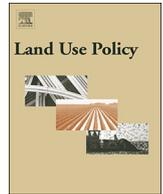


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Urban green infrastructure in Europe: Is greenspace planning and policy compliant?

Clive Davies^{a,c,*}, Raffaele Laforteza^{a,b}^a Department of Agricultural and Environmental Sciences, University of Bari "A. Moro", Via Amendola 165/A, 70126 Bari, Italy^b Center for Global Change and Earth Observations (CGCEO), Michigan State University, East Lansing, MI, 48823, USA^c Department of Architecture, Planning & Landscape, Claremont Tower, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK

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ABSTRACT

Urban green infrastructure (UGI) planning, based on certain principles, has emerged as a way to conceptualise connected greenspace in urbanised environments. This is achieved through the application of processes and approaches linked to policy themes to which the concept can significantly contribute. Taken together the processes, approaches and policy themes constitute the principles of UGI, which when adopted can promote, maintain and enhance quality of life in resource-efficient, compact and climate-resilient cities. In this study we explore the extent to which strategic greenspace planning in Europe is UGI compliant, as we hypothesised that the above principles are presently under-represented in planning documents and policies. This was accomplished by conducting a comparative analysis of the adoption of UGI principles in current practices of greenspace planning across European city-regions based on a systematic review of previous data and reports. The study found that many UGI principles and related concepts are present to some degree in strategic greenspace planning in Europe. However, gaps exist with regard to their scope and level of consideration. Presently, conservation emerges as the predominant task in strategic urban greenspace planning. However, enhancing network connectivity is key to the development of UGI, hence a greater focus on the restoration and creation of greenspace is required in the future. Based on our analysis it can be concluded that the advancement towards UGI planning is well established and progressing, although some areas are markedly under-represented. Strategic greenspace planning in Europe, with a few exceptions, requires further development to be effectively considered as UGI compliant.

1. Introduction

Though it is sometimes used to describe a palette of green engineering technologies and their application in urban design, green infrastructure (GI) is also commonly used as a term associated with strategic approaches to greenspace planning that focuses on network connectivity (Benedict and McMahon, 2002; Rouse and Bunster-Ossa, 2013; Lennon, 2015). In Europe, the GI concept has become widely recognised for its potential to contribute towards ecosystem services preservation and restoration and is now embedded in European policy (EC, 2013); it has also been linked to territorial planning and cohesion (EEA, 2011, 2014). GI has been defined as "...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..." (EC, 2013, p. 3).

As more and more of the world's population is becoming urban and

challenges such as maintaining a high quality of life and adapting to climate change are occupying political agendas for cities, the concept of GI for urban areas has been gaining more attention. This has led to a new urban agenda where promoting environmental sustainability can foster a transformative change when a critical connection is established between the environment, urban planning, and governance (UN, 2016). The increased attention GI is receiving is evidenced by recent policies and guides developed by cities and countries across the globe referencing GI (e.g., in England, Green Infrastructure Planning Practice Guidance [UK Government, 2016]; in the US, Philadelphia's Green Stormwater Infrastructure Planning Guidelines (Philadelphia Water, 2015) and the Environmental Protection Agency's various guides [c.f. US EPA, 2010, 2014]) and by extensive research. For example, Gill et al. (2007) explored the important role that GI can play in adapting the city for climate change. Spanò et al. (2017) considered how established approaches, such as the EEA's Driving

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* Corresponding author at: Newcastle University, School of Architecture Planning & Landscape, Newcastle upon Tyne, NE1 7RU, UK.

E-mail address: clive.davies@newcastle.ac.uk (C. Davies).

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force–Pressure–State–Impact–Response (DPSIR) framework, can be used in support of GI planning. Other studies have linked components of GI in urban areas to human health and wellbeing (Tzoulas et al., 2007; Laforzezza et al., 2009; Dentamaro et al., 2011; Carrus et al., 2015; Coutts and Hahn, 2015).

More recently, urban green infrastructure (UGI) planning has emerged as a distinct subset of GI aimed at creating and managing networks of greenspace in urbanised environments through the application of certain planning processes, approaches and policy themes (e.g., Ahern, 2007; Mell, 2009; Pauleit et al., 2011; Davies et al., 2015). Conceptually, UGI is linked to neighbouring GI at the landscape scale whilst simultaneously focusing on creating and managing networks of multifunctional greenspace in the urban context (EC, 2011). Planning a UGI network involves linking greenspaces at multiple scales whilst addressing groundwater, surface water, and air movement systems (Young et al., 2014). Hence, a UGI typology will include many types of features encompassing both the natural and man-made (e.g., river corridors, parks, forests, green routes). Contributions to the definition and principles of UGI (e.g., Ahern, 2007; Mell, 2009; Pauleit et al., 2011) have been followed by an increasing number of critical accounts on the perspectives of this approach. For instance, it has been argued that GI is a neoliberal concept where the value of ‘green’ is mainly seen in economic terms (Thomas and Littlewood, 2010; Horwood, 2011; Lennon, 2015). Although we do not set out to investigate this in our study, it has been posited that creating more ‘green’ in cities via UGI planning may promote gentrification rather than reduce social and environmental inequalities (Dooling, 2009; Wolch et al., 2014).

