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Editorial

Advancing urban environmental governance: Understanding theories, practices and processes shaping urban sustainability and resilience

1. Introduction: the motivation of our special issue

Cities are the grounds of experimenting not only with new technologies and new solutions but also with new approaches towards livability, sustainability and resilience. The institutional proximity in cities make innovations in terms of planning approaches, governance modes and policy experiences drift across sectors and policy domains. In the Anthropocene era, cities are the primary human habitat and positioned at the epicenter of an epoch characterized by new types of social, governance and technological innovations and in the demand to deal with social-ecological transformations. In this context, local governments are faced with new questions for agenda setting and for policy implementation. This includes planning-as-usual challenges that deal with maintenance of green spaces, improving and restoring urban infrastructure to new demands such as co-designing urban spaces and rethinking functions of urban infrastructures.

Governance of cities is one of the critical opportunities for experimenting with new forms of environmental policy and with new configurations of governance processes and set-ups (from initiatives to networks to meta-governance platforms). Social-ecological processes in cities when examined with holistic frameworks and comparative methods produce new insights for advancing environmental knowledge on system properties as well as on dynamics of urban sustainability transitions and resilience (McPhearson et al., 2016a; McPhearson et al., 2016b). We argue that by taking a social-ecological systems approach to urban areas and by studying how urban ecosystems function, provide goods and services for urban dwellers and what allows and limits their performance, can add to the understanding of social-ecological dynamics and suggest new avenues for governing and managing urban system for resilience (Elmqvist et al., 2013).

In this special issue we are asking what the lessons are from recent developments in research and planning experience for advancing urban environmental governance. The special issue demonstrates how the urban ecosystem services framework can provide bridging pathways and processes towards developing urban resilience plans and policies, governance mechanisms that enable polycentrism and integration, and stewardship strategies to help achieve demand and aspirations for sustainable urban growth and well-being, paving in this way pathways to urban resilience. Contributions encompass new conceptual and theoretical approaches, empirical studies, and methodological and analytical developments critical for providing new models, tools and

approaches for urban resilience planning and governance. The special issue centers on new knowledge about the mechanisms by which urban ecosystem services are understood, valued, and utilized across multiple levels in urban planning and, governance as well as across local and global scales.

2. What are the lessons learnt for advancing urban environmental governance?

2.1. *Introducing new concepts and tools for advancing the understanding of drivers and processes shaping environmental governance of cities*

Conceptual Pillar: Ecosystem services bridge interdisciplinary research for urban resilience and enable an understanding of urban resilience with the lens of ecosystem services.

Cities are hotspots for global changes affecting urban ecosystems and societies worldwide with a range of pressures (Schröter et al., 2005; Grimm et al., 2008). Urban residents are likely to experience directly related key impacts and threats such as increase in traffic noise and air pollution, and decrease in quantity of and access to urban green and blue spaces, all of which posing significant challenges to human health and socio-environmental justice (Kabisch and Haase, 2014). Urban planners and decision-makers have to deal with these challenges to secure a high quality of life of city residents and to increase urban resilience. New concepts are needed to understand urban system resilience with the lens of ecosystem services in the context of urbanization in order to improve the lives of urban residents (McPhearson et al., 2015, 2016a). Buizer et al. (this volume) critically discuss the contribution of the ES concept to this discussion and propose the concept of bio-cultural diversity instead. Urban gardens (Camps-Calvet et al., this volume) and roadside vegetation (Säumel et al., this volume) are discussed as green network elements to provide ecosystem services and to counteract challenges from ongoing urbanization.

While referring to the ecosystem services (ES) concept Buizer et al. (this volume) argue for further development of alternative concepts that can include transdisciplinary exploration in reflexive future urban governance. Authors critically reflect on the intrinsic suggestions of the ES concept and propose a rather new approach – biocultural diversity – as an alternative heuristic concept for urban governance research, which gives greater weight to the potential trade-offs of natural values and human practices.

Particularly for urban green space governance, biocultural diversity may be used for researching the interrelationships between nature and culture. The concept of biocultural diversity is understood as a diversity of ways in which biological and cultural diversity are intertwined. Buizer et al. (this volume) conclude that biocultural diversity as an alternative approach can counterbalance elements of ES research through its inherent focus on diversity, including different value systems and analytical perspectives to the multiplicity of interactions between humans and nature in cities in reflexive transdisciplinary ways. It is further concluded that the biocultural diversity concept offers one way of working towards urban planning strategies to live sustainably with nature in cities by acknowledging the great variety of cultural groups and practices and the diversity of species in most urban settings.

