Landscape Planning and Ecosystem Services: The Sum is More than the Parts

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Abstract

Landscapes provide a broad range of ecosystem services that are crucial for many aspects of human well-being. However, this provision is increasingly under threat from a variety of economic, social and environmental changes. Many of these are manifested in unsustainable land uses. Integrative and proactive environmental planning is needed to address these challenges and can be achieved by combining the conceptual strengths of the ecosystem services approach with the practical and implementation-orientated focus of landscape planning.

Keywords

Sustainability · Environmental impacts · Integrated planning · Economic valuation · Spatial scale

1.1 The Need for More Integrated Environmental Planning

Human well-being depends in many ways on maintaining the stock of natural resources which deliver the ecosystem services from which humans benefit, such as productivity of soils, flood water retention or beautiful landscapes. However, the continued flow of these services is increasingly threatened by unsustainable land uses. This is becoming particularly evident on regional and local scales. Many land

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uses compete within the same area and can produce harmful environmental impacts. Particular threats exist to those public environmental goods whose values are not well-represented in economic markets or whose deterioration will only affect future generations. As market forces alone are not sufficient, effective means for local and regional planning are needed in order to safeguard scarce natural resources, coordinate land uses and create sustainable landscape structures.

European law already includes a set of instruments to protect different environmental goods and services. Many of these are reflected in the planning framework, important examples being the Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) Directives. In addition, several proactive planning approaches are implemented across the EU, such as the Water Framework, Flood Protection and Habitats Directives. However, these are quite sectoral in nature and do not fully exploit the synergies that could be achieved under a more integrated and multifunctional landscape perspective. Furthermore, existing methods for environmental assessments are often not especially appropriate for practical application. Elaborate models used in science may have data requirements that cannot be met in some regions and the results often have a degree of detail that is too complex for implementation-oriented measures. Up to now, an EU Directive regarding proactive overall environmental planning is still lacking.

1.2 Landscape Planning can Help Fill the Gap

As of January 2018 thirty eight countries had ratified the European Landscape Convention (ELC) (Council of Europe 2018), thus committing themselves to implementing landscape planning. *Landscape* is defined by the ELC (Chapter I article 1f) as an "area, as perceived" (and, we would like to add, 'as understood') "by people". The character of the landscape is 'the result of the action and interaction of natural and/or human factors'. This definition highlights the human influence on landscape; also that a landscape is socially constructed, a selection of the 'real' world shaped by human capacities to perceive, measure and understand. In addition, the idea of landscape has a scale connotation since it does not refer to small areas like habitats (which may be landscape components), although there is no precise agreement on how large a landscape should be. There are landscapes in which human impact is minimal (natural landscapes) and those that are predominately shaped by humans (cultural landscapes). The term landscape stems from medieval times where it meant a territory, area or region (Burckhardt 1995; Tress and Tress 2001). It has been used in common language, particularly in English, as referring to pleasant surroundings. In science, landscape was first used in the eighteenth century by Humboldt, who defined it as the "total character of a region of the earth" (Neef and Neef 1977).

Landscape planning is understood here in line with the definition in the European Landscape Convention as 'strong forward-looking action to enhance, restore and

create landscapes'. Acknowledging that understandings of landscape planning vary between countries, a broad definition is adopted here in order to cover different legal and cultural landscape planning frameworks. An inventory of landscape planning tasks would include the production of place-based environmental information, reconciliation of competing land uses, protection, redevelopment, management and monitoring of natural and cultural assets and the development of strategic thinking about land use and management (Sell and Zube 1986; Leitão and Ahern 2002; Ogrin 2010). Furthermore, landscape planning should not only improve the citizen's and politician's understanding of the consequences of planned actions, but also contribute to setting priorities for policy implementation (see BenDor et al. 2017 for US land use planning). This understanding of landscape planning encompasses environmental planning and partly overlaps with what is understood in some countries by 'land use planning'.

Planning is interpreted in this book as both the result and the activity of making a plan and preparing its realisation. In our understanding, a plan is no longer a static piece of paper, but a database of geographical information, attributes and criteria adaptable to new conditions and reflecting uncertainties. The process of planning includes 'using cultural and scientific knowledge' (ASLA 2018) and the translation of scientifically generated results into implementable measures in a manner that bridges the gap between science and politics.

At present, landscape planning has not been introduced in all European states in the way that the ELC suggests and the approaches adopted are quite diverse (Kozová and Finka 2010). There are some European countries where landscape planning has been established for decades (e.g. Germany, the Netherlands and Switzerland). In these cases landscape planning is used as both an integrated source of information (e.g. for reactive instruments such as EIA) and to provide strategic guidance for landscape development. Other states have started to integrate the relevant content into environmentally-oriented spatial planning or supplemented spatial planning with strategic environmental impact assessments (Wende et al. 2011). In England, initiatives such as the Catchment-Based Approach (CaBA) (https://www.catchmentbasedapproach.org) and the recent 25 Year Environment Plan (Defra 2018) have introduced more integrative place-based thinking compared to a previous sectoral emphasis.

While the ratification and implementation of the ELC has initiated more landscape planning and methodological exchange in European countries (Kovács et al. 2013), there are other kinds of environmental planning which also have the potential to offer the same integrative and spatially-explicit perspective as landscape planning. In this book, therefore, landscape planning is also used as a shorthand term for all kinds of environmental planning dealing with holistic frameworks for multiple environmental resources and services.

1.3 Ecosystem Services: The Communicative Turn in Environmental Protection

Alongside a growing awareness of landscape planning, recent years have seen more interest in the concept of ecosystem services at national and European scales. The purpose has been to better communicate the link between nature and human wellbeing, especially to highlight the importance of this to policy and decision makers (Daily et al. 2009; Albert et al. 2014; Mascarenhas et al. 2014). In many cases, the introduction of the ecosystem services concept has been accompanied by a stronger emphasis on economic reasoning.