We also consider UGI as a biophysical concept (biotic and abiotic urban surroundings, Deng and Wilson, 2006) and its application in territorial and functional land-use planning. However, we realise that this also needs to be considered within the context of the grey-green continuum as first proposed by Davies et al. (2006) and subsequently by Mell (2014) and Roe and Mell (2013), and Lennon (2015). We recognise that the term ‘green infrastructure’ is now being used in respect of urban design to describe various, often technological, approaches to the management of built form (e.g., sustainable urban drainage systems or green roofs), which are functionally ‘green’ but also involve a significant amount of ‘grey’ infrastructure. This grey-green continuum has been brought ever more into focus by recent developments at the European level (EC and ALTER-Net, 2015), notably through the promotion of nature-based solutions to tackle urban resilience in the face of global change. This focus is manifesting itself in a variety of ‘green’ engineered solutions where the biophysical concept of UGI may be minimal.

Laforzezza et al. (2013) have pointed out that there is a strong relationship between GI planning and temporal considerations. We recognise that the UGI policy themes discussed later in this work (e.g. social cohesion, biodiversity) can be considered within a time-dependent framework. The same applies to the significance of governance (Buizer et al., 2015; Gulsrud et al., 2016). However, we decided not to expand our investigation to include these aspects, the reason being that they either merit separate studies or that these are already underway. Yet, we were aware while undertaking this research that UGI-compliant interventions operate within a time-based context and that planning and policy is strongly linked to governance considerations; hence, these topics set boundaries to our study.

In this work, we focus on greenspace planning in Europe from a strategic perspective and how compliant strategic greenspace plans are with the processes, approaches, and policy themes of UGI as determined through the European Union-funded FP7 GREEN SURGE (ENV.2013.6.2-5) project. Firstly, however, let us define strategic greenspace planning as it is used in this work. According to CABA Space (2006), an overall approach to greenspace will have specific achievable goals, including the methods and time (i.e., temporal component) required to meet them. In most cases, this planning is undertaken by public authorities – often local municipalities – and is linked upwards

to corporate aims such as territorial land-use plans and downwards to more detailed strategies looking at, for example, nature conservation or urban forestry. Hence, a strategic approach to greenspace planning provides a bridge between local delivery, policy, and overarching aims and objectives which may have been set at the local level, or possibly at a higher tier of government (based on CABA Space, 2006).

Our overarching aim is to test whether, and to what extent, strategic greenspace planning in European cities complies with the principles of UGI planning approaches, processes, and policy themes. We hypothesise that these UGI principles are presently under-represented in planning documents and policies, and that this is a consequence of the level of adoption, the significance of presence, the advancement of policies, and planning contradictions. We expect our investigation of UGI principles to reveal the degree to which they have been adopted and provide us with the necessary evidence to justify further research. Contextually, our hypothesis hinges upon the fact that GI remains a relatively new concept. Therefore, we believe that a number of predecessor concepts, such as those referred to by Davies et al. (2006) (e.g., ecological networks) will feature in our investigation.

The study was informed by our awareness that a number of European cities already had well-established strategic approaches to greenspace planning, and that many of these encompass the planning approaches, processes, and policy themes of UGI, without the authors of these documents being aware of the UGI concept or mentioning it. To corroborate our hypothesis, the following research objectives were defined:

- Understand to what extent our case study cities have adopted UGI principles and what type of correlation exists with the planning family they are part of;
- Define which of the UGI processes, approaches and policy themes are more, or less, significantly present and what impact this has on strategic urban greenspace planning;
- Determine whether there are any contradictions in planning policy that would hinder the development of UGI principles.

2. Materials and methods

We aimed to test our hypothesis through a systematic review of data and reports previously obtained for the GREEN SURGE project and then subjected these to re-analysis to answer research objectives derived from our hypothesis. We had access to: a questionnaire survey, desk study, document analysis, and a semi-structured interview with authors of strategic greenspace plans in 20 major European cities across 5 study-defined planning families.

Firstly, we undertook a fresh review of the UGI principles, as determined by the project, and agreed that they are a robust basis to conduct our study. Specifically, the principles of *connectivity*, *multi-functionality*, *(grey-green) integration*, and *multi-scale* (operating at different spatial levels) constitute the concept of UGI as a planning approach; the principles of *strategic*, *inter- and transdisciplinary*, and *socially inclusive* represent the UGI planning process; while *biodiversity*, *ecosystem services*, *climate change adaptation*, *green economy*, *human health*, and *social cohesion* represent the UGI policy themes (based on Benedict and McMahon, 2006; Kambites and Owen, 2006; Ahern, 2007; Pauleit et al., 2011; EC, 2013; Hansen and Pauleit, 2014; Mell, 2014; Davies et al., 2015).

To assess these UGI principles and the relative compliance of current greenspace planning, we revisited the comparative case study research that was undertaken in the European project, which employed both qualitative and semi-quantitative methods. Twenty case studies representing a variety of European cities and city-regions were re-analysed. These provide a sample of planning systems and different situations affecting urban greenspace planning (e.g., land cover and population dynamics) across Europe (Hansen and Rall, 2015).

