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The use of sociocultural valuation in sustainable environmental management

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ABSTRACT

The integration of sociocultural valuations (SCV) within an ecosystem services (ES) framework is increasingly being required in environmental management contexts. Yet, this raises important questions: how do we approach SCV when people's perceptions are based on unbalanced information and advocate for detrimental actions? How then should SCV results be used? Should they be used to steer decisions? We use an example from a SCV of ES provided by seagrass meadows in the North Western Mediterranean to provide recommendations on SCV integration into the management of a coastal ecosystem. Our results show that societal perceptions and preferences for specific management actions are generally built on unbalanced and incomplete knowledge. Consequently, establishing management decisions on SCV could lead to detrimental outcomes, potentially undermining long-term environmental and social benefits. We highlight the importance of integrating SCV into management design to tailor management to specific contexts. However, we also show that SCV should be considered carefully when deciding on management actions and that the integration of SCV outcomes has to be assessed with regards to the level of knowledge among society.

1. Introduction

The ecosystem services (ES) concept has received increasing attention as a promising framework that facilitates the integration of human-constructed preferences and values of ecosystems into environmental decision-making and management (MEA, 2005). The ES concept emerged from the need to recognise the importance of ecosystems as providers of essential goods and benefits for human wellbeing (MEA, 2005). The adoption of this anthropocentric vision has lead to a different perspective which intends to complement traditional conservation views by promoting a more sustainable management of the environment for the self-interests of people (Agarwala et al., 2014). The ES concept however, has also been the focus of criticism. Some argue that its anthropocentric nature might promote an exploitative human-nature relationship, thus hindering nature conservation objectives. Schröter et al. (2014) summarize the most frequent critics of the ES concept in a comprehensive discussion paper. The most contested arguments include the commodification of nature, the associated fear of "selling out" on nature and the promotion of an exploitative human-nature relationship (Schröter et al., 2014). Despite criticism, the ES concept and its associated framework represent an alternative view to pursue sustainable development.

To facilitate the inclusion of ES into policy and management frameworks, different valuation approaches have been developed to characterise and quantify the different values of ES (Kelemen et al., 2015). Until recently, a dichotomous division in the types of value associated to nature has dominated the debate in environmental conservation. The *intrinsic* value of nature, or valuing nature for its own sake; and the *instrumental* value, or the value of nature as means to achieve human wellbeing. However, while there is evidence that people hold both types of value (Lockwood, 1999), few people make choices based only on the inherent value of things or on how things satisfy their preferences and needs. People also consider their relations, interactions and responsibilities with others and towards nature, these values have been termed *relational* values (Chan et al., 2016). Relational values encompass values related to living a good life and the concept of how preferences and societal choices relate to notions of justice, reciprocity, care and virtue (Ryan and Deci, 2001; Ryff and Singer, 2008).

Three valuation disciplines have emerged to define the range of values associated to ES, namely ecological, economic and sociocultural valuation. Ecological valuation generally describes

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the contribution of particular ecosystem services to the maintenance and functioning of the ecosystem by using biophysical indicators such as diversity or carbon sequestration (Groot et al., 2010; Kennedy et al., 2010). Conversely, economic and sociocultural valuations intend to represent the value of ES for humans. Through economic valuation, a monetary value is assigned to those ES susceptible of having an associated market value such as food production or carbon sequestration (Pendleton et al., 2012; Jackson et al., 2015). However not all ES values are suitable for this type of valuation, this is particularly true for values associated to cultural ES (e.g. spiritual or symbolic interactions with the environment) (Chan et al., 2012). Sociocultural valuation (SCV) is better suited at capturing values and perceptions that groups or individuals assign to ES, their relationships, responsibilities and interdependencies (i.e. relational values) (Boeraeve et al., 2015; Chan et al., 2016). These values are often of a less tangible nature and generally no units are assigned to them since valuations tend to be qualitative, although rankings and ratings are often included. SCV has specially focused on the assessment of cultural ES (Chan et al., 2012). People however, not only ascribe values to cultural ES but also to the provision, regulation and maintenance services associated to the environment. Despite this, SCV research and the assessment of social benefits have been linked to a greater degree to the assessment of cultural ES than to provisioning, supporting or regulating services (Schmidt et al., 2016a). Moreover, SCV can uncover different and sometimes opposing views that people hold with regards to ES values, such as diverging perceptions of what constitutes a benefit (Saunders and Luck, 2016). One of the recurring critiques of the ES framework is that it generally focuses on the benefits people derive from ecosystems, while it dismisses those services that people perceive to undermine their wellbeing by producing unpleasant, unwanted or economically harmful effects (Lyytimäki et al., 2008; Schaubroeck, 2017). These have been termed ecosystem disservices (EDS) (Lyytimäki et al., 2008). Examples of EDS include pollen allergens, red tides, crop pests or unpleasant smells from rotting organic matter.

