Article

Implementing Green Infrastructure in Spatial Planning in Europe

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Abstract: Interest in green infrastructure (GI) has grown in research, policy and planning in recent decades. The central idea behind GI is the understanding of the physical non-built-up environment as an infrastructure capable of delivering a wide variety of benefits to society, including the ability to preserve biodiversity; to provide food, feed, fuel and fibre; to adapt to and mitigate climate change and to contribute to enhanced human health and quality of life. The European Union (EU) has had a GI strategy since 2013, and member states are involved in several strategic and applied GI initiatives and projects. The aim of this study is to explore if and how the European strategy has been implemented. The study adds to the body of knowledge of current GI policies and measures in Europe via an online survey and insights into previous research. The survey reveals that GI is integrated into one or more policy sectors in all 32 countries covered. In 11 of the 32 countries, GI-specific policies are already in place or are being drawn up at a national level. In general, the respondents see the responsibility for GI policy and strategy as a matter of national governments and the implementation as a matter of local governments. They also see the LIFE+ and Horizon 2020 project funds, the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD), as the most important EU funding sources for the implementation of the GI strategy. The study also identifies availability of georeferenced information, zoning and biotope area factor as three of the spatial planning tools used to implement GI.

Keywords: green infrastructure; policy; spatial planning; Europe

1. Introduction

Interest in green infrastructure (GI) has grown in research, policy and planning in recent decades [1–3]. The central idea behind GI is the understanding of the physical non-built-up environment as an infrastructure capable of delivering a wide variety of benefits to society [4], including the ability to preserve biodiversity; to provide food, feed, fuel and fibre; to adapt to and mitigate climate change and to contribute to enhanced human health and quality of life [1,2,5–11]. Although no global definition has been agreed upon, the concept has a number of key components or ideas: connectivity (e.g., between green areas, non-built-up land and water), multifunctionality (e.g., areas that have multiple functions and social values tied to them) and "increased greenery" (e.g., the ambition to enhance the quantity and/or quality of green and blue areas) [3,12–15].

The European Union (EU) has had a GI strategy since 2013 [16], and member states are involved in several strategic and applied GI initiatives and projects [2,17,18]. The European GI strategy seeks to balance "people, planet and profit" [6]. It states that there is no need for legislation exclusively designed to enforce implementation, and calls instead for existing legislation, policy instruments and funding mechanisms to be used [16]. Although GI can be considered a new aspect of policy and governance, especially in EU policy, research has been conducted into it since the 1970s in the fields of

landscape ecology, conservation biology and nature protection [2,19]. Research reveals that the focus of GI implementation in European countries has been on measures to enhance ecological networks, and that the conservation of green space is more common than the restoration and creation of new green areas [1,4,20]. This implies a focus on nature protection and biodiversity.

The aim of this study is to explore if and how the European GI strategy has been implemented. It addresses the following research questions: Other than environmental policy, what policy sectors are covered? Who is seen to be responsible for developing and implementing GI policy? Which European funds and policy tools are being used to implement the GI strategy? To answer these questions, a Europe-wide questionnaire-based survey was conducted and the results have been analysed in the light of previous research.

2. Background and Theoretical Framework

As a spatial planning concept, GI is intended to be a systemic and holistic approach. GI helps the preserve non-built-up land by highlighting the range of societal benefits (e.g., land uses) associated with green areas. Using this approach as a governing strategy can make spatial planning sustainable [21]. GI also represents a solution-oriented and cross-sectoral approach to spatial planning. Before deploying the concept holistically, it is important to acknowledge that GI also has shortcomings. Since the 1970s, studies of the relationships between humans and the environment have focused predominantly on ecosystem resilience and/or ecological networks [22]. Attempts to include human beings and societies in ecosystem thinking [23–25] have failed to take sufficient account of spatial restrictions (e.g., that land is a limited resource) [26–29]. Any defined space in the physical environment is subject to a variety of competing interests and activities [29–32], which makes conflicts between different users of land and water the rule rather than an exception [33,34]. Any realistic assessment of the potential for implementing GI at an institutional level must take these conflicts about land use into consideration.

Other researchers also highlight some of the criticisms that have been levelled at the concept of GI. Davies and Lafortezza (2017) call it a neoliberal concept because the value of 'green' is mainly seen in economic terms and because promoting more green space in cities may contribute to gentrification [1]. Garmendia et al. (2016) argue that it is no surprise that GI initiatives are increasingly linked to business interests in an era when economic growth is considered one of the most important policy goals [2]. Wolch, Byrne and Newell (2014) report that in America and China, paradoxes have been evident in urban green space strategies: the creation of new green space can make neighbourhoods healthier and more aesthetically attractive, but it may also push up housing costs and property values [35].

Including a wide range of policy goals under the GI umbrella has both pros and cons. While holistic concepts make it possible to connect the wide range of goals linked to green areas, there is a risk of the conflicts between different goals being neglected. This risk has been highlighted by previous studies of sustainability as a governing concept [36,37].