In contrast to the ancient origins of landscape, the term ecosystem stems from the much younger science of ecology (Tansley 1935). In general terms an ecosystem can be described as consisting of living organisms and the non-living components of their environment at any scale, in which there are continuous fluxes of matter and energy in an interactive open system (see Willis 1997; Smith and Smith 2012). In this book we include human influences as part of ecosystems, although this is a matter of dispute in the scientific community. In principle, an ecosystem has no defined scale or spatial delineation since these depend on the research question under investigation. The connection between ecosystem and landscape is underpinned by an early remark of Whittaker in relation to the classification of natural communities, (1962: 125), who observed, that "the ecosystem conception suggests a multifactorial or landscape approach to classification" (after Willis 1997). In comparison to landscape and ecosystem, the term environment (also often used in this book) has a wider definition since it includes the whole world surrounding humans, including the societal context with which they interact.

The term 'ecosystem services' is used ambiguously in the literature. Divergent definitions exist with overlapping and sometimes conflicting meanings. Differences in definitions refer to the terms used, the concepts applied to these terms, the ecosystem services classification systems considered, and how actual ecosystem services are defined (von Haaren and Albert 2011; Albert et al. 2016).

Despite this ambiguity, the definitions applied in three major international assessments provide a good overview and orientation as these are most often referred to, and applied, in planning applications. The Millennium Ecosystem Assessment (MA 2005), the first global assessment of the state of ecosystems and biodiversity, defined ecosystem services as "the benefits people obtain from ecosystems". A few years later, the international study on The Economics of Ecosystems and Biodiversity (TEEB 2010) provided a refined definition of ecosystem services as the "direct and indirect contributions of ecosystems to human well-being". By doing so, TEEB emphasized the role of ecosystem services for human well-being and disentangled the concept of ecosystem services from the benefits they provide. Most recently, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) adopted a new definition of ecosystem services as nature's contributions to people (NCP) (Diaz et al. 2015; Pascual et al. 2017). NCP considers all "positive contributions or benefits, and occasionally negative contributions, losses or detriments that people obtain from nature". As such, NCP relates to the ecosystem services term,

but includes stronger acknowledgment of the diversity of worldviews, knowledge systems and values (Pascual et al. 2017; Diaz et al. 2018). The recent introduction of the NCP term has sparked substantial scientific discussion (e.g. Braat 2018; Maes et al. 2018; Peterson et al. 2018) and it remains to be seen what role this new term will play in future research and application.

Action 5 of the EU Biodiversity Strategy to 2020 calls upon member states to map and assess the state of ecosystems and their services in their national territories. These accounting and reporting systems are intended to include the economic value of services which presents further challenges in terms of the way in which multiple natural and human capital assets combine to support flows of services and associated benefits (e.g. hydroelectric power requires stream flow and the application of human expertise to construct the necessary generation technology, Fisher et al. 2009). Properties such as biodiversity and geodiversity are particularly difficult in this respect because on one hand they are part of the basic underpinning natural capital of ecosystems yet also contribute to particular ES, especially those related to natural and cultural heritage. There is consequently considerable potential for double counting and this is partly why up to now ES assessment has been predominantly at the national scale (e.g. UK-NEA or TEEB-DE) and not adapted to regional and local needs. For instance, many important economic values are spatially specific, and indeed this is what is required for local and regional decision making, yet the derivation of such values involves further technical complexities (Bateman et al. 2013). In general, there are challenges in translating natural capital and ecosystem service ideas into practice and this has created a situation in which some planning and management practitioners are reluctant to use the concepts (Albert et al. 2014) and several initiatives have sought to address the problems (e.g. see the Natural Capital Committee (2017) workbook).

1.4 Combining the Strengths of Landscape Planning and Ecosystem Services

Obviously, there is complementarity between landscape planning and the ecosystem services concept. Linking landscape planning and ecosystem services creates a two-way benefit: landscape planning is strong in producing area-specific results, which can be incorporated into implementation mechanisms such as legally-binding land use planning, protected area designations or targeted agri-environmental schemes. The ecosystem services concept does not yet provide a fully developed system of assessment methodologies which are applicable in practice on regional or local scale, nor are there established means of implementation. However, a strength of the ecosystem services concept lies in making the connection between the status of natural assets and human well-being more explicit, as well as the use of economic valuation which can resonate with a range of public and private sector decision makers. Economic analysis also has a capacity to cast a wider perspective on environmental problems and help reveal the influence of driving forces on pressures and the state of ecosystems. Furthermore the economic perspective, more than analysis

in landscape planning and related physio-geographical approaches, focusses on individual preferences and benefits, which can help validate the acceptability of environmental planning goals. Thus linking landscape planning and the ecosystem services concept can be regarded as prototypical for the concept of usable science, which is guided by the needs of decision making (Ford et al. 2013).

This two-way benefit is also reflected in terms of methodologies. A full ecosystem services assessment should not rely primarily on current, perhaps volatile, preferences and monetary values, which as yet cannot fully capture the non-use values of ecosystems. If these long-term or non-use values are to be adequately included, the methodologies from environmental planning need to be incorporated into a toolbox for ecosystem services assessment. In such circumstances, a large methodological overlap exists between landscape planning and the ecosystem services approach. All in all, for an ecosystem services-informed landscape planning, a consistent compendium of methodologies would be of great added value. The potential of merging the approaches and the mission to contribute practicable and consistent methodologies for a wide range of applications in landscape planning, as well as in other environmental assessments, has motivated the authors to write this book. Individual articles scattered amongst the journal literature do not provide sufficient orientation and cannot do justice to this goal.

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