



Linking the ecosystem services approach to social preferences and needs in integrated coastal land use management – A planning approach



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ABSTRACT

Coastal zones with their natural and societal sub-systems are exposed to rapid changes and pressures on resources. Scarcity of space and impacts of climate change are prominent drivers of land use and adaptation management today. Necessary modifications to present land use management strategies and schemes influence both the structures of coastal communities and the ecosystems involved. Approaches to identify the impacts and account for (i) the linkages between social preferences and needs and (ii) ecosystem services in coastal zones have been largely absent. The presented method focuses on improving the inclusion of ecosystem services in planning processes and clarifies the linkages with social impacts. In this study, fourteen stakeholders in decision-making on land use planning in the region of Krummhörn (northwestern Germany, southern North Sea coastal region) conducted a regional participative and informal process for local planning capable to adapt to climate driven changes. It is argued that scientific and practical implications of this integrated assessment focus on multi-functional options and contribute to more sustainable practices in future land use planning. The method operationalizes the ecosystem service approach and social impact analysis and demonstrates that social demands and provision of ecosystem services are inherently connected.

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Introduction

The coastal lowlands and estuaries of northwestern Europe are constantly changing and the population is dealing with increasing competition for space and resources. Today, the increasing use of resources is leading to growing pressure and conflict between the different forms of land use and ecosystems (e.g. European Union, 2012). In relation to southern coastal regions of the North Sea, the natural and societal systems must also deal with the consequences and effects of climate change (Nicholls et al., 2007). For the coast of the Wadden Sea, Katsman et al. (2011) estimate a regional sea level rise of 0.40–1.05 m by 2100. Additionally, the North Sea coastal areas are also exposed to significant and increasing storm events (Beniston et al., 2007; Grabemann and Weisse, 2008; Nicholls et al., 2007; Woth et al., 2005) and shifts in precipitation's scale and time (Beniston et al., 2007; Jacob et al., 2008; Spekat et al., 2007).

Necessary changes in current land use management may lead to both beneficial and adverse effects on human well-being and the ecosystem health of a region. Therefore, long-term anticipatory and spatially explicit courses of action are required. There is an obvious need for adaptive planning strategies which will lead to more sustainable development and promote human well-being (e.g. Ahlhorn, 2009; Bormann et al., 2012). The objective of this paper, therefore, is to develop an applicable methodology for sustainable development in land management, combining the ecosystem services approach and social impact assessment.

In order to find sustainable solutions, the ecosystem services approach has become prominent in the promotion of sustainable development and ecosystem-based land use management (Fisher et al., 2009; de Groot et al., 2010). Ecosystem services, meaning the goods and services people obtain from ecosystems, play an important role in sustaining and fulfilling human life. While the ecosystem services approach takes into account effects on socio-economic factors and contributes to human well-being by focusing on the supply of ecosystem services (MA, 2003), social impact assessment identifies, analyses and evaluates the social impact of projects on people and ecological structures, and focuses on the process of managing social issues related to development (Esteves et al., 2012; Vanclay, 2003a; Vanclay,

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2012). Social impacts include ‘the consequences to human populations of any public or private action’ affecting human well-being (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1995, p. 11). Although ecosystems provide distinct environmental benefits to people and affect human well-being (MA, 2003; UK National Ecosystem Assessment, 2011), the linkages between the natural and the social spheres and the mutual feedback mechanisms are not always well defined. There has been a general lack of understanding on the relationship between ecosystem services and the social impacts of an intervention (Burdge, 2003; Vanclay, 2003b; Wallace, 2007) and a strong awareness in coastal management practice over the last decade that decision-makers and scientists need to jointly address the challenges of an integrative and interdisciplinary management approach (Fish et al., 2011; Österblom et al., 2010; Polasky et al., 2011). Such an approach would include consideration of the interdependencies arising from the complex interactions between nature and society (Carpenter et al., 2009; Sloomweg et al., 2001; Vanclay, 2012).

This paper argues that addressing these linkages, interdependencies and feedback mechanisms is important, particularly for regional planning practice, as planners typically deal with balancing different activities and interests in relation to land use. A potentially promising way of addressing these linkages is the ‘social impact assessment’ approach (see also Schirmer, 2011; Vanclay, 2012).