To provide a framework for the policy analyses that follow, the next two paragraphs consist of a review of policy synergies and policy conflicts for GI.

Several policy themes complement GI. In the academic literature, three sectors or policy themes provide the greatest synergies with GI in Europe; 'biodiversity' [2,17], 'rural development and agriculture' [38–40] and 'urban development and green areas' [5,8,9,13,41,42]. In their policy analysis of 14 European countries, Davies and Lafortezza [1] report that four synergetic policy themes were prominent in national policies: social cohesion, green economy, biodiversity and health. The themes of social cohesion and green economy were poorly represented in policy documents related to GI on the EU level and in the 14 EU member states studied, while health and biodiversity were well represented [1].

The land uses that conflict most in terms of habitat fragmentation with GI preservation and development are 'transport infrastructure', 'energy generation' and 'agricultural intensification' [5]. Continued low-intensity use of land for built up areas, commonly referred to as 'urban sprawl', is also fragmenting habitats and decreasing the amount of land that is not built on in Europe [15,43,44]. At the

same time, 'denser urban structure' and land cover changes in urban areas are often at the expense of green areas and the ecosystem services they preserve [13,45,46].

3. Method and Approach

3.1. Studying Green Infrastructure in Europe via an Online Questionnaire

The survey covered 32 European countries, i.e., the 28 EU member states and Iceland, Liechtenstein, Norway and Switzerland (the 32 countries in the ESPON programme). The recipients were mainly government experts in territorial development linked to European Observation Network for Territorial Development and Cohesion (ESPON) [47]. They either filled in and returned the questionnaire themselves or forwarded it to somebody else in their country who they considered a more relevant respondent. Whenever responses were not forthcoming, searches at the peer-reviewed literature database Scopus Elsevier were used to identify researchers and academics in the relevant country who had published research into GI.

The questions were based on insights gained from previous studies. For instance, the policy sectors included in the questionnaire were based on factsheets on GI produced by the European Commission in 2013 [48]. The questions emerged from an iterative process involving the research team and officials working at ESPON. The online platform SurveyMonkey was used to circulate the questionnaire. The link was included in a covering e-mail. 41 respondents filled in the online questionnaire. Six respondents replied directly by e-mail or provided additional information by e-mail and/or telephone. Reminders were e-mailed once a fortnight until at least one response had been received from each country.

Originally, the time frame for responses was 22 January 2018 until 31 March 2018, but the deadline was extended until 10 May 2018 so that responses could be elicited from all 32 countries. The respondents consisted of advisors, experts or officials of national, regional or local governments (34), mainly in the fields of spatial planning or environmental resource management. In countries where these types of experts did not respond, the respondent(s) were academics (12) or a private consultant (1). As the topic of GI is cross-sectoral and spans multiple institutional levels, it was a challenge to find respondents capable of answering all of the questions. To remedy this, respondents were encouraged to answer at least parts of the questionnaire and forward it to others to answer the rest. Due to the nature of the process it is impossible to say with certainty how many actors were asked to fill in the questionnaire, but it is possible to say how many actually did so and who they were. Even though the length of the questionnaire was designed to encourage a good response rate, some text boxes for long-form answers were left empty. This shortcoming was resolved by sifting through relevant policy documents and official reports and filling in the blanks. This procedure was adopted for questions regarding policy sectors that include GI principles in Austria, Finland, Italy and Malta.

3.2. Analyses of the Empirical Material

The survey questions focused on three major themes: (1) strategy, policy and actors responsible for GI, (2) good practice examples of GI on a regional and local level in each country and (3) governance measures and approaches to GI. This article presents results for the first and third theme, which include both facts and opinions (see Appendix A for the survey).

The results of questions regarding facts were analysed and presented by country, those regarding opinions were analysed and presented as individual responses. For the facts per country, policies for GI and georeferenced information (Figures 1–5), the respondents consisted of experts from the country in question. In cases where several answers reflecting different opinions were received, the answers from national government agencies were chosen as representative of the country.

The rankings for responsibility and financing are based on individual responses. This reflects the nuances in the data because the answers to these questions reflect the respondents' opinions rather than simple facts. The rankings for responsibility for the development and implementation of GI

(questions 6 and 7) are based on individual replies and presented as spider-web diagrams (Figures 2 and 3). The spider webs are based on data summarised per actor group to facilitate comparisons. The summarised score was determined by multiplying the number given (ranging from 1 to 7, question 6 and 7 in the survey) with the number of times that number was given. For example, the actor group 'European authorities' was ranked as follows: most important six times = 6, second seven times = 14, third 3 times = 9, fourth 5 times = 20, fifth twice = 10, sixth 3 times = 18 and seventh 4 times = 28. The N/A alternative was given a score of 8, and the number of respondents that thought this actor group was non-relevant were seven = 56. The total score for this group was 161. The lower the score, the more responsibility the group of actors was perceived to have. This method facilitated Europe-wide comparisons of the different actor groups.