Camps-Calvet et al. (this volume) assess ecosystem services provided by urban gardens in Barcelona, Spain, to increase urban resilience. Authors put a special focus on those urban residents directly benefiting from the services and applied semi-structured interviews to analyse the demographic and socioeconomic profile of the beneficiaries. In a qualitative approach, authors discuss the relevance of their results in relation to current policy challenges with local planners. They found that cultural ecosystem services stand out as the most widely perceived and as the most highly valued ecosystem service and that main beneficiaries are elder, low-middle income, and migrant people. Authors' results showed that ecosystem services from urban gardens are related to a number of policy challenges in the city, such as lacking awareness and stewardship of urban ecosystems and biodiversity, lacking opportunities for recreation, and the need for social integration and environmental justice in cities. It is concluded from this study that urban gardens as part of the urban green infrastructure network can play a significant role tackling these challenges when acknowledged in urban policies.

Finally, Säumel et al. (this volume) present an overview of ecosystem services and disservices of roadside vegetation, with a special focus on herbaceous vegetation. In doing this, authors aim at filling research gaps and at pointing out the multi-functionality of roadside vegetation as parts of urban vegetation that are often neglected in urban biodiversity and ecosystem service research. In their synthesis, authors found that trees and herbaceous road vegetation can mitigate adverse environmental conditions in road corridors, which is particularly important in such neighborhoods with comparatively less green spaces. One of the identified knowledge gaps relates to the contribution of biodiversity to ecosystem services and on the valuation of green street components by different sociocultural groups. In their contribution Säumel et al. (this volume) showed how management options can support planning and governance approaches towards resilience through more livable streetscapes, fostering ecosystem services and counteracting ecosystem disservices. This may be achieved through transdisciplinary participatory processes and a joint planning cooperation of different stakeholders coming from different departments (traffic planning, tree plantings, health, security, or cleanliness issues).

Assessment Pillar: Evaluating and assessing how ecosystems contribute to urban livability, sustainability and resilience as well as how existing urban governance settings and structures ensure ecosystem service protection and provision.

Globally, municipalities are tackling climate adaptation and resilience planning at multiple scales from neighborhood and community groups to city and regional scale planning and policy approaches (McPhearson et al., 2014). Urban green space and ecosystem are well recognized as having critical biophysical

buffering capacities for climate related environmental threats (Elmqvist et al., 2013). However, green space affects social interactions and human wellbeing (McPhearson et al., 2013; Andersson et al., 2015). Campbell et al. (this issue) consider the social dimension of urban green space through an assessment focused on park use, function, and meanings, and compares results to categories of cultural ecosystem services. They develop a mixed-method approach for assessment of uses and social meanings of urban parkland in New York City and pilot this method in 2140 acres of parkland in waterfront neighborhoods surrounding New York City's Jamaica Bay, an area heavily affected by Hurricane Sandy in 2012. This pioneering method combines observation of human activities and signs of prior human use with structured interviews of park users. They find that urban parkland is a crucial form of 'nearby nature' that provides space for recreation, activities, socialization, and environmental engagement and supports place attachment and social ties. The authors show that parks, through their use by and interactions with humans, are producing vital cultural ecosystem services that may help to strengthen social resilience. Some ecosystem services were more easily detectable than others through the assessment technique employed in this study, including recreation, social relations, and sense of place. In line with many other methodologically approaches in this Special Issue, the assessment method used by Campbell et al. (2016) was designed to be spatially explicit, scalable, and replicable so that natural resource managers engaged in park management and/or resilience planning could apply this method across individual sites, in particular districts—such as vulnerable waterfront areas—and citywide. This study demonstrates a way in which cultural ecosystem services and an understanding of social meaning could be incorporated into park management and resilience planning, which has been suggested as a gateway opportunity for urban decision-makers to bring ecosystem services into local scale development and land use planning (Andersson et al., 2015).

Land-use planning is an important determinant for green space policy in cities. It defines land covers and hence the structure and function of urban ecosystems and the benefits these provide to humans, such as air purification, urban cooling, runoff mitigation, and recreation (Gómez-Baggethun et al., 2013). The ecosystem service approach has helped to attract policy attention to these benefits but the concept often remains poorly implemented in urban policy and governance (Hamstead et al., 2015). To address this gap, Langemeyer et al. (this volume) advance a framework to bridge ecosystem services into policy processes through multi-criteria decision analysis (MCDA) as a decision support tool. First, they conduct a systematic literature review to assess state-of-the-art knowledge on ecosystem service assessments through MCDA. Next, they build on insights from the literature review to develop the 'ecosystem services policy-cycle', a conceptual framework that merges the 'ecosystem service cascade' and 'policy cycle' models to reinforce the link between ecosystem service assessments and practical applications in urban policy and governance. Finally, the authors illustrate the applicability of the proposed framework along an example about conflicting interests on land use and green space planning following the closure of the Airport Tempelhof in Berlin, Germany. This paper highlights the scope of MCDA as a decision support tool for integrating ecosystem service assessments in green space governance. The result is an important discussion on the advantages and disadvantages of different methodological choices in the use of MCDA in ecosystem service assessments. Langemeyer et al. (2016) note that a key strength of using this tool to inform green space policies lies in its capacity to accommodate conflicting stakeholder perspectives and to address trade-offs between ecological, social and economic values.

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