

## **Green Infrastructure – a strategic planning approach to improve urban quality of life**

In Europe, strategic green space planning has been gaining importance for urban development for a few years. The main reason for this is that planning researchers, policy makers and practitioners have recognized the potential of green infrastructure planning to tackle current and future challenges for city regions, for example sustainable and resilient environment, economic welfare and well-being of citizens (Laforteza et al. 2013). Also, it supports strategies to cope with climate change, economic decline, environmental injustice, demographic change and emigration (EEA 2011).

Once declared as “leftover area”, policy-makers and researchers perceive urban green today more and more as an **important policy field for improving urban quality of life**. On the European as well as on member state level, there is a list of existing green infrastructure policy documents that pursue an in-depth improvement of urban green spaces. It is important that urban and regional planning create contiguous open spaces to reach goals of maximized well-being. This is relevant in growing as well as in shrinking cities. In growing cities there is a danger that that open spaces are under pressure of development and utilization goals. Shrinking cities have due to the economic and demographic changes possibilities and potentials for the design and the connection of open spaces.

The **term “green infrastructure”** subsumes a “strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings” (European Commission 2013, page 7). Therefore, in urban regions green infrastructure includes a wide range of classical types of open space: parks, sports facilities,

playgrounds, cemeteries, smaller greenways, allotment and community gardens and street trees. In addition, this also includes “vertical” forms of green, i. e. green roofs and green walls. Connecting elements like cycle tracks and trails are key components in the consideration of green infrastructure as a network of different land uses.

In current urban research, a special focus is put on the importance of **strategically planned urban green infrastructure** as an integrated approach to be a key lever to deal with the challenges of sustainable and resilient urban futures (JPI Urban Europe 2015). The main reason for this is the potential of green infrastructure to tackle economic-social-environmental issues altogether.

Described as an “ecosystem service all-rounder” (Schröter-Schlaack/Schmidt 2015: 17), this characteristic of green infrastructure elements unfolds a special relevance for urban spatial planning. “Ecosystem services” describe services provided by nature that produce important benefits for humans. In this way, humans can gain social, ecologic and economic benefits. This triad (of social, ecological and economic benefits) combined with the focus on an integrated, connected provision of open spaces generates the **essential added value of the concept of green infrastructure against existing approaches.**

In the field of **social impacts** green infrastructure can provide an important contribution for social cohesion as well as for mental and physical health and wellbeing. For example, green areas are meeting places (e. g. parks or sports areas) and therefore foster social interaction in neighbourhoods. Especially in densely populated neighbourhoods the potential of green infrastructure in this concern is very important. Wellbeing and health of the urban population are also positively influenced by elements of green infrastructure, as green open spaces

provide several opportunities for individual physical activities and invite people to be active – this proves to have a high positive impact on physical well-being. Apart from that, urban green reduces individual stress levels and thus increases mental well-being as well.

In terms of **ecological impact**, green infrastructure is very powerful in supporting climate change mitigation and adaptation, thereby contributing to urban environmental resilience. Urban (micro) climate is positively influenced through mitigation of urban heat island effects, formation of cold air corridors and the general improvement of ambient air quality. Furthermore, some elements of green infrastructure, e. g. parks, meadow landscapes and protected areas, act as flood control through providing retention spaces. Above and below ground biomass are storages for carbon. A network of green areas ensures that unique habitats for (all kind of) species can develop and migration of species can be safeguarded. Therefore, green infrastructure can be an instrument to compensate negative effects of urbanization and to support aims of conservation and biodiversity improvement.

Green infrastructure also unfolds **economic impacts**. It contributes to resilient urban communities by minimizing the risk of damage due to storms or heat waves. Green infrastructures ensure access to natural resources as well (e. g. through filtration of rain water). They are also an important amenity in residential and commercial neighbourhoods, thereby increasing property values. All in all, green infrastructures may raise the urban quality of life and stimulate the influx of people and companies.

Looking at these possible impacts of urban green, **it can be stated that the term green “infrastructure” is perfectly chosen**. The multifunctionality of strategic und integrated planned networks of green spaces leads to the conclusion, that green infrastructure should be

treated equally with other “grey” infrastructure (streets, grid infrastructure etc.) when thinking about its sociopolitical relevance in urban planning. The full scope of social, ecologic and economic benefits can be created for urban societies only if there is attention for the single different elements of green infrastructure, as well as their interaction and the side effects. A strategic planning approach is essential in order to integrate the different aspects of green infrastructure into a comprehensive concept.

Green infrastructure can only fulfill its promised benefits when obstacles are known and accounted for. Importantly, implementing green infrastructure plans beyond pure strategic documents is a quite demanding task, because it is a highly interdisciplinary and participatory field of action. This is why limitations on interdisciplinary understanding, diverging methods and priorities of administrative sectors as well as how to co-produce with the right set of participation approaches are the more important obstacles to look at in future urban research (Wilker/Rusche/Ryma-Fitschen 2016).