The results for financing GI via EU funds are also based on individual responses, not countries (Figure 4). The questions regarding georeferenced information on protected areas and its use in spatial planning are presented per country (Figure 5). These questions were answered by 40 respondents online (questions 8, 11, 12 and 13 in the survey).

The results were analysed on the basis of insights from previous studies of GI. Eurostat data for population and per capita GDP have been used to provide explanations for the results.

4. Results and Analysis

4.1. Policies for Green Infrastructure in Europe

Eleven of the 32 countries have adopted or are developing GI-specific national policies (Figure 1). Nine of the national policies implemented were in countries with a per capita GDP above the EU average in 2017 (Luxembourg, Norway, Denmark, Sweden, Netherlands, Germany, Belgium, UK and France). This may indicate that countries with prosperous economies are more capable of evolving national GI policies. However, due to the lack of any clear pattern, these results should be treated with care. Some countries had a an above-average per capita GDP and no GI specific policy (Finland, Austria, Ireland, Iceland, Switzerland and Liechtenstein). This suggests that political willingness is also crucial for the development and implementation of a GI policy.

The respondents saw GI as the physical expression of a network of ecosystems associated with areas that are not built up. Respondents from all of the countries included green areas and the interconnectivity between them in their answers. Some acknowledged blue areas. Respondents from two countries, the UK and Iceland, did not see GI as related to actual green and blue areas but primarily to the immaterial infrastructure (planning and policy work) by public bodies for a 'green transition' of societies, e.g., in a more environmentally friendly manner. The respondents' answers identified the tools used by official agencies to promote energy efficiency and the use of public transport as examples of GI good practices [49]. All of the countries used GI in one or more policy sector(s). One way to determine what GI consists of in policy and planning practices is to build an understanding of which sectors it is used in. The survey covered 13 policy sectors (Figure 1). Firstly, note that respondents tended to be more willing to include GI in a policy sector than not, i.e., there are more 'yes' than 'no' answers.

Secondly, note that some policy sectors include GI principles more than others. Land use and spatial development planning; water management; agriculture, forestry and fisheries; climate change mitigation and adaptation; environmental protection and rural development are policy sectors that often include GI principles (i.e., had more than 20 "yes" answers in the survey). This means that GI was perceived as wider ranging than protecting biodiversity, which is what the European GI strategy from 2013 intended and what has been identified in previous studies of the integration of GI into policy work [2,5,8,9,12,16,38–41].

The third thing to note is that the results indicate that GI principles are not prominent in some sectors: finance, energy, health and social services did not include GI principles (i.e., had more than 10 "no" answers in the survey). This result differs somewhat from the results presented by Davies and

Lafortezza (2017), who found that health is a policy sector in which 14 of the member states integrate GI [1]. In the comments to the question regarding policy sectors that include GI (question 5 in the survey), three additional policy sectors were mentioned: nature conservation, urban development and building.

		GI specific policy	GDP per capita in 2017 above EU average	Policy sectors including GI principles												
				Land use and spatial development planning	Transportation	Water management	Agriculture, Forestry and Fisheries	Climate change mitigation and adaptation	Environmental protection	Disaster prevention	Finance	Energy	Cultural heritage	Health	Social services	Rural development
	AT															
	BE															
	BG															
	HR															
	CY															
	CZ															
	DK															
	EE															
	FI															
	FR															
	DE															
	EL															
	HU															
	IE															
	IT															
	LV															
	LT															
	LU															
	MT															
	NL															
	PL															
	PT															
	RO															
	SK															
	SI															
	ES															
	SE															
	UK															
	IS															
	LI															
	NO															
	CH															

Figure 1. Green infrastructure in policy sectors in 32 European countries (EU28 and Iceland, Liechtenstein, Norway and Switzerland). Based on a summary of 41 survey responses, e-mail and phone correspondences, face-to-face interactions and document analysis. The filled boxes indicate "yes", and the white boxes indicate "no".

