

## GREEN INFRASTRUCTURES FROM THE PERSPECTIVE OF EUROPEAN INSTITUTIONS

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### Abstract

*The paper presents a research about the approach of green infrastructure (GI) in recent official documents elaborated by European Institutions including the European Commission (EC), the European Environmental Bureau (EEB) and the European Environment Agency (EEA). Green infrastructure is an emerging concept which has developed in the last decades being used by professionals from different areas of study such as landscape architecture, ecology, environmental engineering, forestry, agriculture, geography, spatial planning and regional development. The study is concerned on the understanding of the complex and multiple roles of green infrastructures for the future of environment and human society in the 21<sup>st</sup> century. The aim of the research is to emphasize significant issues regarding green infrastructures, such as terminology, benefits, opportunities for integrated development strategies and specific policies, in order to synthesize the current situation of green infrastructure management in Europe. Analyzed materials for the study include recent reports and communications of European institutions. Among these are Green Infrastructure (GI) — Enhancing Europe's Natural Capital (EC, 2013), The Multifunctionality of Green Infrastructure (EC, 2012), Green Infrastructure – Natural Resource Care Areas. Opportunities and benefits (EEB, 2011), Building Green Infrastructure for Europe (EEB, 2008) and Green Infrastructure and Territorial Cohesion (EEA, 2011), the last being one of the most comprehensive official document in this direction. The conclusions of the study highlight the importance of integrating green infrastructures among European policies and among the opportunities to implement an EU Green Infrastructure strategy in order to enhance and conserve the natural capital in a sustainable manner.*

**Key words:** Green infrastructure, Landscape planning and management, Sustainable development, European institutions, Conservation and development policies

### INTRODUCTION

Green Infrastructure is a recent and emerging concept which has been developed mostly in the last twenty years by landscape architects, ecologists, environmental engineers, urban planners and geographers. In the last years, the importance given to green infrastructure by the EU has increased significantly. The concept has been introduced into several European Documents concerning environmental, economic and social issues.

Multiple benefits of green infrastructure such as food resources, clean water, clean air, climate balance, flood prevention and recreation are an essential condition for a high level of human security at global, regional, national and urban scale. In Europe, the continuous and insufficient controlled development of the built environment – known as gray infrastructure – represents a significant

threat for the future of green infrastructure. Thus, several measures should be taken to manage urban and regional development in order to generate a sustainable, smart and inclusive growth, which is a major priority within the EU agenda for 2020 (EC, 2013). As well, according to the European Biodiversity Strategy, a GI (Green Infrastructure) strategy will be developed till 2020 (EUEC, 2011).

### MATERIALS AND METHODS

The main task of the research consists in evaluating the current situation and perspectives of EU regarding Green Infrastructures by analysing the most comprehensive European documents published between 2008 and 2013. The aim of the analysis was to identify terminology aspects, benefits, major risks, policies and opportunities regarding green areas in order to determine the development premises

of a green infrastructure integrated strategy at European level.

The examined documents are concerned mostly on theoretical aspects, containing also a number of particular case studies. Thus, analyzed issues within the documents are approached both at quantitative level, as in the case of ecological or economic benefits, and at qualitative level, like in the case of terminology, social benefits or proposed policies.

The conclusions of the study conclude the important role of Green Infrastructure for the sustainable development of EU which strongly depends on the implementation of a future GI European Strategy.

## RESULTS AND DISCUSSIONS

**Terminology.** Even if many definitions of Green Infrastructure (GI) concept have been developed during the last years it is hard to cover all aspects within a short paragraph (EEA, 2011). According to EC, “GI is a successfully tested tool for providing ecological, economic and social benefits through natural solutions. It helps us to understand the value of the benefits that nature provides to human society and to mobilize investments to sustain and enhance them” (EC, 2013). Pursuant to EEB, “Green infrastructure areas take the form of a sustainable coherent interconnected network of regional characteristic landscape elements, natural areas and open spaces in the land which brings a wide range of ecological benefits” (EEB, 2011). Thus, by protecting and enhancing green areas, human communities can get benefits from nature. GI can and should be integrated it into urban, landscape and regional planning and development, in order to become complementary to the built (grey) infrastructure solutions (Figure 1).

**GI Benefits and EU Policies.** According to Cohesion Fund and the European Regional Development Fund (ERDF), Green Infrastructure represents one of the investment priorities within the regional policies. GI is considered as a contributor to “regional policy and sustainable growth in Europe, facilitating smart and sustainable growth through smart specialization” (EC, 2013). The GI policies and solutions are considered to be important mostly

in urban areas, in which over 60% of EU citizens live. GI plays an important role in urban environments because of its benefits which ensure a high level of human security. This implies health related aspects such as improving air and water quality and reduction of diseases, contribution to the cultural identity of local communities and helping to combat social isolation and exclusion. Green areas contribute to pleasant landscapes which could be used for tourism and recreational activities. GI offers also individual benefits at physical, psychological and emotional level.

An important opportunity offered by GI in the field of landscape planning is making connections between urban, suburban and rural areas, providing pleasant places to live and work in (EC, 2013).

