EU regions and cities to invest in GI. EU financed interventions can help to change the underlying paradigm from one where economy and environment are seen as trade-offs to one where the synergies and co-benefits are increasingly appreciated.

They will also enable decision makers, stakeholders and civil society to achieve complex policy objectives such as regional and rural development, as well as water, resource efficiency and biodiversity goals whilst at the same time promoting new business opportunities for SMEs, for instance in the planning, implementation and monitoring of GI initiatives.

Ekostaden Augustenborg – an urban regeneration initiative

The Ekostaden Augustenborg initiative has been one of the most far-reaching sustainable urban renewal initiatives in Sweden. Built in the 1950s the area was a pioneer of Sweden's new social housing but soon fell into disrepute. The urban renewal project addressed a wide range of issues regarding both the built environment and social conditions for the people living in the area. Amongst others, 10,000 m² of green roofs were installed and an open stormwater system was built, along with attractive green spaces to improve the environment for both people and nature.

In the end the entire project cost around €22 million but the benefits that have been derived from this initial investment are already stacking up: rainwater runoff rates have decreased by half, residents have made significant energy savings whilst biodiversity has increased by half. The overall image of the area has also improved significantly, unemployment has fallen from 30% to 6% and the turnover in tenancies has decreased substantially.



From coal mines to eco-tourism: the Hoge Kempen National Park

The Hoge Kempen National Park (6,000 ha) is set in a rural part of eastern Belgium, a former coal mining area in the Province of Flanders. The objective of the national park was to revive the local economy, restore and further develop the natural values of the region and support nature tourism and education. The initiative was taken against the background of closing coal mines in the late 1980s and the need to promote economic development.



The initiative was successful in many respects. It brought together a wide range of stakeholders to protect and promote the area in a sustainable and integrated manner that makes the most of its natural values. It also raised €90 million in investments to carry out a range of improvement projects. Already the investment is starting to pay off. The park is generating €24.5 million per year in revenues from sustainable tourism alone.