We reassessed the existing planning family classifications in Europe

Table 1
Typology of planning families of the 20 European case study cities.

Planning family	Description	Country	Case study city
Nordic	Comprehensive integrated	Denmark, Finland, Sweden	Aarhus, Helsinki, Malmö
British	Land use management	United Kingdom	Edinburgh, Bristol
New Member States	Post-socialist	Poland, Hungary, Slovenia, Romania	Lodz, Poznan, Szeged, Ljubljana, Oradea
Central	Regional economic planning	Austria, Germany, Netherlands	Linz, Berlin, Hale (Salle), Amsterdam, Utrecht
Mediterranean	Urbanism	Italy, Spain, Portugal	Bari, Milan, Barcelona, Lisbon, Almada

based on [Nadin and Stead \(2008\)](#), who adapted the [ESPON \(2007\)](#) and European Commission Compendium ([EC, 1997](#)) classifications; these typologies are organised into five main categories (for details, see Supplementary Table S1):

- Nordic/Comprehensive integrated
- British/Land-use management
- New Member States/Post-socialist
- Central/Regional economic planning
- Mediterranean/Urbanism

Hence, the 20 case study cities previously mentioned represent 14 European countries across these 5 planning families ([Table 1](#)).

We re-analysed information that had been gathered using four main methods: (i) a *questionnaire* for case study officials; (ii) a *desk study* conducted by a local partner; and (iii) a *planning/policy document analysis* and (iv) a *semi-structured interview*, also conducted by the local partner. The questionnaire had elicited planning professionals' perceptions of strategic greenspace planning in their city and explored the most important policy themes and issues. It had been administered on up to three individuals separately in each of the cases; hence, approximately 60 interviews were conducted. The *desk study* of relevant literature and documents (e.g., description of planning instruments for greenspace planning at the city level) had been conducted to verify and supplement results from the questionnaire. The *document analysis*, focusing on two important plans or policies related to UGI, had been conducted to provide insight on whether or how different approaches, processes and policy themes were considered in planning depending on accessibility. The *semi-structured interviews* had been held in the local language and the results were later translated into English for overall analysis.

Our systematic review commenced with a re-analysis of the published findings of the European project and whether any of these required re-interpretation in light of our hypothesis and research objectives. Secondly, we reviewed the histograms produced in the Tier 1 report ([Davies et al., 2015](#)) to see if the original interpretations still stood up to scrutiny. Finally, we included new information sourced from our literature review to produce a more up to date study.

3. Results

3.1. Planning and policy processes

Our systematic review of compliance with UGI planning processes, approaches, and policy themes confirmed that there are notable differences and similarities among the European planning families investigated ([Fig. 1](#)). Only the *strategic* UGI-compliant process was found to be well established in all but the New Member States planning family. However, our analysis of previous data confirmed that there is little evidence in the case study cities that their strategic approaches are oriented to the long-term development of greenspace as infrastructure, beyond the life of current plans. With respect to *inter- and transdisciplinary* processes, these were not only less well represented than the strategic approach but also showed widely varying results with no planning family representing them strongly. It should be noted,

however, that neither were they absent. Our review also showed that there is a notable peak in the British and a significant lack in the Mediterranean planning families for *social inclusion*, with the results for others being mid-range.

3.2. Planning and policy approaches

In respect of UGI approaches ([Fig. 1](#)), the most similarity could be found with regards to *connectivity* and *multifunctionality* and the most variation was evident in the *integration* and *multi-scale* approaches. Concerning connectivity, almost all of the plans reviewed consider the benefits of functional and/or physical networks. These benefits were generally referred to either ecologically (notably biodiversity) or socially (notably recreation). Connectivity was referred to in terms of ecological networks, where biodiversity nodes are connected through green corridors. In regards to multifunctionality, almost all the plans reference the potential of green networks to provide multiple functions and services, which are enhanced when the networks are well connected.

As we re-looked at the original data on integration, it became clear that this term was not very familiar to the case study city interviewees. Our interpretation is that the original reports were correct in identifying that this is primarily, but not solely, considered in the context of the management of stormwater. Some cases did offer ideas about combining GI with grey infrastructure to reduce environmental impacts, particularly the negative impacts of urbanisation. The planning approach of integration peaked in the British planning family and was less prominent elsewhere, especially in the Central planning family.

In the case of the multi-scale approach, this principle was not robustly present in any planning family and was markedly diminished in the British and New Member States families. In contrast, the Mediterranean planning family showed strong city-to-regional planning linkages. In a few cases, linkages between planning documents at different spatial levels were according to policy themes (e.g., biodiversity). On the whole, the UGI principle of multi-scale appeared to be moderately adopted in planning approaches.