Whether an ecosystem function is identified as a service or a disservice depends on the perspectives and views of the individual, which are mainly determined by the interactions between the individual and the service and by the characteristics of the individual itself (Scholte et al., 2015). Individual's perspectives and values on the environment are partly shaped by the level of knowledge, relationship to and understanding of the ecosystem by the individual, as shown by multiple studies (e.g. Jobstvogt et al., 2014; Muhamad et al., 2014; Orenstein and Groner, 2014; Cebrián-Piqueras et al., 2017). In the case of the marine environment this is particularly challenging as most people regard it as remote and unfamiliar (Jefferson et al., 2014). Thus, a greater understanding of the function of the ecosystems might change people's perceptions and how they value it.

Parallel to this, the integration of public views and values, which SCV methodologies can deliver, is increasingly recommended as a requirement in contemporary governance (EU, 2001; Epstein et al., 2014; Spangenberg et al., 2015). As examples, the European Union pursues to promote citizen participation in shaping and delivering EU policy (EU, 2001). In an environmental policy shaping context, public views are also being encouraged in different areas, from international fisheries (Epstein et al., 2014) to local environmental planning (Turnhout et al., 2010; Mascarenhas et al., 2016).

However, the consideration and integration of SCV in wider environmental governance and local environmental management raises fundamental questions: how do we approach SCV when people's perceptions are founded on unbalanced information and advocate for detrimental actions with potentially long-term negative impacts on human wellbeing, the ecosystem itself and the wider land / seascape? How should SCV results be used? Should they be used to steer management decisions? The body of literature in SCV studies is rapidly growing, generally highlighting the positive aspects of the integration of SCV into management (i.e. integration of values, perspectives, uncovering conflicts...), however no critical studies exists on the potential negative consequences of this integration. Here, we present a study that examines in detail the suitability of using SCV in steering management decisions. The present study goes further than previous by assessing the aims and purposes for which SCV is suited for and for which is not and by analysing potential unwanted consequences associated with the use of SCV in an environmental management framework.

We use a SCV case of ES derived from seagrass meadows (*Posidonia oceanica*) in the Balearic Islands (Western Mediterranean, Spain) to illustrate and provide recommendations on the use and integration of SCV into the management of coastal ecosystems. Within coastal ecosystems, seagrasses are key components that provide crucial ES. Seagrasses contribute to the protection of coastal areas by diminishing wave energy (Duarte et al., 2013), trapping (Ondiviela et al., 2014) and generating sediments (Jiménez et al., 2017), provide important nursery areas for a range of marine organisms (Jackson et al., 2015), regulate the cycling of nutrients (Hemminga and Duarte, 2000) and play a significant role in the global sequestration and burial of carbon (Duarte et al., 2013) among others. Seagrass meadows are the dominant coastal marine ecosystem in the Mediterranean Sea and around the Balearic Islands ranging between 0.5 m to 40 m depth.

The Balearic Islands, with a resident population of approximately 1 million people, are one of the major tourist destinations in Europe (16 million tourists visited the islands in 2016, 30 million are forecasted for 2017). Besides the climate and culture, tourists are drawn to the islands' clear coastal waters and white sandy beaches. *P. oceanica* is a major contributor to the generation and maintenance of these valued assets. Particularly, it maintains the clarity of the water, contributes to the generation of white sand and protects beach sand from being washed away during winter storms through the accumulation of dead *P. oceanica* leaves on the beach, termed beach casts (Ondiviela et al., 2014; Jiménez et al., 2017).

However, despite the many benefits of *P. oceanica* in the maintenance of sandy beaches and clear waters, residents and visitors often perceive beach casts as a disservice as they are considered as unpleasant. In the Balearic Islands, in line with the contemporary move towards the integration of social perceptions into environmental governance, the regional government launched a public consultation in May 2017 to gather public views on the management of *P. oceanica* as part of the redrafting of *P. oceanica* management plans. This scenario offers a timely opportunity to analyse the suitability of incorporating public views into management decisions.

We carried out a SCV with stakeholders' groups of the marine environment and the general public in order to (i) uncover differing perceptions of the ecosystem and its management between groups with different levels of environmental knowledge; (ii) show the impact of enhanced information on ecosystem and management perceptions and (iii) investigate the suitability of integrating SCV into environmental management.

2. Methods

2.1. Sampling of direct stakeholders and the general public

We carried out a socio-cultural valuation exercise of *Posidonia oceanica* ecosystem services with multiple social actors to reveal