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SHORT COMMUNICATION

Hopping on one leg – The challenge of ecosystem disservices for urban green management

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Abstract

The importance of ecosystem services for human well-being has been highlighted by several recent environmental studies and assessments. These assessments provide useful information for urban green management, but they largely exclude various nuisances and losses produced by ecosystem functions. Lack of attention to these ecosystem disservices may seriously hamper environmental management in general and urban green management in particular. Ecological, social and technological changes will affect both what kind of disservices will emerge and how they will be experienced and managed. Especially in urban areas, environmental, social and technological changes spanning from global to local levels are continuously altering urban ecosystems. Our ways of perceiving and valuing ecosystem functions are also undergoing rapid change. Here we discuss the concept of ecosystem disservices from the perspective of northern European urban ecosystems. It is concluded that perceptions about ecosystem disservices have an increasing influence on how urban green areas are experienced, valued, used, managed and developed.

Keywords: Ecosystem services; Environmental management; Urban biodiversity; Urban planning; Urbanization

Introduction

The current enthusiasm concerning the concept of ecosystem services (ES) resembles a race of one-legged hopping in a crowded street: This unusual way of moving is likely to spark some interest amongst bystanders and it is possible to move unexpectedly fast by taking long leaps forward. However, the danger of falling down is evident. Furthermore, despite the initial interest triggered by the high visibility of the race, it may not be easy to allure bystanders actually to participate.

In public, political and scholarly debates on environmental management, the concept of ES is currently embraced as a useful way to build a policy-relevant bridge between human welfare and ecosystem functioning (Carpenter et al., 2009; Daily et al., 2009). However, the concept is understood in a conspicuously unbalanced manner. By definition, ES refers only to the "goods" produced by biodiversity and ecosystems, ignoring the inevitable "bads" that ecosystems produce for human well-being. An illustrative example is the well-known definition employed in the Millennium Ecosystem Assessment, stating that "Ecosystem services are the benefits people obtain from ecosystems" (MEA, 2005, p. v). There exist several other definitions and practical applications of the ES concept but common to them all is this unbalanced way of framing ecosystem functions as benefits only.

This positive framing of nature is strikingly different from past interpretations of nature as an enemy to civilization, something to be tamed and cultivated in order to be useful for human well-being. These deeply rooted beliefs – as well as concrete everyday experiences – about the malevolence of nature with regard to human

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aspirations still exist. Against this background, the focus of many scientists (e.g. MEA, 2005) and NGO's (e.g. Ranganathan et al., 2008; WWF, 2008) on benefits only is understandable and well justified. ES approaches are assumed to broaden and deepen public and policy support for implementing environmental management measures. There is already some evidence that conservation projects based on the ES concept are more likely to gain economic and public support compared to traditional conservation projects (Goldman et al., 2008).

It is often assumed that a variety of services is likely to be provided by rich biodiversity and large enough green or blue areas, such as nature reserves, forests, urban parks, shorelines and wetlands (Costanza et al., 1997; MEA, 2005; TEEB, 2009; Table 1). Securing especially the regulating and supporting ecosystem services is used as an argument for protection of biodiversity. However, this rationale for biodiversity preservation or enhancement is lost if it turns out that the services can be replaced with similar or better man-made services or services produced by heavily manipulated ecosystems or ecosystems with very low biodiversity. Regarding urban green areas it is especially important to notice that high or increasing biodiversity does not necessarily mean only richness of goods and services, but also a richness of nuisances. This is at least implicitly acknowledged in several ES reports. The Living Planet Report 2008 (WWF, 2008, p. 4), for example, states that "... it is not biodiversity *per se* that underpins ecosystem services, but the abundance of particular species that are critical in maintaining habitat stability and providing those services."

The main concern of this essay is that it may turn out to be counterproductive for urban green planning and management to frame ecosystem functions as benefits and to highlight them without paying adequate attention to the various nuisances and disservices which urban ecosystems inevitably produce. For example, emergence of invasive species into urban green areas can increase biodiversity but decrease ecosystem services (DeStefano and Deblinger, 2005; McKinney, 2008). Eradication of invasive species is often difficult even when there exists widely shared understanding about the harmfulness of the species.

Questions important for urban green management include, for example, identification and characterisation of the key nuisances, identification of the people most likely to suffer from them and possible strategies that can be used to mitigate the problems (Lyytimäki et al., 2008). Assessing future development is also an important task, especially in the face of rapid global environmental changes such as global warming. Social changes such as urbanization, ageing of the population, growing multiculturalism and changing lifestyle patterns are likely to alter the ways ecosystem functions are experienced.

Knowledge about what urban ecosystem functions are perceived as harmful is important simply because more and more people are living in urban environments. Already about half of the world's population lives in urban areas and the share is substantially higher in industrialized countries (EEA, 2006). As urban sprawl continues, more wild or semi-wild species will face the need to adapt and find niches in urban areas. The growing area of urban ecosystems provides an evolutionary arena for species capable of rapid adaptation and increases the likelihood of emergence or migration of species causing various harms and nuisances.

In the following, we briefly outline the current discussion and provide a tentative working definition of ecosystem disservices. Then we take a closer look at ecosystem disservices by using urban ecosystems as a case. We focus on northern European urban areas. As a summary we identify and discuss key research challenges.

Table 1. The categories of ecosystem services as presented by the Millennium Ecosystem Assessment (MEA, 2005).

Biodiversity	
Ecosystem services	
Supporting Nutrient cycling, soil formation, primary production, etc.	*Provisioning* Food, fresh water, wood and fibre, fuel, etc. *Regulating* Climate regulation, flood regulation, disease regulation, water purification, etc. *Cultural* Aesthetic, spiritual, recreational, educational, etc.

Defining disservices

No widely agreed definition of ecosystem disservices exists. Based on literature searches (Web of Science, Google Scholar), there are only a few studies that explicitly build on the concept of ecosystem disservices. Most of these deal with disservices in agriculture, including e.g. pest damages, nutrient runoff, erosion or competition by undesired species that can reduce crop yields or increase production costs (O'Farrell et al., 2007; Zhang et al., 2007). However, a substantial literature dealing with ecosystem disservices without actually mentioning the concept can be found under labels and topics such as management of nuisance species (DeStefano and Deblinger, 2005), fear related to urban areas (Koskela and Pain, 2000) and health risks caused by ecosystem functions. Important examples of