4.2. Who Is Responsible for Green Infrastructure in Europe?

The survey sent to the 32 countries included two questions about responsibility for GI (see Figures 2 and 3). The respondents were asked to rank the actors and/or institutions that they perceived as being responsible for developing a policy or strategy for GI in their country (Figure 2) and the actors and/or institutions that they perceived as responsible for implementing GI in their country (Figure 3).
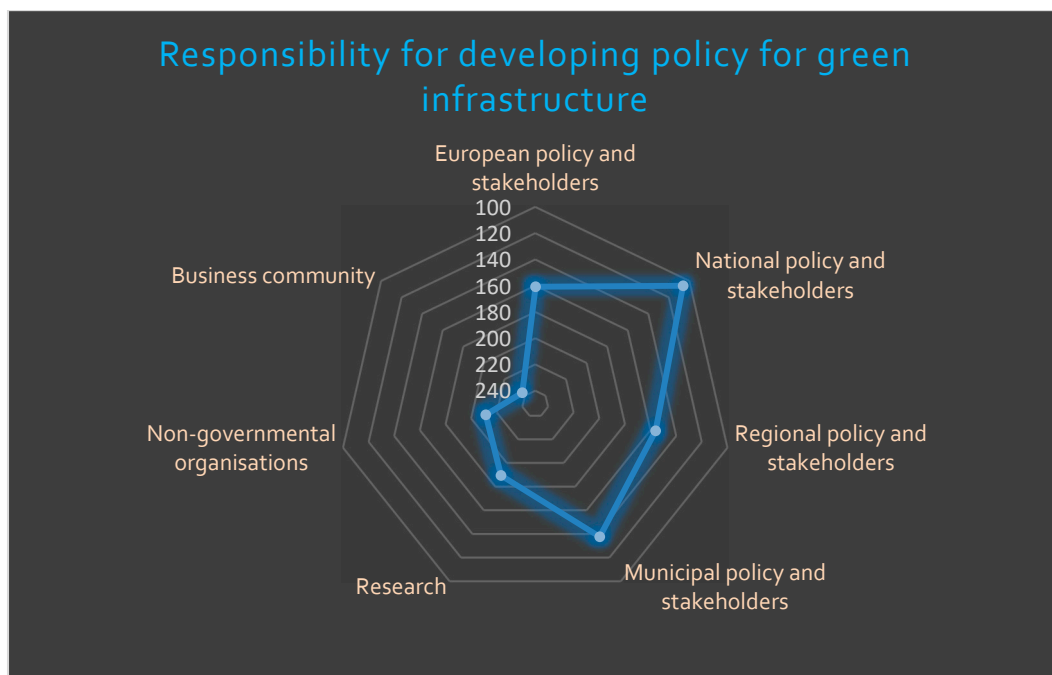
Figure 2. Groups of actors responsible for developing a policy for green infrastructure in the 32 European countries (EU28 and Iceland, Liechtenstein, Norway and Switzerland) based on a summary of 41 online survey responses. The actors/institutions with the lowest score were considered to have the greatest responsibility.

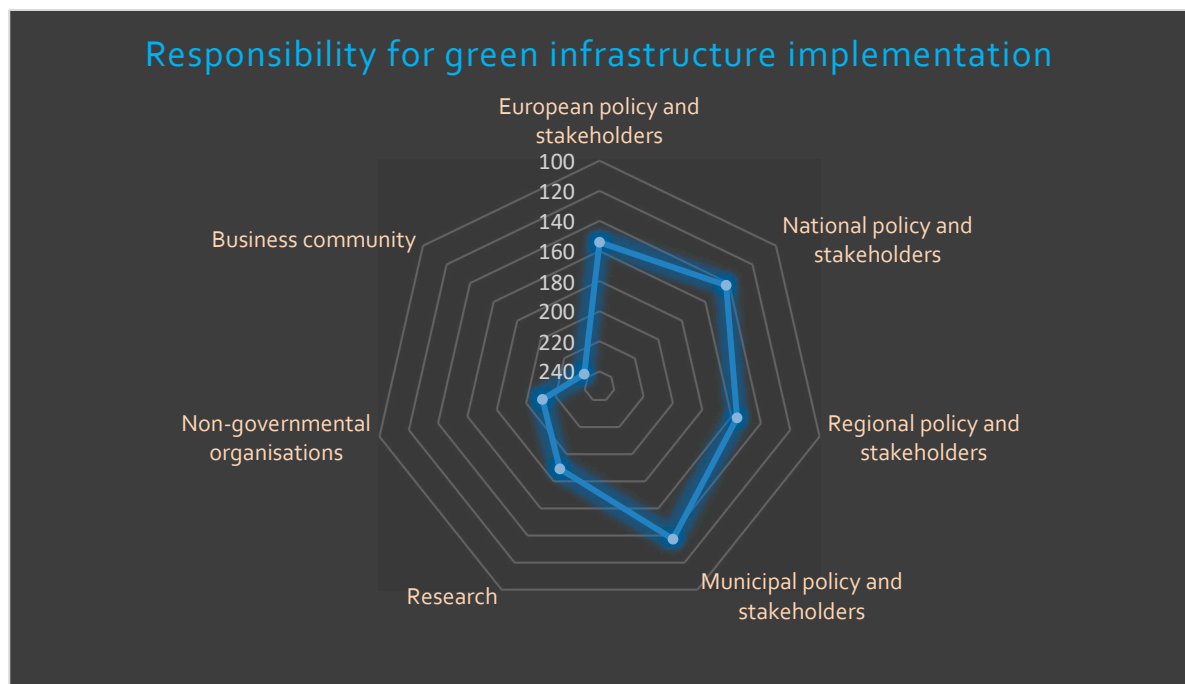**Figure 3.** Groups of actors responsible for implementing green infrastructure in the 32 European countries (EU28 and Iceland, Liechtenstein, Norway and Switzerland) based on a summary of 41 online survey responses. The actors/institutions with the lowest score were considered to have the greatest responsibility.