3.3. Planning and policy themes

We investigated the six UGI policy themes which were studied according to their level of representation in the analysed plans ([Fig. 2](#)). This proved to be very insightful with less than 20% of the analysed documents referring to a concept similar to *green economy*, whilst in contrast *biodiversity* and *health* were heavily represented (> 70%). Aside from biodiversity being a highly represented policy theme, there were a number of similar concepts mentioned, including ecological diversity. Closely behind in representation was the contribution of greenspace to human health. As with biodiversity, there were similar concepts mentioned for health, such as active lifestyles. Middle ranking was given to the policy themes of *adaptation to climate change* and *ecosystem services*. For the latter, the term ecosystem functions was also mentioned. *Social cohesion* and especially green economy were poorly represented. In the first case, similar concepts to social cohesion appeared frequently, such as social justice. Green economy was almost absent and never referred to directly.

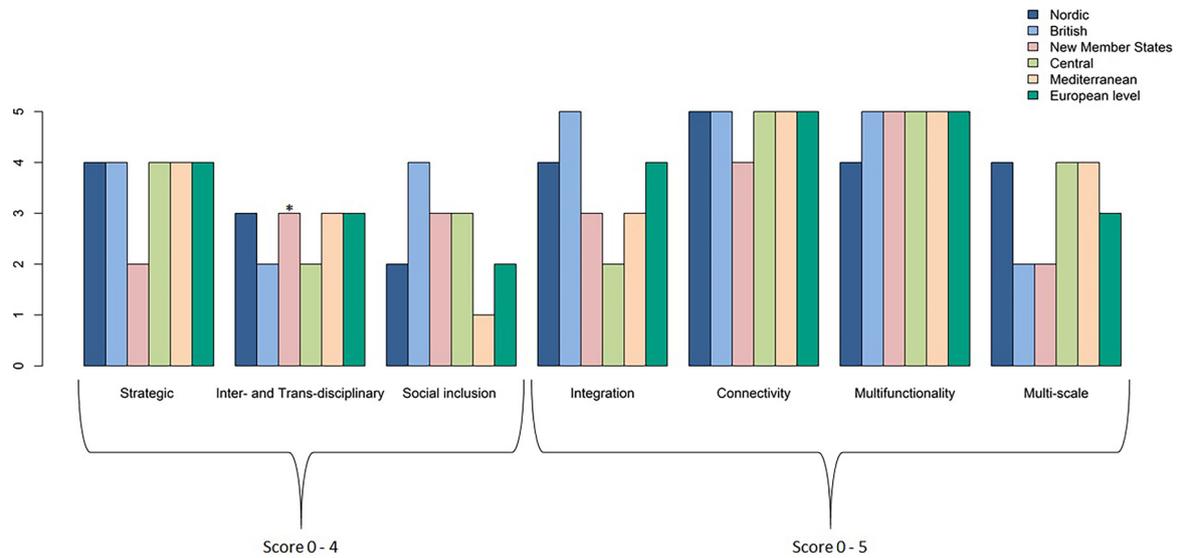


Fig. 1. Relative uptake of urban green infrastructure processes (score 0–4, left-hand columns) and approaches (scored 0–5, right-hand columns) across the five European planning families studied and for Europe as a whole. The asterisk indicates a disagreement in the results from the questionnaire and document analysis.

3.4. Emphasis on planning and policy tasks

We investigated how urban greenspace was being emphasised in respect of the tasks of *conservation*, *restoration* and *creation* (Fig. 3). The greatest emphasis on the conservation of urban greenspace appeared in the British planning family and only slightly less strongly in the Central planning family. In the Mediterranean planning family emphasis was widely spread from little to very strong. With regards to the emphasis on restoration the majority of the planning families ranked this category less than very strong. In the case of the Central planning family there was a very wide spread, from little to very strong. In the Nordic planning family restoration appeared to be less of a focus. The task of creation of greenspace showed a modest peak in the ‘much’ category, but it was not strongly represented. The results for the tasks of restoration and creation are important points that will be dealt with later in our discussion.

3.5. Development of urban greenspace

The quantity of greenspace and its quality, both as habitat and recreation, were considered (Fig. 4). In the original study, stakeholders had been invited to state whether these criteria had decreased, stayed the same, or increased. From our re-investigation it is clear that the *quantity* of greenspace has indeed increased, notably in the Mediterranean case studies. Only in the New Member States can it be said with any certainty that the quantity may have stayed the same, while the

other results were inconclusive. With regard to the development of urban greenspace *quality for recreation*, both the Mediterranean and New Member States planning families showed a strongly positive increase. This is a trend reflected to a lesser extent in all of the planning families. The results for the development of urban greenspace *quality as habitat* was less dramatic, with a positive result noted for more than half of the case studies, although a number of cities reported that quality as habitat had stayed the same.

3.6. Influence of different policy levels

The influence of different policy levels on UGI planning according to city officials was assessed (Fig. 5). In almost all cases, *municipal policy* was the most influential, followed by *national policy*, *European policy* and *regional policy*, all in that order. There was a strong variation in the influence of regional policy by planning family, with the level of influence being notably low in the Nordic planning family and somewhat higher in the Central and Mediterranean cases.

