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‘Mind the Gap’ between ecosystem services classification and strategic decision making

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ABSTRACT

Ecosystem services (ES) are increasingly embedded in policy agendas, but if and how policy actors are considering them is not often reported. This study assesses the extent to which ES were considered by key policy actors involved in the strategic decision-making process leading to an innovative large-scale Dutch coastal management project. We analysed retrospective interviews to ascertain which ES were considered and how they were described by policy actors. Over half of the quotes (118/228) and 16 out of the 17 interviewees referred to three broad ES categories, with high degrees of adoption: coastal safety, recreation and cognitive development (learning by doing). The broad terms ‘nature’ and ‘spatial quality’ were also referenced often (36 times). Our findings suggest that broad, unspecified ecosystem services were adopted highly by the policy actors, while specific ecosystem service categories were rarely considered. Relatable and comprehensible cultural ecosystem services also constituted critical arguments for policy actors in their strategic decision making. We reflect that ambiguous, broad terms can help to garner support and unite efforts across disciplinary and institutional boundaries. For ES to align with relevant aspects of decision making, a ‘translation step’ between ES research and decision making might be required and ambiguity should be acknowledged.

1. Introduction

In the past decades, scientific research has embraced the ecosystem services concept, which connects nature to human wellbeing (TEEB, 2010). Ecosystem service assessments can inform policy makers on the socio-economic and cultural consequences of biodiversity loss and environmental degradation in an intuitive way, which aids communication (Ruckelshaus et al., 2015). Ecosystem services are increasingly embedded in national and supranational policy agendas, such as that of the United States (Arkema et al., 2015), the European Union (Maes et al., 2012) and the recently established Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (www.ipbes.net). However, the uptake of the concept in general and of specific ecosystem services in policy decision making (‘decision making’ throughout this paper) seems to have occurred slowly and perhaps not as comprehensively as initially expected (Bouwma et al., 2018; Schleyer et al., 2015). If and how policy actors consider ecosystem services in decision making has only recently been considered in the literature, as have the factors influencing this adoption (Laurans and Mermet, 2014; Wright et al., 2017).

The ecosystem services concept assumes a decision-making model in which explicating and quantifying ecosystem services enables comparison of the benefits of different courses of action, and choosing and planning accordingly (Daily et al., 2009). However, the limitations of this model include policy actors’ shifting goals, the haphazard and opportunistic search for information and policy alternatives, and the often incomplete and non-systematic analysis of those alternatives (Eisenhardt and Zbaracki, 1992). So, providing well-founded, science-

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based assessments of the changes in ecosystem services, i.e. instrumental use, is not necessarily sufficient to give the ecosystem services concept weight and significance in decision making (Laurans and Mermet, 2014; Wright et al., 2017). Recent studies suggest that decision makers are more likely to utilize ecosystem services research outcomes if the concept and specific reporting categories have been explained to them and the classification is based on stakeholder consultation (Hauck et al., 2013; King et al., 2015). In addition, Posner et al. (2016) showed that attributes enhancing salience and especially legitimacy best explain the impact of ecosystem services information on decision making. This suggests that the topics covered in ecosystem services assessments need to be relevant to decision making (laws, policies, problems or election themes), but also that policy actors need to be heard in such assessments (van Oudenhoven et al., 2018). Such insights can help identifying which factors to consider when conducting ecosystem service assessments for decision making, and when communicating to policy actors on topics related to ecosystem services (Ruckelshaus et al., 2015).

With this paper, we contribute to the literature on the uptake and adoption of ecosystem services in decision making. The majority of this relatively recent body of work has focused on the question if and how ecosystem services information reaches and influences decision making, and relates to how individual ecosystem services have been embedded in existing policies, implemented laws and formal policy processes (Bouwma et al., 2018; Mann et al., 2015; Schleyer et al., 2015; Wright et al., 2017). In our paper we take a step back, by observing arguments of Dutch policy actors in support of a decision that could shape Dutch coastal management in the future. By relating ecosystem services to the arguments and motivations of policy actors who have not been exposed to ecosystem services information, a sense of the coherence, relevance and compatibility of specific ecosystem services can be obtained, as well as of the concept as a whole (Bouwma et al., 2018). In addition, instead of assessing a formal decision making process leading to the formulation of concrete policies or laws, we observe a *strategic* decision-making process in the context of a large-scale *pilot project*, where we follow Mintzberg et al. (1976) in defining a *strategic* decision as one that is important in terms of the actions taken, resources committed, and the precedents set. Furthermore, studying decision making in *pilot projects* offers unique insights, because policy actors may employ pilot projects strategically to test the potential success or failure of innovations and decisions in a non-linear, iterative decision-making process (Vreugdenhil et al., 2010). Finally, coastal management in The Netherlands has traditionally been 'forced' to be innovative and multifunctional (van Wesenbeeck et al., 2014). Studying a large-scale pilot project in Dutch coastal management can therefore be regarded as a litmus test – it offers us the opportunity to observe if innovation and multifunctionality in coastal management have been explained by policy actors in terms of ecosystem services or in terms of other concepts and ideas. This forms an important contribution to the literature on the uptake of ecosystem services in coastal and marine decision making, on which few studies have been published to date (c.f. Beaumont et al., 2017; Drakou et al., 2017).

