



Analysis

Socio-cultural valuation of ecosystem services: uncovering the links between values, drivers of change, and human well-being



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ARTICLE INFO

Article history:

Received 9 May 2012

Received in revised form 22 September 2014

Accepted 23 September 2014

Available online 18 October 2014

Keywords:

Critical ecosystem services

Semi-arid watershed

Social perceptions

Stakeholders

Tradeoffs

Value conflicts

ABSTRACT

Ecosystem services studies currently lack information regarding stakeholders' socio-cultural values. This information is highly relevant to human well-being, which is the motivation of ecosystem services assessments. We present results from an analysis of stakeholders' perceptions of ecosystem services, well-being and drivers of change in two semi-arid watersheds in south-eastern Spain. Based on the information compiled through a literature review, participant observation and semi-structured interviews, we designed a questionnaire and conducted 381 interviews. Our results show that semiarid watersheds deliver a large variety of ecosystem services; however, these services are perceived in different ways. We identified five stakeholder groups, including: locals dependent on provisioning ecosystem services, locals not directly dependent on provisioning ecosystem services, environmental and local development professionals and rural and nature tourists. Overall, provisioning services related to traditional practices were perceived as highly important and highly vulnerable by every stakeholder group. However, we found contrasting perceptions of some ecosystem services among stakeholders and of the relevant drivers of change and well-being. We suggest that socio-cultural valuation is a useful tool to prioritize ecosystem services but more attention should be directed to emerging trade-offs. Linking values to other stakeholder perceptions might be a useful way to move forward in ecosystem services valuation.

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1. Introduction

The ecosystem services (ES) concept was conceived as a metaphor and later used as a heuristic analytical tool to make explicit the links between ecosystem conservation and human well-being (Norgaard, 2010). Here, we define ES as the direct and indirect contributions of ecosystems to human well-being (de Groot et al., 2010). ES assessments aim to inform environmental management and planning using multiple indicators (e.g., ecological, socio-cultural and economic) (MA, 2005; TEEB, 2010). Recent critiques, however refer to the lack of explicit inclusion of the stakeholders in ES studies (Menzel and Teng, 2010; Seppelt et al., 2011). As a result, socio-cultural values¹ (i.e., social needs, perceptions and preferences towards ES) are currently missing or poorly

investigated in the assessments (Bryan et al., 2010; Chan et al., 2012). Neglecting what matters to people in ES assessments may hinder the social and political relevance of the concept and thus, its usefulness to facilitate social change (Anton et al., 2010; Menzel and Teng, 2010).

Socio-cultural values vary among stakeholders due to a complex set of factors. They are context-dependent and may also be related to different objectives, concerns and priorities for ecosystem management (Lamarque et al., 2011). Some of the factors that shape the stakeholders' perceptions of ES are related to the type of knowledge they hold (i.e., experiential or experimental), their place attachment (Lamarque et al., 2011; Lewan and Söderqvist, 2002) and the way in which they interact with their natural surroundings (Russell et al., 2013). For instance, Sodhi et al. (2010) found that local stakeholders with a longer time of residency near protected areas placed more value on the ES provided by their ecosystems. Therefore, there are two fundamental aspects to take into account when conducting ES assessments. First, the selection of stakeholders is particularly important as it is likely to influence their outcome (Seppelt et al., 2011) and second, greater understanding of the factors underlying ES values (human needs, well-being concerns, the effect of drivers of change etc.) is required.

Although well-being is at the core of ES definition, studies rarely explicitly include it as part of ES assessments. However, human well-being surveys can be used, for instance, to evaluate the importance of ES and how changes in ES may affect people's needs and willingness to

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¹ We understand socio-cultural values as a type of assigned value as defined by Lockwood (1999), which denotes those values that people attach to things (goods or services), in this case to ecosystem services, expressed in non-monetary terms. These values, according to Brown (1984) and Bryan et al. (2010) incorporate a person's perception of the ecosystem service under valuation, their held values and associated preferences and the context of valuation. In the current study we considered the values relating to ecosystem service importance for human well-being and the vulnerability of those services to being lost or degraded.