Figure 2 indicates that national governments were perceived to have the main responsibility for developing a policy and strategy for GI in Europe (score: 106). Local governments were ranked second

(137), regional governments third (156) and European institutions fourth (161). Other non-public actors were also considered responsible for GI development in terms of policy or strategy, but not to the same extent. Of these, researchers were ranked highest (189), followed by non-governmental organisations (211) and, finally, the business community (237).

Figure 3 indicates that local governments were seen as having the main responsibility for implementing GI in Europe (score: 137), followed by national governments (142), European institutions (154) and regional governments (156) just behind. Researchers (189) and NGOs (211) were considered more responsible than the business community (237).

Summarising the results for all 32 countries, various levels of government were seen as having the main responsibility for both policy development and the implementation of the GI approach. Previous studies of GI implementation also showed that it is mainly driven by the various levels of government, but which one is considered the most influential or responsible differs from country to country [1] and [20].

4.3. Financing GI in Europe

Financial measures are important for preserving, restoring and developing green and blue areas and for enhancing their qualities and uses [15,50,51]. The respondents ranked the importance of different funding sources for implementing GI measures based on a list of seven European funds (Figure 4).
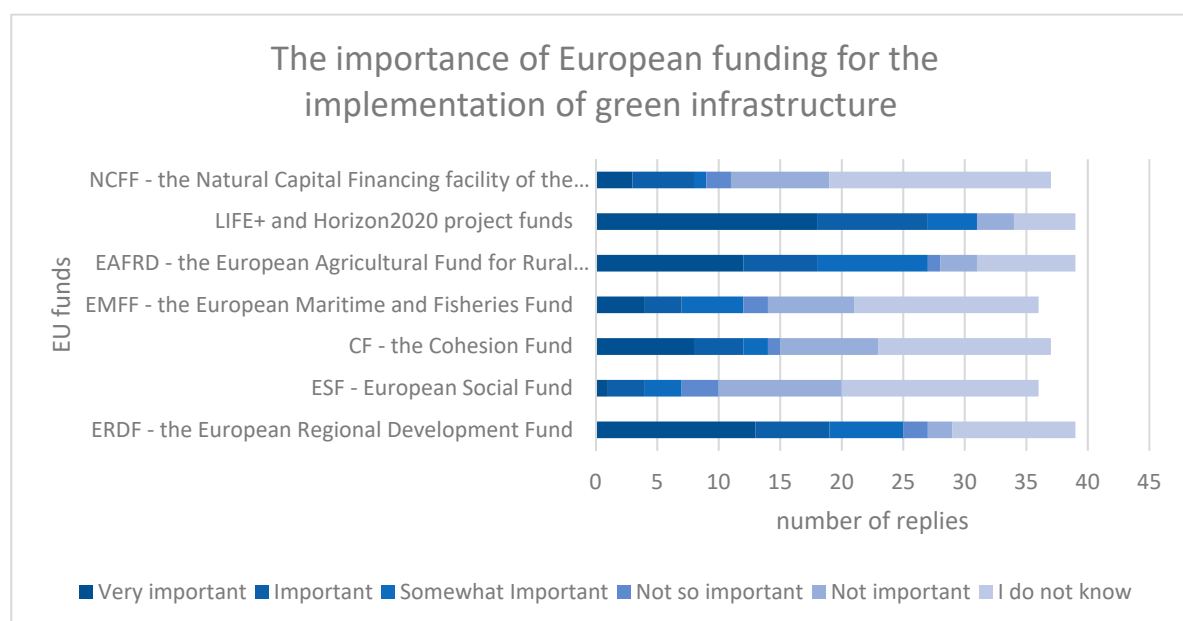
Figure 4. The importance of European funding for the implementation of green infrastructure in 32 European countries (EU28 and Iceland, Liechtenstein, Norway and Switzerland) based on a summary of 40 online survey responses to the question.

Text comments added to the questionnaire stated that subsidies, investments and tax breaks were used as land management incentives for 'greening' agriculture, for establishing and managing nature trails and nature reserves, for renewing urban parks and building green roofs. As examples, the five structural funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF)) were used, together with national environmental funds, in Cyprus and Slovakia. EAFRD was used for agro-environmental subsidies in Belgium and to improve environmental quality in Natura 2000 areas in Denmark. CF was used for enhancing urban

green areas in Slovenia. The results indicate that funding flowed mainly from public funding sources to public actors and institutions. There was also a certain amount of private green investment.

