



Bringing stakeholders together to articulate multiple value dimensions of ecosystem services

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ABSTRACT

Ecosystem services are embedded with multiple values. Capturing and integrating plural perspectives when conducting ecosystem services studies is a recognized need and yet a challenge. This paper proposes a participatory approach that fosters articulation of values allowing the integration of different value dimensions to inform decision-making processes, an important challenge that has been gaining traction in the field of ecosystem services research. Using participation as a value articulating institution, stakeholder groups of the Portuguese marine and coastal Arrábida Natural Park were engaged in a participatory process that included a collaborative workshop to articulate value dimensions expressed by ecological, economic and social criteria in two different contexts: the assessment of project alternatives for regulating access to beaches and recreational activities and a conflict related with allocation of coastal vineyard areas. Results demonstrate that the proposed deliberative process fostered changes in participants' initial mental models and created new insights, namely by generating additional alternatives, expanding perceptions on affected ES, and helping the formalization of multiple evaluation criteria and decision rules, thus supporting decision-making in marine and coastal protected areas.

1. Introduction

The ecosystem services (ES) concept has recently received world-wide attention, yet value reductionism and monistic approaches still emerge in many debates. Looking into one dimension of value brings several associated risks and biases (O'Neill 1996; De Groot et al., 2002; Spash, 2008; Martínez-Alier, 2002). Hence, various authors have been following a more integrative perspective, calling attention to the importance of considering a broader range of ecological, social and economic ES values (Chan et al., 2016; De Groot et al., 2002; Spangenberg and Settele, 2016).

However, practical questions on how to articulate multiple ES values still remain. Once different ES values are recognized, the way they are integrated to support decision-making processes is determinant, as highlighted by recent studies on ES value pluralism (Martín-López et al., 2014; Lopes and Videira, 2013). Following such integrative perspectives, we will expand the scope of traditional ES valuation by openly supporting a more comprehensive approach that articulates different dimensions of values attached to ES.

In this article, participatory and deliberative ES-based evaluation processes are assumed as meaningful rule structures facilitating value

articulation, following Vatn's definition of the concept of value articulating institutions (Vatn, 2009). These rules represent contexts where discussions take place based on different rationalities and distinct principles on how these values should be articulated. Various authors have been exploring the development of multi-dimensional approaches to natural resource management pointing to the benefits of participatory methods that raise awareness in ES contexts (Antunes et al., 2009; Koschke et al., 2014; Mascarenhas et al., 2016). According to Hauck et al. (2013), the concept of ES enables a comprehensive evaluation of policy impacts, which is dependent on the incorporation of the diversity of stakeholders' perceptions, knowledge and preferences.

We conducted a review of value articulation approaches in recent ES studies in order to assess how, and to what extent, value articulation has been promoted. Despite the recent calls for articulation of multiple ES values (Lopes and Videira, 2013; Martín-López et al., 2014), evidences of such integrative processes was found in only a few cases. For example, geographical information systems were used by Hayha et al. (2015), Buckhard et al. (2012) and Ripper and Kyle (2014) to capture and articulate at least two ES value dimensions. However, other authors recognized three value dimensions – ecological, social and economic values – that captured ES values separately, through standalone

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methods (Hattam et al., 2015). In contrast, Martín-López et al. (2014) combined different values using plots revealing different information and trade-offs across value dimensions. We also found that due to its capacity to assess trade-offs and accommodate value pluralism, multi-criteria analysis has shown promising results as a method for integrated valuation of ES (Langemeyer et al., 2016; Seidl and Lexer, 2013; Fontana et al., 2013; Nordstrom et al., 2011; Grazhdani, 2014; Esse et al., 2014). Authors have highlighted the benefits of combining multi-criteria approaches with participatory methods (Antunes et al., 2011; Acosta and Corral, 2015; Salgado et al., 2009; Carnoye and Lopes, 2015). However, in the context of ES, the lack of information may be a challenge when conducting multi-criteria analysis (Langemeyer et al., 2016). Participation also played an important role in the majority of the reviewed studies. Nevertheless, involvement of interested parties was seemingly promoted for specific valuation tasks and not as an integrative feature of the value articulation process. This analysis allowed us to reiterate that the importance of identifying and capturing multiple ES values does find resonance in ES literature; however, the question of how to operationalize such articulation in participatory decision-making processes still remains open.