4. Discussion

Based on the results of our research it has been possible to discern trends with regards to UGI-compliant planning principles in strategic urban greenspace planning across European cities; some of these principles are well represented and others much less so. However, it should be noted that there is a general absence of the terms ‘green

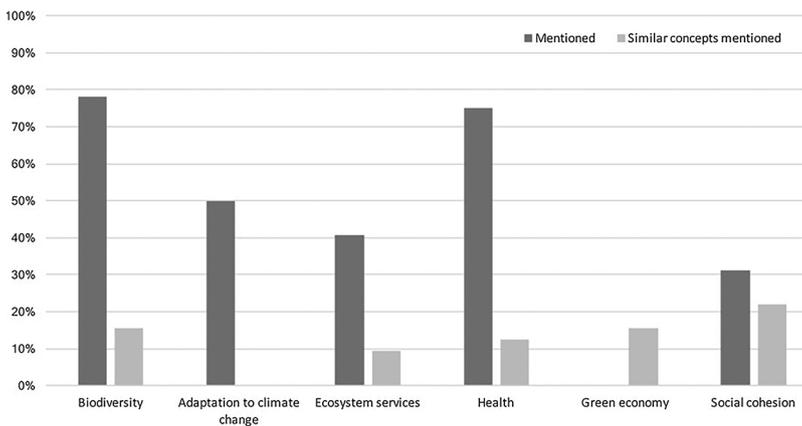


Fig. 2. The six urban green infrastructure policy themes investigated and their level of representation in the case study plans (N = 32).

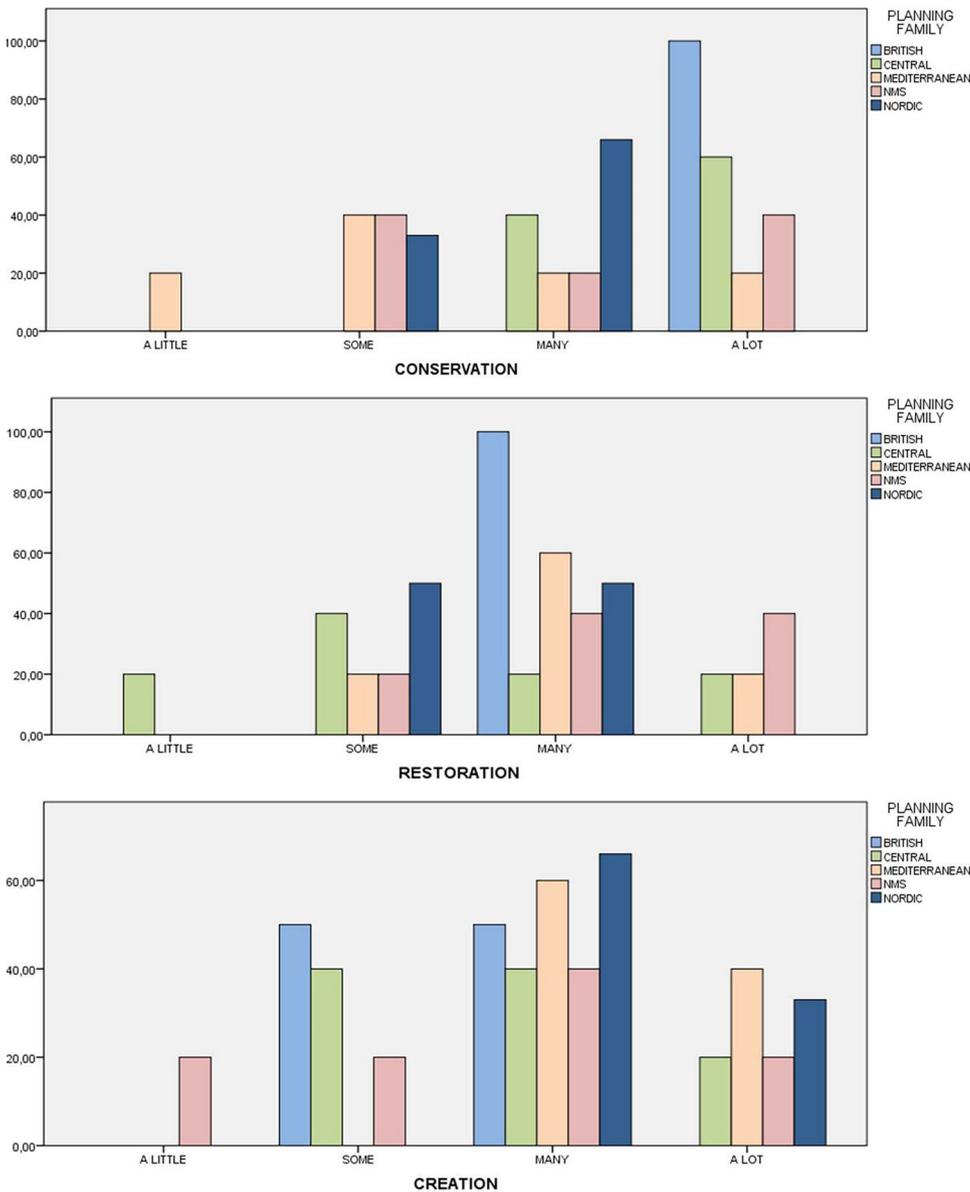


Fig. 3. Emphasis on the three tasks of conservation, restoration and creation of urban greenspace in relation to the case study cities drawn from questionnaire responses.

infrastructure’ or ‘urban green infrastructure’ in the European greenspace policy documents investigated. We have interpreted this as an indicator of the newness of the concept as well as the frequency with which strategic greenspace planning documents are updated and revised. Whilst we did not set out to research this finding, we feel it explains some of the results that were found and, hence, is worth reporting.