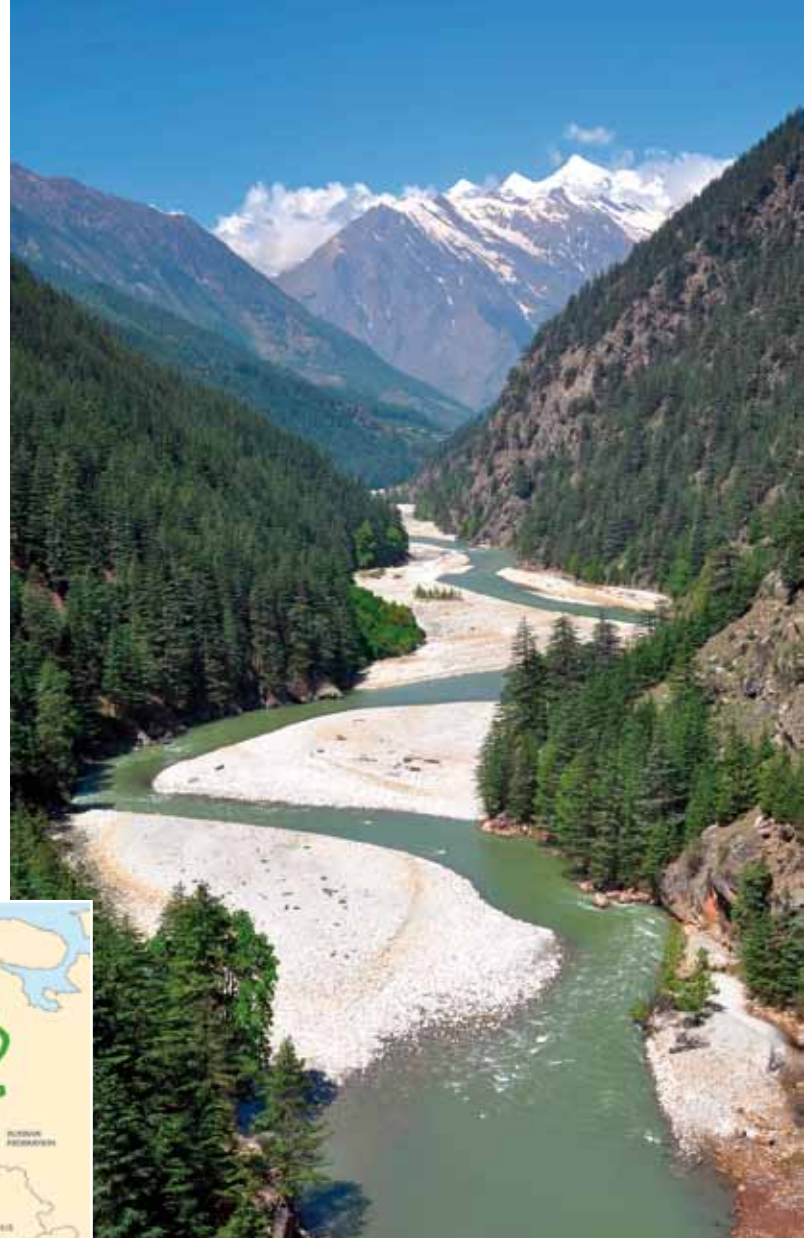
Supporting EU-level GI projects

The second element of the new GI strategy looks at the possibility of developing a trans-European Green Infrastructure (TEN-G) initiative, similar to that already in place for large-scale EU transport (TEN-T) and energy (TEN-E) networks.

Many ecosystems, for instance in mountain ranges (the Alps, the Pyrenees, the Carpathians) and along river basins (the Rhine, the Danube), extend beyond national boundaries and are part of the EU's shared natural and cultural heritage and identity. They too would benefit considerably from coordinated, joined-up actions and a pan-European vision.

Developing an instrument for a trans-European Green Infrastructure in Europe would not only have significant benefits for securing the resilience and vitality of some of Europe's most precious ecosystems but could act as an important flagship for promoting GI at national, regional and local levels and boosting the importance of GI in policy, planning and financing decisions.

Member States and regions are encouraged to seize the opportunities for developing GI in a cross-border/transnational context through the macro-regional strategies supported by the ERDF and through European territorial cooperation programmes in particular.



Major rivers and mountain ranges are obvious candidates for EU-level GI projects.

The Green Belt Initiative runs the length of Europe.

The European Green Belt Initiative

The Green Belt Initiative has its roots in the aftermath of WWII when Europe was divided between East and West. At that time the border between the two sides was heavily guarded and a strip of land – thin in some places, wider in others – was left untouched for many years. After the fall of the Iron Curtain, efforts were made to try to enhance this land for nature conservation purposes and to build an ecological corridor running the length of Europe, from the Barents Sea down to the Black Sea, crossing 23 countries.

The Green Belt Initiative is however, more than just a nature conservation project, it is also very much about people, cultures and helping to improve the socio-economic conditions of many ex-border regions. It has a clear strategic view and objective which aims to better harmonise human activities with the natural environment and increase opportunities for the socio-economic development of local communities. At the same time it reaches down to local communities in order to promote grassroots activities. It not only reconnects people with nature but also with each other.



Alpine-Carpathian Corridor

This joint project between Slovakia and Austria aims to create and preserve a coherent 120-km wide ecological corridor from the Alps to the Carpathians. It comes in response to the increasing fragmentation caused by agricultural intensification, the rapid expansion of built-up areas and expanding transport infrastructure. The main objectives are to create a coherent Green Infrastructure within this corridor which supports the restoration and wise use of the ecosystems present and enables wild animal populations to move more freely and interact with each other.



A range of practical measures are currently underway, such as improving the traffic network by building 'green bridges' over highways at key points/bottlenecks and creating suitable habitat patches or stepping stones within the corridor.



Good farming practices generates clean water

Since 1993, the mineral water bottler Vittel has been running a programme to maintain water quality to the highest possible standard within its 5,100 ha catchment area at the foot of the Vosges Mountains. The programme pays all 27 farmers in the watershed of the 'Grande Source' a premium to use environmentally friendly farming practices on their dairy farms in order to keep the underlying aquifers free of pollutants. Contracts are long-term (18–30 years), and adapted to the conditions at each farm.

Detailed monitoring programmes have been put in place to ensure the system is delivering the ecosystem benefits it is designed for. Results so far are very positive and show that the high service value of the scheme clearly makes the investments profitable.

The Vittel example illustrates the advantages of involving private sectors who benefit from ecosystem services (here mainly the provision of clean water) in the financing and implementation of GI projects.



Improving access to finance for GI projects

The private sector also has an important role to play in investing in Green Infrastructure and in developing innovative 'green' technologies in general. GI projects are, however, complex and are often perceived as risk by investors, particularly in the early stages of development. Specific financial instruments (such as risk-sharing practices) can help reduce the risks associated with GI projects.

In this context, the European Commission and the European Investment Bank (EIB) are looking at a number of options to establish a financing facility to support natural capital-related investments, including GI projects.