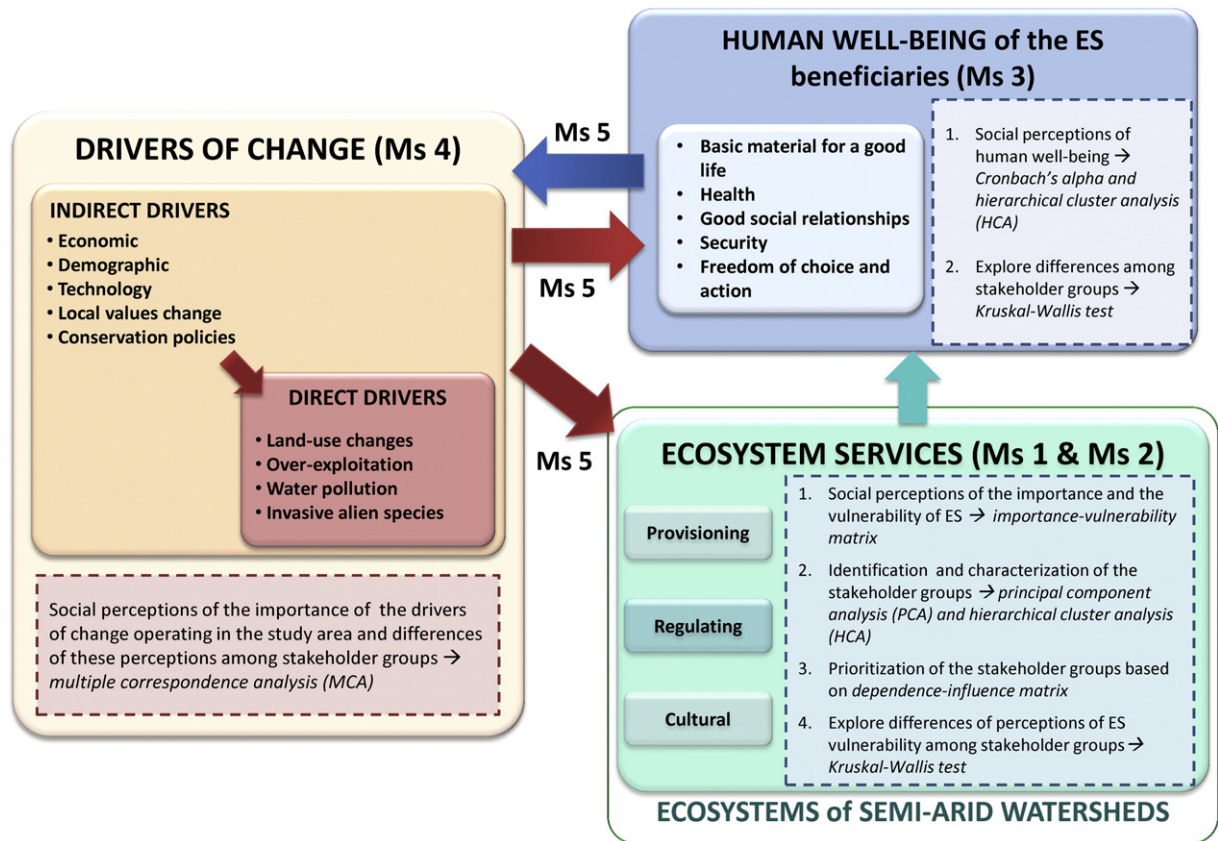


Fig. 1. Theoretical and methodological framework, modified from the MEA (2005) framework, representing the main relationships among ecosystem services, human well-being and drivers of change. Dashed lines refer to the methodological approach and the statistical techniques used for data analysis. Ms 1, Ms 2, Ms 3, Ms 4 and Ms 5 represent the specific methodological steps followed in the study.

maintain their quality of life (Smith et al., 2013). Furthermore, studies frequently overlook how changes in the delivery of ES affect the well-being of different stakeholder groups (Daw et al., 2011). This might be particularly relevant in the case of those stakeholders whose well-being is more directly dependent on ES (de Groot et al., 2006; Reed et al., 2009). Therefore, identifying the drivers of change² that shape ES delivery and its ultimate effect on the stakeholders' well-being emerges as an important issue (Chan et al., 2012; Smith et al., 2013; Summers et al., 2012).

In this study, we aim to empirically advance on the measurement of different socio-cultural values and how they relate to well-being and the effect of drivers of change. We do so using a conceptual framework modified from the Millennium Ecosystem Assessment (MA, 2005), which guides our objectives and the methodological steps we have followed (Fig. 1). We understand that the delivery of ES contributes to social well-being. Those stakeholders who participate in land-use decisions and planning can influence the effect of indirect and direct drivers of change. At the same time, drivers of change shape the stakeholders' well-being and ES flow (Fig. 1). Therefore, we take into consideration these three elements, i.e., ES, drivers of change and well-being assessing the stakeholders' perceptions. Using this conceptual and methodological framework, we aim to (1) identify the most important ES for well-being and the ES that are most vulnerable to loss or degradation, (2) analyze if and how perceptions of well-being and drivers of change relate to socio-cultural values and (3) provide useful insights for socio-cultural valuation of ES and for management. To do so we conducted the following specific methodological steps (Fig. 1): (1) performed a socio-cultural valuation of ES, (2) determined the main stakeholder groups that use and

manage ES, (3) measured local stakeholders' views of well-being, (4) pinpointed the most important drivers of change and (5) identified the specific relationships among these perceptions.

We explored these objectives in two semi-arid watersheds in the southeast of Spain. Arid and semi-arid areas have been underrepresented in ES literature and considered marginal in ES assessments (O'Farrell et al., 2011; Reyers et al., 2009; Safriel et al., 2005). Furthermore, in these areas, there are often conflicting interests among multiple stakeholders about the use of vulnerable and scarce ES (Castro et al., 2011; García-Llorente et al., 2012b; Quintas-Soriano et al., 2014). Because of the nature of these vulnerable ecosystems, those stakeholders whose well-being is most dependent on an ecosystem's capacity to supply ES are also often vulnerable (Whitfield et al., 2011). Therefore, the need to conduct ES socio-cultural valuation emerges as a core issue in these areas.

2. Study Area

The semi-arid environments of Spain have recently been characterized as one of the most vulnerable ecosystems in terms of ES delivery (EME, 2011). We conducted the study in the Adra and Nacimiento watersheds, which are located in the provinces of Almeria and Granada in south-eastern Spain (Fig. 2). Both watersheds are in mountainous rural areas with a marked agrarian character. In the upper areas, a unique and multi-functional landscape has been designed to support subsistence farming on terraces as well as traditional irrigation systems such as acequias. Acequias have secured fresh water for humans and agriculture for centuries and have positively impacted other regulating services, such as hydrological regulation, water quality and local climate regulation (Pulido-Bosch and Ben Sbih, 1995).

² Here, drivers of change are defined as any natural or human-induced factor that directly or indirectly causes a change in an ecosystem (MEA, 2005; Nelson et al., 2006).

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