Strategic greenspace planning is well established in most planning families, while the New Member States lag behind (by 50%) in this regards. This latter result is interpreted as reflecting the fact that governmental systems in New Member States are still under development. The strong presence of a strategic approach is an encouraging finding in respect of UGI compliance, since it relies heavily on the convergence of different approaches to achieve the network connectivity that the concept requires. At no stage in the research process was there any indication that a strategic approach to greenspace planning would be abandoned. Therefore, we can say with some confidence that a strategic approach will continue and that it complies with the conditions for the UGI concept to evolve. However, the notion of strategic planning does not appear to have a long-term orientation beyond the life of the current case city planning documents studied. This is a clear disadvantage

when it comes to coping with long-term challenges, such as climate change and urbanisation.

As evidenced by the semi-structured interviews, the connection between different professions within the category of inter- and trans-disciplinarity appears not to be a lack of willingness among professionals, but how staff and stakeholders are distributed among and within key organisations. This may reflect departmental structures and inter-departmental cooperation. The implication of this is that unless the relevant professional actors involved in all the potential principles of UGI are brought together, compliance with this policy process may not be fully realised.

Based on the results of social inclusion, the largest scope for enhancement of current strategic greenspace planning towards UGI compliance is related to this principle. Our findings suggest that it has the potential to be strengthened in many cases. We also observed that the involvement of non-governmental actors is increasing and that there is a desire to increase the inclusion of the public individually. This suggests that strategic approaches to greenspace planning will need to be adapted to be more responsive to non-governmental actors and the public, which could involve new planning processes, additional resources, and different staff skill sets.

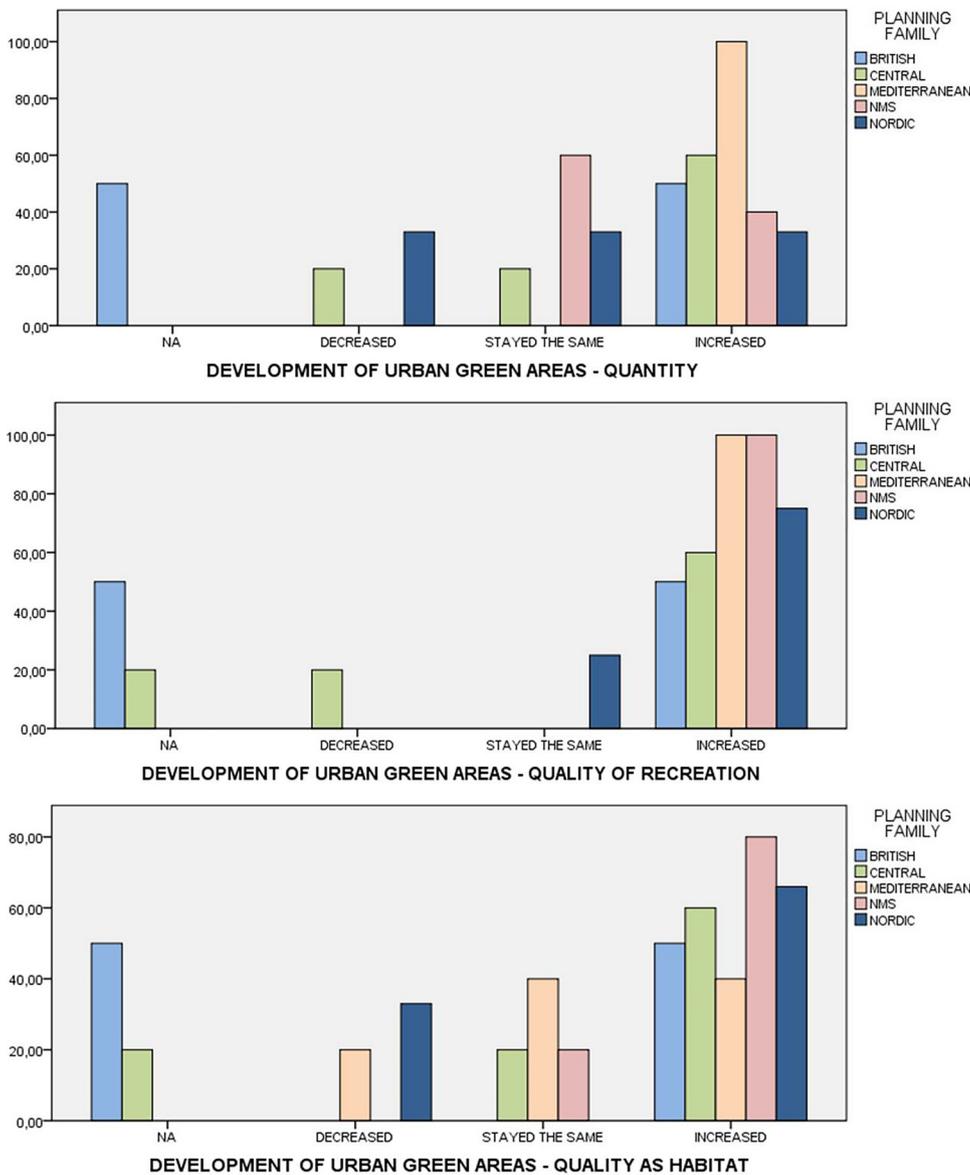


Fig. 4. Development of quantity, quality for recreation, and quality as habitat of urban greenspace in the case study cities based on questionnaire responses.