Furthermore, the European Business and Biodiversity (B@B) Platform will showcase innovative Green Infrastructure projects carried out by businesses. The goal will be to disseminate examples of projects that are beneficial for biodiversity whilst offering business opportunities.



Improving information and promoting innovation

Our understanding of the technical issues associated with deploying Green Infrastructure has developed considerably in recent years. Nevertheless, more research is needed to improve our understanding of the links between biodiversity, the condition of the ecosystem and its capacity to deliver ecosystem services.

While it is clear that most decisions regarding GI projects will be taken at local, national and regional levels, a minimum level of consistency is needed in relation to the data used to inform these decisions, particularly for projects supported by EU funds. Under the GI strategy, the Commission is working to ensure the most effective use of data from current and planned actions and is providing financial support for programmes that tackle this knowledge gap, such as Horizon 2020.

It is equally important to continue to support the development of the innovative technology and processes for GI, and to ensure specialists acquire the necessary skills and competences to apply them. Further specialised training in GI technology will be essential in the medium term. For instance innovation is required for developing new engineering approaches for designing and constructing green roofs and walls, but also for innovative methodologies and technologies in restoration, spatial planning and participatory approaches for implementing GI.

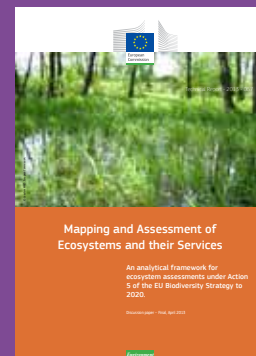
Wildlife bridge over motorway.



MAES — Mapping and Assessment of Ecosystem Services

In line with the EU Biodiversity Strategy to 2020, Member States are, with the assistance of the European Commission, working on the mapping and assessment of ecosystems and their services (MAES). The first results of this work, due by end of 2014, will be important for informing policy decisions across a wide cross-section of policy areas and will help to set priority areas for investments in GI.

This work should also contribute to the assessment of the economic value of ecosystem services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020.



Green Infrastructure solutions, applied in synergy with biodiversity, are less energy-intensive and require less upkeep than conventional solutions and are therefore more efficient and sustainable.

Further information

Information on GI and EU strategy

- DG ENV Green Infrastructure website: <http://ec.europa.eu/environment/nature/ecosystems/>
- Communication from the Commission: *Green Infrastructure (GI) – Enhancing Europe’s natural capital*, COM (2013) 249 final
- Commission video on Green Infrastructure (2013): <http://www.tvlink.org>
- Four-page Factsheet on Green Infrastructure: <http://ec.europa.eu/environment/nature/info/pubs/docs/greeninfrastructure.pdf>

Commission guides on use of EU funds for GI projects

- Connecting Smart and Sustainable Growth through Smart Specialisation: A practical guide for ERDF managing authorities (2012): http://ec.europa.eu/regional_policy/sources/docgener/presenta/green_growth/greengrowth.pdf
- The Guide to Multi-benefit Cohesion Policy Instruments in nature and Green Infrastructure: http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/guide_multi_benefit_nature.pdf
- Review of LIFE projects supporting GI: LIFE building up Europe’s Green Infrastructure: http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/green_infra.pdf

Information on EU Adaptation Strategy and Climate Change and Nature

- EU Adaptation Strategy: http://ec.europa.eu/clima/policies/adaptation/what/documentation_en.htm
- Four-page Factsheet on Nature’s role in climate change: http://ec.europa.eu/environment/nature/info/pubs/docs/climate_change/en.pdf

In-depth studies and reports

Commission-funded studies

- *Green Infrastructure implementation and efficiency in EU-27* (2012)
- *The Multifunctionality of Green Infrastructure* (2012)
- *Design, Implementation and Cost Elements of Green Infrastructure Projects* (2011)

European Environment Agency reports

- Landscape fragmentation in Europe (2011)
- Green Infrastructure and territorial cohesion (2011)
- Mapping of Green Infrastructure (2013)

European Information Facilities containing information on GI

- BISE Biodiversity Information System for Europe: <http://biodiversity.europa.eu/>
- WISE Water Information System for Europe: <http://water.europa.eu/>
- CLIMATE ADAPT: <http://climate-adapt.eea.europa.eu/>

Further guidance on Green Infrastructure in agricultural and adaptation policies are foreseen.

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European Commission
Building a Green Infrastructure for Europe
Luxembourg: Publications Office of the European Union
2013 — 24 pp. — 21 x 21 cm
ISBN 978-92-79-33428-3
doi: 10.2779/54125





Publications Office

ISBN 978-92-79-33428-3



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