1) What is your contribution towards the issue outlined by ‘Shaping common ground in urban sustainability’? What are your (new) insights? And what would you propose as the common case?

A strategic approach to planning and management of green infrastructure in metropolitan and also more rural areas is crucial, especially with regard to urban decision making and governance for sustainability. The latter has been debated in recent literature on “sustainability transition” (Frantzeskaki et al. 2012), on „governance of environmental

sustainability“ (Genus 2014) and, more broadly, on „environmental governance“ (Meadowcroft 2002).

This leads to the **main challenges** that can be identified: transfer and use of ecosystem knowledge (1), governing highly participatory processes (2) and combining different expert languages (3).

2) What is needed to go beyond and integrate the diversified state of the art in contemporary urban sustainability research and innovation? Where are and how can we constructively tackle limitations on language, methods, epistemologies, ontologies, etc.?

At first, a **common language** needs to be found between planners, ecologists, economists, sociologists and other disciplines within public administration and stakeholder groups to be able to convey a common understanding of the multifunctional benefits of green infrastructure. At the same time, ecosystem knowledge needs to be spread across different sectors and different stakeholder groups, including the public, to enhance support in green infrastructure investments. For this, the common understanding is the baseline on which teaching and campaigning activities can be grounded to activate not just strategic, but conceptual or even instrumental use of ecosystem knowledge in the whole planning process. Finally, as urban green infrastructure planning effects the whole urban society, it is a major policy field in which participation and co-creation play a central role in activating stakeholders and improving policy outcomes and acceptance by using open and innovative governance models for an inclusive development of city regions.

This highlights that improved, strategic green infrastructure planning is an **important issue for a future urban agenda**. It connects the different thematic priorities “environmental sustainability and resilience”, “accessibility and connectivity” as well as “urban governance and participation” which have been put forward as relevant research fields (JPI Urban Europe 2015).

A **green infrastructure planning approach** in a specific locality / in a specific city-region is achieved following a set of important principles. At first, as green space planning is bounded to the development of the physical landscape, it needs to focus on an extensive ex-ante planning of green infrastructure. This can only be done with providing, collecting and combining scientific, theoretical as well as practical knowledge of implementing and delivering integrated plans on different administrative scales (Llausas and Roe 2012). In this particular case, urban development policies have to balance the different types of urban green for developing a network of green spaces in an urban region, be it based on land already owned by the public or be it supported by a strategy of buying or selling land. Only an integrated approach can exploit the full scope of social, ecologic and economic benefits for urban societies. It is important to focus on the different assets of green infrastructure and the interaction of these. More importantly, all stakeholders involved in the planning process need to learn a common understanding of the ideas, principles and functions of a well-defined green infrastructure strategy. In this context it is important to highlight that stakeholders have to be understood in its widest sense, being it experts within different administrations, contractors, NGOs or citizens. Those stakeholders need to have a say in the strategy as well as in implementation phases of green infrastructure projects.

Implementing a green infrastructure planning concept as characterized above generates a range of positive outcomes for city regions (Lafortezza et al. 2013). Foremost, it sets out a framework to integrate natural resources and stability-oriented policies into a holistic, ecosystem-based concept. By doing so, needs of humans and nature are addressed simultaneously. Consequently, such a concept enables planners to identify ecological hubs and links, before land is developed. In doing so, the land use mix within a city region is arranged based on priorities, resulting in a more balanced structure of urban green and settlement or commercial areas. Finally, a green infrastructure strategy that is encoded in a masterplan delivers a comprehensive, focused mission statement for the future of city regions, which is credible for stakeholders external to the public administration (Ahern 2007). Following such a long-term concept is an important step towards changing perceptions of people. For the case of a shrinking city region, this becomes even more important. If a city wants to fight a certain stigma of being a shrinking region, which may be connoted with perceptions of unhealthy post-industrial sites, such a green infrastructure planning concept can be one decisive step towards altering this image. Nevertheless, this process is based on long-term, incremental changes. It takes time to prepare, plan, implement and adapt a green infrastructure.

**Summarizing our arguments from above,** pursuing a green infrastructure strategy can be a helpful instrument to foster and regenerate urban quality of life. Due to its multifunctional and interconnected assets, which all deliver specific ecological, social and economic benefits, the impact of green infrastructure as a network is bigger than the impact of the sum of its parts. Nevertheless, planning and implementing a green infrastructure concept in a city region needs a certain momentum in which all relevant stakeholders agree to work together to support a long-term goal. Moreover, this broad support needs to be steadily fostered, because changes

and improvements are incremental when looking at single projects within a green infrastructure planning strategy. This can be achieved by framing strategically as well as operationalized tasks for all levels of administration in a co-productive process. In addition, it is key to transfer the ecosystem service knowledge to stakeholders to make them aware of the potentials of a coordinated green infrastructure plan.

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