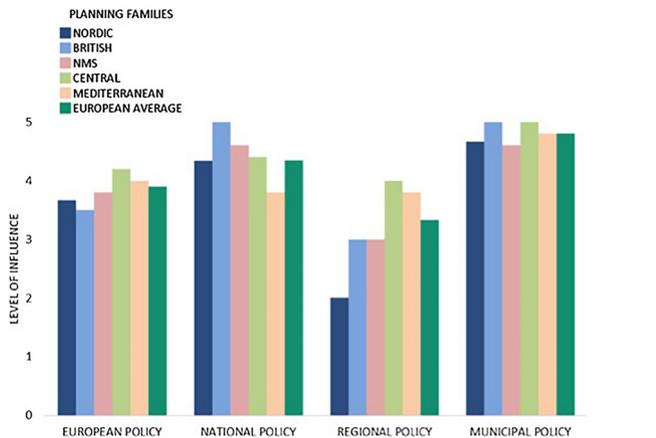


Fig. 5. Influence of different policy levels considered in greenspace planning and policy-making according to city officials (N = 20).

Our study has revealed that there is a relationship between the integration of green and grey infrastructure and the inter- and transdisciplinary process referred to above; equally, our findings show that

there is much yet to be accomplished in this area. Interviewees had previously confirmed that those practicing grey infrastructure solutions generally reside in different municipal departments (e.g., highways, water authorities) than those leading on greenspace. There is an evident policy contradiction, since unless cooperation is present the integration of green and grey infrastructure will happen only to a very limited extent. To illustrate this, consider the emerging interest in nature-based solutions (Eggermont et al., 2015; Kabisch et al., 2016; Laforzezza and Chen, 2016). For nature-based solutions to fully contribute to UGI planning there is a strong argument that the different professions within municipalities and the private sector will need to work in a more transdisciplinary way to meld grey and green infrastructure together. The potential is already present, as evidenced by a number of examples in the area of water management and highways.

The connectivity and multifunctionality approaches have been inherited from earlier concepts and are well represented. However, these need to be balanced against the integration and multi-scale approaches that are less adopted. The strong presence of connectivity and multifunctionality suggests that existing strategic greenspace planning approaches are to some extent already UGI compliant. This will need to continue and the under-representation of integration and a multi-scale approach enhanced for all of the UGI planning approaches to be wholly

present.

With regards to policy themes the unequal weight given to these strongly supports our hypothesis of under-representation. The robust presence of biodiversity and health is in marked contrast with the low presence of green economy and social cohesion. Major changes in respect of policy themes will be required for the next generation of strategic greenspace plans to be considered as UGI compliant. Essentially, this change will mean maintaining or moderately enhancing the current presence of biodiversity and health, significantly enhancing or introducing the policy themes of adaption to climate change and ecosystem services, and most notably ensuring that green economy and social cohesion are introduced and to a significant extent. Given the low starting point for green economy and social cohesion it is not unreasonable to pose the question of whether it might take 'more than one generation' in terms of strategic greenspace planning updates to reach full UGI compliance.

There is an opportunity for simultaneous maintenance and enhancement of policy themes based on a major focus cross-cutting topic where it is locally appropriate. For example, in areas where the tree canopy has the potential to be highly performing, developing the urban forestry approach could deliver enhanced services and benefits across all of the policy themes (e.g., habitat for wildlife, carbon storage for climate change adaptation, nutrient cycling for ecosystem services, recreational space for health and wellbeing, biomass for the green economy, and a platform for social cohesion projects). Furthermore, the advent of new technologies, such as the use of LiDAR, provides powerful planning tools that can be employed along with GIS to map policy themes and determine their appropriate level of representation (see, e.g., [Giannico et al., 2016](#); [Laforzezza and Giannico, 2017](#)).

Concerning the policy theme of adaptation to climate change, the results need to be interpreted carefully. A reason for this is that it is evident from the semi-structured interviews that city-level climate change planning processes are increasingly well established, but exist in isolation from strategic greenspace planning. This illustrates a contradiction, namely, that whilst cities are addressing climate change adaptation through planning they are not necessarily doing this in connection with the role strategic greenspace planning can bring to it. Hence, there is an opportunity to research the degree to which cross-compliance and shared narratives exist between strategic greenspace plans and climate change adaptation plans.

