7.2. Application of ecosystem services in spatial planning

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Introduction

Spatial planning and landscape planning are generally concerned with the spatial arrangement and management of land but differ in focus and disciplinary orientation. Spatial planning, according to the European Regional/Spatial Planning Charter, "gives geographical expression to the economic, social, cultural and ecological policies of society". It includes various instruments, such as comprehensive planning, zoning and Strategic Environmental Assessments (SEA). Landscape planning, in contrast, has been defined by the European Landscape Convention as "a strong forward looking action to enhance, restore or create landscapes". In many EU member states, landscape planning is an integral part of spatial planning.

The aims of this chapter are to introduce the current spatial and landscape planning practice concerning the integration of environmental information, to present options for applying ES maps in planning and to discuss related opportunities and challenges.

Current practices of integrating environmental information in planning

Assessing and addressing environmental issues is not new to the fields of spatial and landscape planning. Depending upon the planning instrument under consideration, different types of environmental information and approaches for integration are already in use. SEA, particularly, aims to provide a high level of protection for the environment by systematically integrating environmental considerations during planning preparation and adoption. The environmental issues explicitly mentioned by the European SEA legislation include biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage (including architectural and archaeological heritage) and landscape.

Landscape planning also illustrates various approaches for taking account of environmental information. The German 'Landschaftsplanung', for example, analyses the current state of the landscape concerning a set of landscape functions, defined as "the capacity of a landscape […] to sustainably fulfil basic, lasting and socially legitimised material or immaterial human demands". As such, it considers the capacities (or potentials) of ecosystems to deliver ecosystem services (ES) as demanded by society, regardless of their actual and current use. The measures, against which landscape planning assesses and evaluates these landscape functions, are legally derived environmental development objectives and expert-based assessments of rarity and value.

Importantly for useful application, mapping approaches need to be adapted to the specif-

ic objectives and interests of decision-makers, planners and stakeholders involved in the planning processes. Furthermore, the delineation of maps often relates to jurisdictional boundaries whereas ecosystems and ES provisioning and benefiting areas easily transcend them. To this end, a multi-level approach to mapping with eventually different degrees of mapping detail (Chapter 5.6) are required to provide decision-makers with information on how external effects influence their decision-making and how their decision-making in the respective jurisdiction may influence ES provision and delivery in other jurisdictions.

Options for applying ES maps in planning

Various options exist for applying ES maps in support of spatial planning and decision-making. The way in which the ES maps can be used depends upon the specific planning instrument in use, the need to fulfil statutory requirements for the implementation of the respective instrument, the needs and interests of instrument users and decision-makers, as well as the time and resources available for developing ES maps (in addition to what is already legally required). Consider the following examples.

ES maps can be used as an information source for investigating impacts of proposed planning decisions and for comparing possible alternatives. Recent publications have addressed the question of how ES maps can be used to support SEA of spatial planning (see Chapter 7.8).

ES maps can help to identify where areas of particular environmental sensitivity or high potential for ES delivery or for demand for ES are located. Such information is useful for developing comprehensive and strategic development plans. For example, areas which have particular environmental sensitivity against impacts, provide particularly important ES, or provide opportunities for exploiting synergies by delivering several ES simultaneously, should be safeguarded, enhanced or restored.

Maps of green and blue infrastructure representing the spatial variation in ES supply potential, coupled with spatially explicit data on people's values and actual use of ES, help spatial planners identify mismatches between supply and demand, as well as trade-offs or compensation actions to be undertaken in planning decisions. In addition, the flow of ES from supplying areas to the beneficiaries can be illustrated with ES maps, especially when using participatory mapping methods.

ES maps can enhance stakeholders' and decision-makers' engagement by better communicating the benefits and shortcomings associated with proposed planning options.

ES maps visualise the trade-offs that can be caused by land-use changes and urban management alternatives for ES provision.

ES maps support valorisation, for example, by selling agrarian and touristic products with price premiums as a way to co-finance environmentally sensitive land use management.

ES maps contribute to understanding the spatial relationships between the planning area (which typically corresponds to a jurisdiction, for example, at the regional or national level) and the areas where ES are supplied and used. A proper recognition of these relationships allows addressing situations where the benefits of planning decisions accrue at one scale, but costs are borne at another scale.

By using open access data and methods for mapping, similar approaches can easily be

made available for scientific review, practical application, comparison between different regions and further development.

Case example of applying ES maps in spatial planning, city of Järvenpää, Finland

The small and relatively compact city of Järvenpää, Finland, decided to take positive actions for land improvement by placing infill development in city-owned land parcels that were mainly green areas of varying quality. To understand the values of the potential infill development sites, the green infrastructure of Järvenpää was mapped based on natural values, ecological connectivity and ES supply (Figure 1) and demand (Figure 2). The maps covering the whole city area were then used to assess the importance of each potential site.