All of the funds listed in the questionnaire were considered important to some degree (Figure 4). The three EU funds considered 'Very important' for implementing GI in Europe by most respondents were LIFE+ and Horizon 2020 project funds (18 of 40 respondents), the European Regional Development Fund (ERDF) (13) and the European Agricultural Fund for Rural Development (EAFRD) (12). Note that nine respondents stated that European funds were not used for implementing GI and 12 respondents did not know if the funding originated from the European Union or not. Some respondents also added comments about other funds, in particular national funding and co-funding from various sources depending on the primary aim of the GI in question.

4.4. Georeferenced Information on Protected Areas and Its Use in Spatial Planning

One of the basic prerequisites for preserving and restoring networks of green and blue areas, is geographical knowledge of the existing GI and its environmental qualities. Although GI includes a wider range of green areas than just protected land, the respondents were asked if information was easily accessible about the location of protected areas and about their environmental qualities (see Figure 5). Another prerequisite is that this knowledge was used as the basis for decisions in spatial planning, such as where to locate new housing, commercial areas, industries, roads, waste disposal and so forth. The respondents were asked how often the information was used in decision-making processes in spatial planning on regional and local levels (Figure 5).

Availability and usage of georeferenced information	Always	Sometimes	Rarely	n/a
	AT	BE	BG	HR	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	IS	LI	NO	CH
Location data																																
Data on environmental quality in protected areas																																
Usage in decision making																																
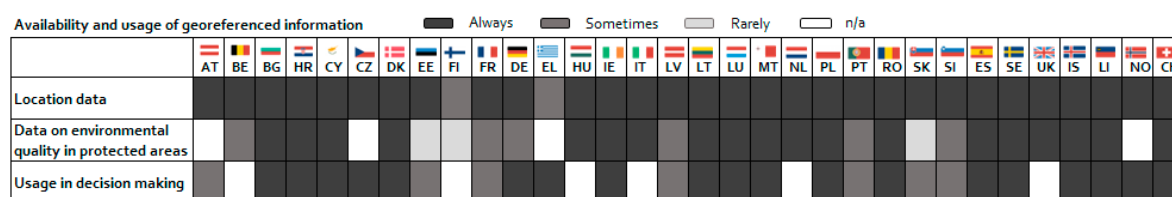
Figure 5. Availability and usage of georeferenced information on location and environmental quality in 32 European countries (EU28 and Iceland, Liechtenstein, Norway and Switzerland).

Out of the 32 countries, 30 had georeferenced information about where protected areas were located that is accessible online.

Nineteen countries stated that georeferenced information was available about the environmental quality of protected areas, e.g., biodiversity rates, ecosystem services and/or other quality measures. Six country representatives said that this information was sometimes available. Three representatives said that it was rarely available, and four representatives did not know.

Nineteen country representatives stated that the information was used in all decision-making processes in spatial planning at regional and local levels, seven representatives said that it was used sometimes, and six representatives stated that they did not know.

The results indicate that information about the location and size of the protected areas, in terms of coordinates, boundaries and hectares, was more readily accessible for decision-making processes than the qualities of these areas. Although it is positive that georeferenced information on land cover and land use patterns is available, in several countries there were multiple sources, which means that the responsibility for providing georeferenced information regarding land and water use is shared between several institutions and online platforms. In planning practice, this can present an obstacle to practitioners and planners in finding and using the most accurate information. The majority of the respondents said that continued mapping of land cover and land use patterns in terms of zoning and monitoring is important for the ongoing implementation of GI. This includes protected areas, production forests, agricultural land, level of fragmentation, urban sprawl and ecological status.

When asked directly if the planning system included innovative ways of calculating GI requirements for new urban developments, 12 respondents from 12 countries explicitly mentioned that

such incentives are used to some extent in their national planning system. As this information has not been validated, it should be treated with care and not be used as evidence that this planning tool is definitely in use in 12 European countries. Instead, it should be seen as an indication of a certain level of awareness of the opportunities to include such tools in planning procedures. The planning tools have different names throughout Europe, such as biotope area factor, green space factor, blue green area factor, max density of built-up area, coefficient of vegetation area, or green-area-per-capita factor [51,52]. These tools are used in varying forms and to a varying degree in the different countries. What they share in common is that the planning processes include a calculation of 'a factor' of space that must left as land that is not built up or designed as green space. The point of this is to ensure that the actors responsible for the building phase incorporate areas and elements for GI into their work.