The emphasis on the three tasks of conservation, restoration and creation of urban greenspace supports our hypothesis with regards to some predecessor concepts featuring strongly; this is so for conservation. However, significantly less emphasis is being placed on the tasks of restoration and creation of urban greenspace. This gives rise to a contradiction, since restoration and creation of urban greenspace are precisely the instruments required to enhance connectivity and multifunctionality. The document review and semi-structured interviews firmly place connectivity and multifunctionality at the top of the list of UGI-compliant approaches, as seen in [Fig. 1](#), yet the main process for enhancing these are less strongly present. This seems incongruous, unless of course all those cities who emphasise conservation already have well-established green infrastructure networks, which is highly improbable. Next-generation strategic greenspace planning will need to rebalance the tasks and focus more on the restoration and creation of urban greenspace and bring them into balance with conservation.

In respect of UGI compliance the results for quantity, quality for recreation, and quality as habitat are encouraging with all of these appearing to increase. It is notable that quality for recreation is scoring higher than for quality of habitat. Hence, cities are prioritising the development of green space for recreation over habitat. This could reflect an anthropocentric view of greenspace, including the allocation of resources, but does call into question whether the biodiversity focus is as robust as the results appear to suggest (e.g., see [Fig. 4](#)). Within these results there are some important trends to discuss. For example, the quantity of greenspace in the Mediterranean planning family appears

very high and could be an outlier based on the case study cities being atypical. To confirm this result, a larger number of cities would need to be subjected to data collection and analysis. A further issue to emerge is that in growing cities land for greenspace is under pressure, whereas in shrinking cities (e.g., the New Member States) there is more land available for greenspace creation. This posits a question as to whether it is easier to create green infrastructure networks in shrinking cities, as the land supply is less of an issue than in growing cities. Conversely, shrinking cities may lack the resources to make UGI investments.

With respect to the influence of different policy levels the extent to which European policy makes an impact on strategic greenspace planning at the city level initially came as a surprise. Upon reflection and closer examination this can be related to two key issues: firstly, the regulatory framework of EU directives (e.g., habitats directive) which can be expected to influence all cities equally, and secondly, EU structural funding (which only covers under-developed regions). Many cities in the New Member States rely on structural funding to invest in their strategic greenspace provision. As such, it might be expected that the influence of European policy in the New Member States would be significantly higher than in other regions, but this does not emerge from our systematic review of findings. This could reflect the fact that the case study cities are atypical or that local stakeholders in the New Member States undervalue the contribution of EU structural funds. Either way, this is an area for further research where a greater data density provided by more case studies within and outside of structural funding regions could give more conclusive results. Also notable in this section is that regional policy was the least influential, which most likely reflects the fact that many countries have now abandoned their regional government structures.

A number of limitations of the present study should be acknowledged. Firstly, we feel that our results are insufficient in regards to the policy theme of adaptation to climate change. We have identified that planning for climate change adaptation and strategic greenspace can take place independently. Therefore, we were unable to draw significant conclusions on how UGI is featured in climate change plans, as we did not analyse these during the study. We can postulate, however, that there is insufficient linkage and we feel that this is an area for future research. Secondly, the restricted number of case study cities means that we are hesitant in making definitive statements which a greater number of cases might overturn. For instance, we are very confident in the emphases we can place on approaches such as connectivity and multifunctionality, the process of a strategic approach, and the policy themes of biodiversity and health. On the contrary, we are less confident in the reliability of the results on the more contested areas, such as the multi-scale and integration approaches, the processes of inter- and transdisciplinarity and social inclusion, and the policy themes of green economy and social cohesion – areas that warrant further research.

5. Conclusions

In our research on the European case study cities we have looked at current strategic greenspace planning practice through the lens of UGI compliance. We can say with reasonable confidence that a strategic process to greenspace planning is very well established. However, there is little evidence to suggest that the strategic planning process presently considers issues beyond the lifetime of current documents. The compliance of inter- and transdisciplinary and social inclusion processes are under-represented or lacking.

The most UGI-compliant approaches that have emerged from our study are connectivity and multifunctionality. Integration and a multi-scale approach will need to be significantly developed in planning practice as they are currently under-represented.

Of the policy themes biodiversity and health, which have been major drivers of strategic greenspace planning for some time, continue to be present at the strategic level and based on our findings show no

sign of abating. Deficiencies exist in the UGI policy themes of green economy and social cohesion. This has led us to postulate that it could possibly take more than one generation of strategic greenspace planning for these policy themes to be sufficiently represented in plans for them to be UGI compliant.

Our analysis has revealed that conservation is the strongest task taken up by current strategic urban greenspace planning. However, in pursuit of UGI compliance it will be necessary for restoration and creation of urban greenspace to feature more strongly, as an emphasis on these tasks will enhance UGI network connectivity. In summary, the outcomes of our study allow us to state that the current generation of strategic greenspace planning documents are partially, but not wholly, UGI compliant. Our findings will be of benefit to those looking to research aspects of UGI, such as ecological economists, social scientists and landscape planners. In respect of civil society, we hope that our findings will be of particular interest to those about to embark on, or are currently engaged in, strategic greenspace planning where our findings may assist them in making their plans as UGI compliant as possible.

Further reading

Researchers interested in a full breakdown of the case studies and an analysis of each are referred to a report of city portraits (Hansen et al., 2015a).

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.landusepol.2017.08.018>.

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