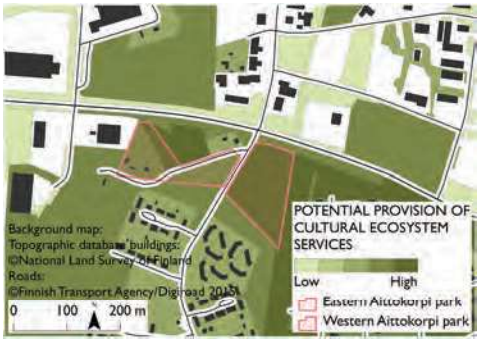

Figure 1. The variation in the cultural ES supply potential in and around the potential infill development site of the eastern and western Aittokorvenpuisto (delineated with a red line) in Järvenpää. The darker the green, the greater the supply potential. Black areas are buildings, white areas are impervious land.

The values of the sites were described in detail and this information helped the spatial planners to make an informed decision about which areas could be used for construction while causing least harm to both nature and people.

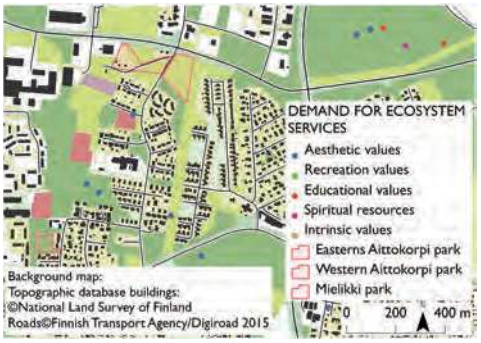

Figure 2. Demand for ES, assessed by a map survey in a workshop organised for local residents in Järvenpää. The dots represent markers placed by residents and the different colours of dots represent different cultural ES-related values of the respondents. The potential development sites within the urban fabric are delineated with a red line. Black areas are buildings, white areas are impervious land. Other colours of the areas show to which class in the created green infrastructure typology the area belongs.

Requirements of ES maps to be usefully applied in planning

In order to be useful in planning, ES maps need to fulfil a number of requirements:

They need to be specifically attuned to the context and purpose of the planning study and the interests and concerns of the population. To be actually useful, the mapping exercise needs to begin with a joint decision of map-makers, users and decision-makers concerning the spatial scale and resolution applied, the ES considered, the indicators used, the approaches used for assessing and valuing, as well as the format of the mapping outputs. As a consequence, the information needs and requirements of potential users and decision-makers need to be investigated and addressed in the design and implementation of the mapping exercise from the very outset.

The ES classes selected and examined need to be specifically attuned to the issue at stake.

Mapping of ES supply is only a part of the planning process. It needs to be complemented with spatially explicit information on ES demands, stakeholder interests etc.

Users and decision-makers need to be systematically involved in the development of the ES maps. Feedback from local and regional experts is also essential in verifying the maps because no spatial data is perfect and without gaps.

The timeliness and longer term appropriateness of the maps should be ensured. The maps need to be prepared in the timeline with the planning decision that is to be made. In addition, ES maps should be developed and delivered in a way that allows them to be updated once changes have been made to land uses and management.

Opportunities and challenges of applying ES maps in planning

Several challenges exist concerning the application of ES maps in planning.

ES maps, as with any kind of environmental information, are only one part of the various information and concerns that planning needs to take into consideration. They may illustrate and, thus, helpfully support efforts to integrate environmental considerations in decision-making, but the actual potential to influence decision-making is limited (especially within statutory planning).

Incorporating ES in decision-making can make the planning process more complex. This is a significant challenge that might be alleviated by developing assessment standards, the provision of ES maps by national institutions, simple but robust methods and tools for the creation of maps.

ES maps appear to represent true information, but they most often have inherent uncertainties attached to them (Chapter 6). Communicating this uncertainty to the audience and appropriately addressing the uncertainty by planning- and decision-makers is an enduring challenge.

The opportunities provided by using ES relate to the provision of essential and important information for planning.

The use of the ES concept, versus other concepts such as landscape functions, has the potential to relate well to diverse groups of users and stakeholders through the notion of 'services' provided by nature and landscape to people. As such, they can facilitate cooperative landscape and spatial planning and implementation in practice.

ES maps can complement existing environmental information and approaches by providing more differentiated information on the actual provision and use of ES (and not just ES potentials as hitherto the case), trade-offs and synergies of land use options concerning the delivery of various ES and the spatial allocation of the supply of and demand for ES.

ES maps can provide a useful basis for quantification and economic valuation of ES which in turn may provide additional added value for planning and decision-making.

Conclusions

Maps of ES supply and demand are useful for planning- and decision-support in providing information concerning ES provisioning and benefiting areas as well as synergies and trade-offs between several ES. This information can relate to the status quo or in alternative land use options. Outcomes of ES maps can then

be used to identify areas that need to be safeguarded, enhanced or developed.

To harness these opportunities for applying ES maps, planning practitioners need to apply the mapping techniques and maps in ways carefully adapted to the specific user, governance and decision-making context.

Further reading

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