The case study considered in this paper is an innovative large-scale coastal management pilot project, the pilot 'Sand Motor' in the Netherlands. The Sand Motor is a large, locally concentrated sand nourishment of 21.5 million m^3, which was realized in 2011 on the North Sea coast in the Netherlands (Aukes et al., 2017; Bontje and Slinger, 2017). This sand nourishment required finances of 70 million euro to be committed and an unprecedented stock of sand to be deposited in one location, while it triggered a worldwide interest in large-scale sand nourishment technology. Strategic decision making in the pilot involved first establishing and then widely communicating the Sand Motor's added value, next to the original goal of coastal protection, in terms of the multiple goals of recreation, knowledge development and innovation, and nature development (Aukes et al., 2017). Although the aims of the pilot Sand Motor are intimately linked to some ecosystem services, the extent to which ecosystem services were considered by policy actors has not been studied yet. Therefore, the pilot Sand Motor provides a case study of theoretical relevance (c.f. 'theoretical sampling' in Corbin and Strauss, 1998), to evaluate the consideration of ecosystem services in the pilot's initiation and design process.

Hence, the objective of our study is to assess the degree of adoption of ecosystem services by policy makers involved in the strategic decision-making process leading to the pilot Sand Motor. We explore this process through the eyes of key policy actors, i.e. policy actors involved in the initiation of the pilot Sand Motor. To achieve our objective, we analysed a series of retrospective in-depth interviews with policy actors to ascertain which ecosystem services were considered in support of this coastal protection alternative. We also characterised how the ecosystem services were described by policy actors and the degree of adoption of the ecosystem services by Dutch coastal policy actors representing different organisational levels. Finally, we reflect on the implications for the utility of the ecosystem services concept, the definitions of ecosystem services and their classification at the science-policy interface, focusing particularly on coastal and marine decision making.

2. Strategic decision making in pilot projects

Literature on the adoption of the ecosystem services concept in decision making has mainly centred around existing policies or landscape planning (Bouwma et al., 2018; Mann et al., 2015; Verutes et al., 2017). The concept's role in strategic decision making in pilot projects, which essentially are policy instruments feeding into wider policy processes, has received little attention. Studying decision making in pilot projects is more common in social sciences studies. Such studies offer unique insights, because pilot projects allow technological or administrative innovations to be tested and learning to occur about the working of the innovation in practice as a policy instrument (Vreugdenhil et al., 2010). This evidential basis can then be used to roll out the technological or administrative innovation at a broader institutional scale (Sanderson, 2002). A successful pilot project may therefore act as a stepping stone to wider application of policies and innovations, making it a favoured policy instrument (Vreugdenhil et al., 2012). The relatively small scale of a pilot project is usually selected to reduce risks, while allowing for experimentation. Cross-sectoral and cross-disciplinary issues can be tackled, and by facilitating temporary cooperation between actors in unconventional coalitions, pilot projects can bring usually disconnected policy actors together and can build shared learning experiences.

The execution of the pilot Sand Motor allowed an unprecedented large-scale sand nourishment that combines the multiple goals of coastal safety, nature and recreation, among others, to be tested in the field. The goals of nature and recreation were added to the project after having formulated the initial goal of coastal safety (Aukes et al., 2017). In addition, to make sure that learning occurred about the working of this innovation in practice, knowledge development and innovation were subsequently also listed as part of the pilot's goals. The pilot brought together, and facilitated cooperation between, multiple actors and multiple disciplines. The coalition of actors that signed the ambition agreement leading to the Sand Motor's realization consisted of the Province of South Holland, the Ministry of Transport, Public Works and Water Management, local municipalities, the local water board and, finally, an environmental NGO not involved in the formal decision-making process (Province South Holland, 2008). As such, this actor coalition provided a forum in which coastal management change could be practised and a shared learning experience could be built (cf. Vreugdenhil, 2010). The pilot Sand Motor was identified as an advocative and precedent-setting pilot project by Vreugdenhil et al. (2010) and experienced by several initiating policy actors as an 'iconic' departure, in the sense that different ongoing development processes in