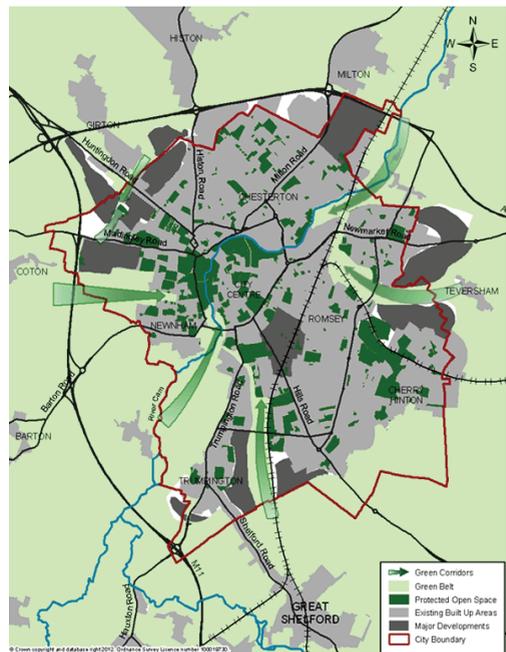


Figure 1. Green Infrastructure in Cambridge (source: Cambridge City Council)

GI is also a contributor to food security and to the education process within local communities through urban food production.

GI plays an important role in EU policies focused on climate change and disaster risk. Biodiversity and ecosystem services are part of an adaptation strategy to combat the adverse effects of climate changes. For example, initiatives in agriculture and forestry with a positive impact on greenhouse gas balances and

CO<sub>2</sub> storing are considered to be included into EU climate policies (EC, 2013). Future GI policies of EU should be concerned on reducing the carbon footprint, mitigation the negative effects of land fragmentation and integrating better land use and ecological issues into spatial planning. The purpose of these aspects refers to increase the GI benefits as water retention, air purification and biodiversity enrichment.

GI solutions, like flood plains, riparian woodlands, wetlands or protection plantations, could be also integrated into EU policies in order to combat extreme weather events and natural disasters (floods, landslides, avalanches, forest fires, storms), reducing vulnerability to risks for human settlements (EC, 2013).

Another significant role of GI in consists in the protection, conservation and enhancement of the EU's natural capital, according the commission's recent proposal for an Environmental Action Programme to 2020 (EC, 2013).

Towards an EU Strategy for GI. As presented in above, GI can make an important contribution to achieve several key objectives of EU policies.

Over the last 20 years, more and more GI sustainable projects have been carried out on a local, regional, national or trans-boundary scale. A condition to optimize and maximize the functionality and benefits of GI lies in interconnecting projects at different scales to achieve consistency and coherence at EU level. GI must become a "standard part of spatial planning and territorial development that is fully integrated into the implementation of these policies" (EC, 2013).

Funding mechanisms, such as Common Agricultural Policy, the Cohesion Fund, the European Regional Development Fund, Horizon 2020, the Connecting Europe Facility Fund and the Financial Instrument for the Environment, should facilitate funding for GI projects during 2014-2020 budgetary envelope. Decisions regarding GI projects should be taken both at local, national at regional scales with a view to be assessed in a coherent and coordinated way across the EU (Figure 2).

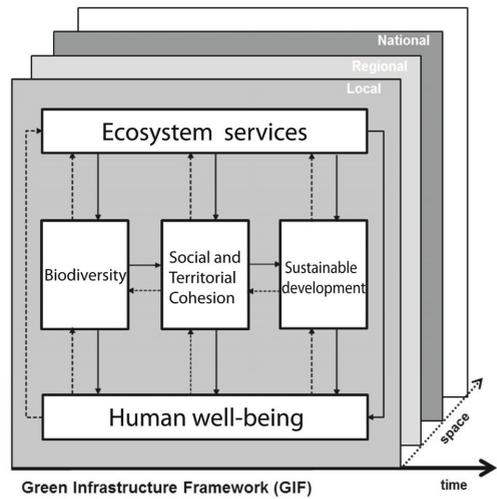


Figure 2. Green Infrastructure Framework (Lafortezza, R., Davies, C., Sanesi, G., Konijnendijk, C.C., 2013)

Development and protection of GI should be strengthened by expanding research regarding GI benefits and associated technologies and processes. For example, in urban environments efficient buildings, incorporating green features such as green roofs and walls can deliver ecological, social and health benefits (Figure 3).



Figure 3. Green wall on a building in Paris (source: www.livegreengreen.com)

Many natural areas such as mountain ranges (the Alps, the Carpathians), river basins (the Rhine, the Danube) and forests (the Fennoscandinavian Forests) belong to EU's natural and cultural heritage and identity,

requiring a coordinated pan-European vision, which can be implemented through macro-regional strategies and through European territorial cooperation programs (EEA, 2011). An example for a macro-regional strategy is the European Green Belt Initiative. It comprises an ecological network running from the Barents Sea to the Black Sea which connects national parks, natural parks, biosphere reserves, protected areas and other natural areas along or across borders, conserving and protecting some of most impressive and fragile European landscapes.

The further strategy should enable a framework in order to provide a combination of policies and technical or scientific actions. Currently, it thinks that the strategy can be implemented within the context of existing legislation, policy instruments and funding mechanisms including the following elements (EC, 2013):

- Promoting GI in the main policy areas (climate change and environmental policies, disaster risk management, health, etc.)
- Improving and strengthening the knowledge base and promoting innovation
- Improving access to finance
- GI projects at EU level (by the end of 2015)

## CONCLUSIONS

Green Infrastructure can contribute significantly to achieving many of the EU policy objectives. The EU can promote the development of GI by generating a framework to encourage and facilitate GI projects within existing laws, policies and funding mechanisms.

The future GI Strategy should be a driver for a sustainable development of EU states, regions and cities. It should coordinate planning and management strategies at national, regional and urban level in order to create coherent and cohesive green infrastructure networks over the entire EU. The GI Strategy will require an interdisciplinary approach with the involvement of many European, national, regional and local institutions as well as a wide range of specialists with different professional backgrounds.

Thus, reconciliation between green and grey infrastructures, by enhancing GI benefits to the human society and protecting the wildlife, will be a difficult task that will need to involve all the local communities from EU.

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