5. Conclusions

Previous studies highlighted that the GI concept was not yet being implemented in an integrated manner and that it was being interpreted slightly differently depending on context [1,5,6]. Some even noted a growing number of sub-national and local variations for GI assessments and outcomes [3]. The results presented in this study indicate similar trends, which should come as no surprise, given the range of different governance structures and national policies in Europe. Whether this is necessarily a problem remains an open question. On the one hand, strict definitions of concepts, goals and associated measurements are important for quantifying how effective policies are on the ground. On the other hand, openness of political goals on pan-European levels facilitate contextualization and adaptation of pan-European policies. This openness can be seen as necessary for a policy to be legitimately implemented on national, regional and local levels and have real effects, not only in financial terms but also in terms of the environment and social benefits, or—in the words of the GI strategy—"to balance people, planet and profit" [6,16].

Despite different ways of implementing the European GI strategy, the respondents in this study indicated a common understanding of the concept. Respondents from most countries included green areas and the interconnectivity between them. Some respondents mentioned blue areas. Respondents from Iceland and the UK also included policy measures for green transition. The study indicates that the 32 European countries integrate GI in one or more policy sectors, especially in the 11 countries that have developed or are developing GI-specific national strategies. The analyses in this article suggest that a more systematic coordination of policy could lead to a further and wider implementation of GI in various policy sectors. Targeted coordination per sector and national GI-specific policies would help achieve the multifunctional nature of GI to a greater extent. Further study is needed of whether sectoral policy coordination would be best achieved by focusing on the five sectors that already seem to include principles for GI (water management; agriculture, forestry and fisheries; climate change adaptation and mitigation; environmental protection; rural development) [1,2,17,38–40] or by focusing on the policy sectors that seem to lack such principles (finance, energy, health, social services) [5].

A parallel route to further implementation of GI—even with further policy integration—is to make use of existing spatial planning procedures. Criticism has been raised of the tendency not to acknowledge spatial restrictions (e.g., that land is a limited resource for which several uses and policy sectors compete) [26–29]. This is indeed relevant for a concept such as GI, which has an ambition of combining multiple goals and policy sectors. Based on the results of this study, it can be concluded that even though the georeferenced information on protected areas and their environmental qualities is provided at a national level and used as part of the basis for decisions in spatial planning on regional and local levels, the decisions on where to invest in socio-economic developments (e.g., build new housing, commercial areas or industries) are not always based on this information. This means that the spatial planning on a regional, local and city level does not always prioritise GI. This challenge, which can be seen in the GI implementation in Slovenia, Ireland, Italy, Norway and Austria but which is also indicated elsewhere in Europe, is related to one of the fundamental issues of governance of land and resources, i.e., the balance between knowledge and power. Regardless of the level of government

involved, relevant and up-to-date knowledge is one of the fundamentals for decision making—using the information to make decisions is another fundamental [33].

The responses about responsibility for both policy development and the implementation of GI in this study confirm that GI is mainly considered to be the responsibility of the various levels of government [1,20]. Which level is seen as having the main responsibility differs from country to country. The responsibility of the actor group of land owners (e.g., gardeners, foresters and farmers) is not explicitly included in the questionnaire. Although not indicated by our respondents, indications from media debates in countries such as Sweden, Denmark and the UK suggest that it is important to acknowledge the role of land owners in analyses regarding the responsibility for implementing GI and maintaining the environmental qualities of their land. Farmers, foresters and other private land owners were assumed to be part of the actor group 'business community' in this questionnaire. As agriculture has been called 'the elephant in the room' [53], to not focus the questionnaire more on this actor group is a shortcoming that future studies of GI are recommended to address.

Appendix A

Survey on Green Infrastructure

ESPON GRETA- Green Infrastructure: Enhancing biodiversity and ecosystem services for territorial development, GI policy in Europe

The ESPON-funded project GRETA aims to develop a comprehensive knowledge base for enhancing green infrastructure to benefit territorial development in different European regions and cities.

With this survey we are collecting information to improve the knowledge base regarding GI.

The survey should only take about 15 minutes to complete. Information will be incorporated into a set of National Fact Sheets, one for each of the ESPON countries. Any personal information shared with us will be anonymised.

Feel free to share the survey with other experts as well.

Thank you for helping us balance the green, blue and grey infrastructures in Europe!

* 1. Questions for the national fact sheets and Green Infrastructure (GI) policies

Personal information:

Name

Country

Email Address

2. Background information about you

Title:

Affiliation:

3. Questions regarding policies in relation to Green Infrastructure (GI)

Does your country adopt and implement the following pan European policies?

	Yes	No	I don't know
Natura 2000	○	○	○
GI (Green Infrastructure) strategy	○	○	○

European policies that are applied and have a direct relation to GI policy and/or planning.