Overall, the paper presents a framework and guideline for linking the ecosystem services approach with social preferences and needs. A guideline such as this could be used to assist planners and researchers establish a more integrated, possibly participatory, policy development process, particularly in relation to regional development.

A key idea behind the guideline is that development and management processes have to take into account the mutual interdependencies between environmental and societal changes caused by planning-related interventions. Generally, a separation

of ecosystem services and the related social impact on communities is likely to generate problems and incomplete impact assessments (Sloomweg et al., 2001; Chan et al., 2012; de Groot et al., 2010; Nahlik et al., 2012). To overcome this problem, this paper reports on an effort to develop guidelines that allow for a consideration of social and environmental issues in an integrated manner.

The paper argues that our guideline may support decision-making in this case, as it has the potential to reduce complexity and can be employed to encourage stakeholder participation. Another implication of the guideline may be its ability to produce innovative courses of action, leading to more sustainable and multi-functional land management. Finally, the integrated approach developed here is also essentially transdisciplinary as it involves the natural and social sciences, and negotiates the separation between humans and the environment.

The illustrative case employed involved regional governance processes on regional climate adaptation strategies in the area of Krummhörn in northwestern Germany (Fig. 1).

The increasing scarcity of resources and expected impact of accelerated climate change constitute major problems for land use management in the case study region (see also Ahlhorn, 2009; Bormann et al., 2012). Change in land use also affects the population and thus has a social impact, while the ability of the ecosystem to provide services might also be affected (MA, 2003; Schirmer, 2011; Vanclay, 2012). This paper considers a variety of ecosystem services and social impacts, combined with science and stakeholder-driven actions that concentrate on sustainable development and human well-being.

Assessment methodology

The following section will explain how the concept of ecosystem services can be anchored in local decision-making and planning processes to meet the changing conditions and need for action, as well as to promote sustainable development.

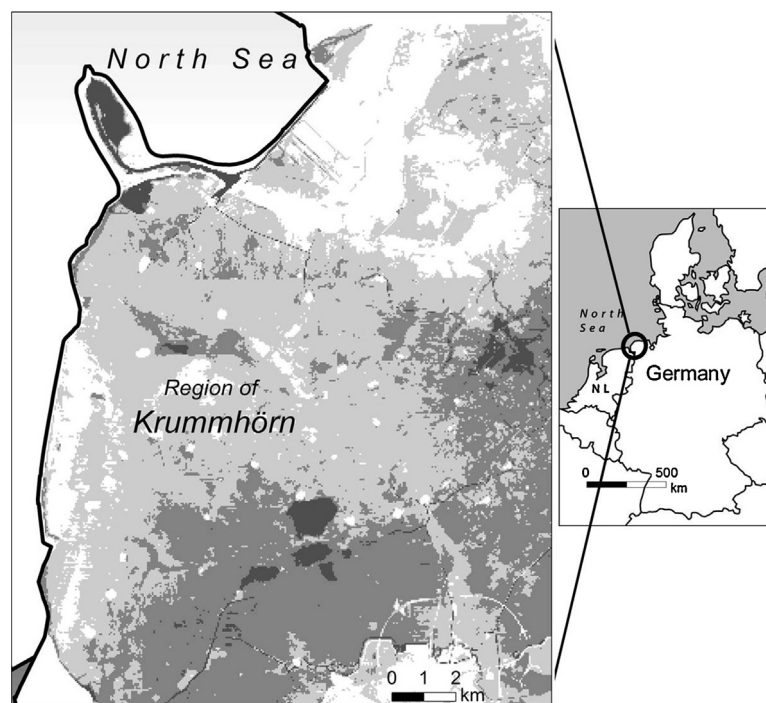


Fig. 1. Topography of the pilot region of Krummhörn, northwestern Germany. Most parts of the community (159 km², 12,600 inhabitants) are located within low-lying marsh. Due to the tidal influence of the North Sea, it is almost impossible to maintain unprotected settlements within the low-lying areas. Today, about one-third of the total area is below sea level. White = >1 m asl, light grey = 0–1 m asl, grey = 0–1 m asl, dark grey = <–1 m asl. Source: © LGLN, 2012.

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