




Editorial

# Special Issue: Landscape Urbanism and Green Infrastructure

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**Abstract:** With the notion of landscape urbanism long neglected, interlinkages between ecology and architecture in the built environment are becoming visible. Yet, the diversity in understandings of the interconnections between cities and nature is the starting point for our research interest. This volume contains nine thoroughly refereed contributions concerning a wide range of topics in landscape architecture and urban green infrastructure. While some papers attempt to conceptualize the relation further, others clearly have an empirical focus. Thereby, this special issue provides a rich body of work, and will act as a starting point for further studies on biophilic urbanism and integrative policies, such as the sustainable development goals of the United Nations.

**Keywords:** built environment; nature-based solutions; sustainable cities; biophilic design; urban planning; landscape architecture; environmental justice; public perception; well-being

## 1. Introduction

The global population is projected to grow from 7.7 billion in 2019 to almost 10 billion by the middle of the century, with urban areas to absorb all of the future growth [1]. Rapid urban growth presents an important opportunity for economic prosperity, meanwhile, unsustainable, non-resilient urbanization patterns have caused the degradation of ecosystems and their services. Therefore, urbanization presents one of the most urgent challenges of the 21st century to the implementation of an ambitious urban development agenda that seeks to make cities and human settlements inclusive, safe, resilient, and sustainable (according the 11th goal of the United Nations 2030 agenda for sustainable development) [2].

Green infrastructure is a network of green spaces designed and managed to deliver a wide range of ecosystem services that can improve environmental conditions and therefore citizens' health and quality of life [3]. As cities grow bigger, it is imperative to maintain or increase ecosystem services per inhabitant. Restoring, rehabilitating, and increasing connectivity between existing, modified, and new green areas within cities and at the urban–rural interface is necessary to enhance the adaptive capacity of cities to cope with the effects of changes and to enable ecosystems to deliver their services for more livable, healthier, and resilient cities [4].

The underlying economic conditions and the need for urban growth due to the growing population require environmentally sustainable policies in order to address the problem in accordance with a healthy environment. Cities already find themselves in a challenging context facing risks associated with climate change, increasing health crises, social inequality, and global competition [5]. A paradigm shift is needed towards restorative sustainability for new and existing urban areas, and increasing efforts must be made to ensure that multidisciplinary knowledge is adequately taken into consideration. Doing so will help promote solutions that celebrate the richness of design creativity while enhancing users' experience, comfort, health, well-being, and satisfaction, and will allow for improved harmony between urban and natural ecosystems, thus helping to reconnect urban dwellers to nature.

To address these issues, the prime aim of this Special Issue was to provide a set of innovative contributions regarding the links between cities and nature. Furthermore, it focused on the emerging opportunities and challenges of landscape architecture, as innovative nature-based solutions and climate change adaptation issues require transdisciplinary research. This collection of papers provides approaches and methodologies that are useful for both researchers and professionals. It contains nine thoroughly refereed contributions, accepted through a single-blind review process following standard MDPI review guidelines.

The Special Issue consists of the following papers: Jon Bryan Burley [6] conceptualizes the emergence of landscape urbanism in a form of chronological criticism, presenting a broad historical overview, comparing the normative theories derived in the Western traditions embedded in urban design with the general values of landscape urbanism, and revealing the transdisciplinary perception in which the planning and design community derived the foundation of landscape urbanism. Parker and Simpson [7] present a systematic quantitative review on how public green infrastructure contributes to city livability. This review informs urban planners, decision makers, and researchers about the psychological, physiological, general well-being, and wider societal benefits that humans receive as a result of experiencing nature in urbanized landscapes.

De Sousa Silva et al. [8] investigate the issue of environmental justice focusing on availability and accessibility to green infrastructure in two contrasting European cities. Quantitative indicators of public green space revealed inequalities between prosperous city districts and suburbs where minorities live. Urban planners were informed on how to balance green space distribution within city neighborhoods, providing environmental justice without provoking green gentrification. Kim et al. [9] examined the potential of informal green space as supplementary urban green space to meet the well-being needs of residents. They conducted a study on residents' perception in Ichikawa, Japan, a shrinking and aging city that is clearly deficient in urban green areas, currently providing only 3.43 m<sup>2</sup> of green space per capita. Their results revealed that informal green space is recognized by residents and can play an important role in providing green infrastructure services in cities with spatial and financial limitations, thereby relieving the burden of governments and helping them meet the needs of residents. Meanwhile, the elderly and people in lower socioeconomic groups often experience unequal availability of green space. Urban planners should be aware of this environmental justice issue and address this into their green infrastructure policies.

Christman et al. [10] developed a new framework to support decision making regarding green stormwater infrastructure implementation in Philadelphia. They employed a participatory approach using a diverse set of variables that evaluate suitable sites, and integrated social factors in site prioritization based on their ranked proximity to a variety of features defined by the built and social environments. The results of this study indicate optimal locations in the city for the implementation of tree trenches, pervious pavement, rain gardens, and green roofs. Zanin et al. [11] assessed stormwater nutrient and heavy metal plant uptake in a bioretention pond in Italy in order to study a solution based on sustainable urban drainage systems (SUDS). Eleven species of herbaceous perennial helophyte plants, with ornamental features, were used and tested to reduce and treat stormwater runoff in urban areas. Blau et al. [12] demonstrate nature-inspired solutions for the recovery of an urban river of South Europe that was canalized and transformed in culvert pipes. In the face of climate change, the river restoration project presents a unique opportunity for adaptation to its consequences and to provide areas for recreation and contact with nature within the built environment. Using a regenerative sustainability approach based on biophilic design principles, it was proposed to re-naturalize the river corridor that once was crossing the old town of Albufeira in Portugal as a way to improve well-being and city resilience in the long term. Such actions demonstrate the benefits of the transition to a regenerative economy.

Parker and Simpson [13] undertook a study of visitor satisfaction with a public green infrastructure and urban nature space in Perth, Australia, using the importance-performance analysis technique. The survey informed the green managers about the needs for improvement of the amenity and

infrastructure, and also optimized nature space management, directing attention towards a more effective utilization of scarce resources. A similar study was also conducted by Panagopoulos et al. [14] in Kalamaria, Greece. They investigated residents' perceptions and satisfaction rates concerning the pedestrian and cycling streets of the city in times of economic crisis, and evaluated their importance for residents' well-being. The survey showed frequent and longtime use of the pedestrian zones. Even that the urban landscape aesthetics and people's health and well-being were considered as important functions of pedestrian zones, at the same time, residents were not satisfied with their quality of life and the existing green infrastructure. The research shows that local authorities can use participatory approaches in re-designing and transforming public spaces and managing a city's green infrastructure, and that the information gained from participatory approaches can be used to increase well-being in cities.

## 2. Conclusions

In conclusion, these papers unambiguously demonstrate an important contribution from landscape architecture theory combined with in situ observations based on participatory approaches and tools like nature-based solutions and geographic information to promote equitable green infrastructure in a sustainable urban planning framework. The special issue addresses a broad range of different topics, leveraging on the multidisciplinary vision of landscape urbanism. The papers suggest a diversity in understandings about the connection between cities and nature. Innovative urban design and planning may reduce environmental burdens, foster equitable access to public spaces, and promote sustainable urban mobility patterns. Moreover, the implementation of green infrastructure may increase city resilience to climate change and disaster risk reduction. Thereby, this special issue provides evidence on practices and lessons learnt regarding green infrastructure and biophilic urbanism, thus contributing to the sustainable development goals of the United Nations.

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