4. Has your country developed specific GI policies, strategies, or similar?

	Yes	No	I don't know
Answer	○	○	○

If yes, please provide name of policy, strategy, or framework (Description of key areas of focus, website or other information)

5. Based on your expertise, are GI principles included in your country's legislation, policy and/or strategy for:

	Yes	No	I don't know
Land use and spatial development plans	○	○	○
Transportation	○	○	○
Water management	○	○	○
Agriculture, Forestry and Fisheries	○	○	○
Climate change mitigation and adaptation	○	○	○
Environmental protection	○	○	○
Disaster prevention	○	○	○
Finance	○	○	○
Energy	○	○	○
Cultural heritage	○	○	○
Health	○	○	○
Social services	○	○	○
Rural development	○	○	○

Other sector

6. Who in terms of actors and/or institutions have the main responsibility for **GI implementation*** in your country?

*With implementation we are referring to actions taken to further develop the multi functionality and connectivity of protected areas.

<u>Rank actors 1-7, where 1 main responsibility</u>

⁞	⬍ European policy and stakeholders	☐ N/A
⁞	⬍ National policy and stakeholders	☐ N/A
⁞	⬍ Regional policy and stakeholders	☐ N/A
⁞	⬍ Municipal policy and stakeholders	☐ N/A
⁞	⬍ Research	☐ N/A
⁞	⬍ Non-governmental organisations	☐ N/A
⁞	⬍ Business community	☐ N/A

7. What institutions/actors etc. have the main responsibility for developing **GI *policy and strategy** in your country?

*With policy and strategy we are referring to funding and activities such as the formulation of a national Green Infrastructure policy and GIS-mapping for green areas to be used for decision making.

<u>Rank actors 1-7, where 1 main responsibility</u>

⁞	⬍ European policy and stakeholders	☐ N/A
⁞	⬍ National policy and stakeholders	☐ N/A
⁞	⬍ Regional policy and stakeholders	☐ N/A
⁞	⬍ Municipal policy and stakeholders	☐ N/A
⁞	⬍ Research	☐ N/A
⁞	⬍ Non-governmental organisations	☐ N/A
⁞	⬍ Business community	☐ N/A

8. Questions regarding financing GI

Does your country receive European funds that contribute towards GI policy development and implementation?

	Yes	No	I don't know
Options	○	○	○

9. Please rate the importance of the following European funding mechanism for contributing to the implementation of GI measures in your country

	Very Important	Important	Somewhat important	Not so important	Not important	I don't know
ERDF - the European Regional Development Fund	○	○	○	○	○	○
ESF - European Social Fund	○	○	○	○	○	○
CF - the Cohesion Fund	○	○	○	○	○	○
EMFF - the European Maritime and Fisheries Fund	○	○	○	○	○	○
EAFRD - the European Agricultural Fund for Rural Development	○	○	○	○	○	○
LIFE+ and Horizon2020 project funds	○	○	○	○	○	○
NCFF - the Natural Capital Financing facility of the European Investment Bank (EIB)	○	○	○	○	○	○

Other relevant funds (Please identify)

10. Questions regarding GI in spatial planning

What kinds of instruments are integrated into spatial planning that consider the elements of GI?

Information tools that are applied as innovative ways of calculating GI requirements for new developments *(e.g. Biotope Area Factor / Green space factor etc.)*	
Financial incentives or subsidies	
Other	

11. On a national level, is information about where protected areas are located easily available (e.g. georeferenced data etc.)?

	Always	Often	Sometimes	Rarely	Never	I don't know
Options	○	○	○	○	○	○

Please provide some additional information e.g. webpage

12. On a national level, is information on environmental quality in protected areas easily available? (e.g. biodiversity rates, ecosystem services and/or other quality measures)

	Always	Often	Sometimes	Rarely	Never	I don't know
Options	○	○	○	○	○	○

Please provide some additional information e.g. webpage

13. Is the provided information used in decision making processes regarding spatial development on regional and local levels?

	Always	Often	Sometimes	Rarely	Never	I don't know
Options	○	○	○	○	○	○

Please provide some additional information e.g. webpage

14. Questions regarding good practice examples of GI projects:

We are interested in good practice* examples of GI planning and managements at regional scales.

*With good practice example we are referring to implementation of instruments and/or actions in a way that can be perceived to successfully increase connectivity and multi-functionality in green space.

<u>Can you please provide a good practice example of GI planning and management within your county?</u>

15. Please provide the following information for the good practice example:

City & Region	
Area & Population	
Budget (amount and source of funding)	
Timespan	

16. How did the GI project emerge?

17. Which of the following functions does the good practice example address?

	Yes	No	I don't know
Protect biodiversity	○	○	○
Preserve cultural heritage	○	○	○
Mitigation and/or adaptation to climate change	○	○	○
Ecosystem services incl. food production	○	○	○
Promote health and well-being	○	○	○
Recreational and amenity	○	○	○
Enhancing green economy	○	○	○
Urban attractiveness	○	○	○
Social cohesion and inclusion	○	○	○

18. **Lessons learned and recommendations from your good example:**

Which are the most important factors of success?

19. Which are the most challenging factors (or failures)?

20. What are the innovative approaches in the project?

21. What are the perceived or measured effects?

22. Finally, please share other considerations or thoughts on the issues of GI in your country:

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