Thus, this paper proposes a collaborative platform for the articulation of ES values following a participatory conceptual framework for ES valuation and assessment (Lopes and Videira, 2013). The innovative nature of this methodology relies on the combination of three stages with distinct and complementary participatory tools that allow co-production of knowledge and combine information in an integrated and iterative process, engaging stakeholders from the beginning of an ES assessment process. The implementation of the third phase of the framework is described in this article, whereby the goal of the deliberative exercises was to articulate more than two types of ES values. Ultimately, the proposed approach aims to contribute to the debate on the advantages and limitations of an integrated and participatory process to articulate ES values.

The proposed approach was tested in the Arrábida Natural Park (ANP) in Portugal. The ANP is a coastal and marine protected area in Portugal that has nature conservation status, which confers several challenges due to tensions between high human presence on the territory and preservation of natural ecosystems. Two relevant decision-making contexts in the ANP were considered: (1) a land-use conflict involving allocation of vineyard areas in the natural park (provisioning ecosystem service), and (2) an assessment process comparing alternative projects to regulate access and visitation to recreation sites (cultural ecosystem service).

The paper proceeds with the presentation of the methods and the deliberative process. Section three provides an overview of the main features of the selected case study and describes the obtained results, while section four discusses the main lessons drawn from the empirical application. The main conclusions of our study are presented in the final section.

2. Methodology for articulating values of ecosystem services

Articulating ES values involves relating different values assigned to ES and assessing their implications for a decision-making process. Based on the literature findings outlined in the previous section, and on the conceptual framework developed by Lopes and Videira (2013), we developed an approach to engage stakeholders in a process of ES value articulation. The cornerstone of the process is a participatory workshop where different ES value dimensions are discussed and articulated based on multi-criteria principles (Munda, 2004; Gamper and Turcanu, 2015).

Fig. 1 summarizes the key tasks and methods envisaged in the proposed methodology, depicting the connections between activities of the “value articulation” stage and the information that supports them collected in preparatory stages.

As observed in Fig. 1, the value articulation process starts with the

framing of the decision problem. This task is informed by two supporting stages designated as “set the scene” and “deepen understanding” (see Lopes and Videira, 2016, 2017). In the “set the scene” stage, stakeholders are asked to identify the main ES provided by the study area and their perceived importance (Lopes and Videira, 2016). In the “deepen understanding” stage, through a participatory systems mapping process, stakeholders are engaged in the mapping of critical variables and their causal links underpinning ecosystem functioning (Lopes and Videira, 2017). With the information gathered in these two stages, relevant decisions where ES values need to be articulated may be selected with a contribution from local managers and other stakeholders. Once the decision problem is framed and alternatives are defined, participants are asked to identify which ES are affected by those alternatives (Task 2). Task 2 then leads to the construction of a matrix where effects of each alternative are assessed in relation to each ES identified by participants (Matrix 1).

Task 3 aims to support the analysis of effects of each alternative on multiple evaluation criteria. The identification of these criteria is supported by information produced in the “deepen understanding” stage. For example, we have previously tested a participatory systems mapping approach that captured the interdependencies and feedback structures underpinning ecosystem functioning in the ANP (Lopes and Videira, 2017). These causal models included variables which were translated into ES indicators that support the definition of ecological, economic and social evaluation criteria to consider in Task 3. A second matrix (Matrix 2) is then constructed. Participants choose criteria (e.g., using different coloured cards to distinguish economic, social and ecological criteria) against which each alternative is scored, quantitatively or qualitatively, for example, with respect to direction of change induced by alternatives on each criteria (e.g., increase, decrease, maintain or indifferent, and higher and lower decrease or increase).

At the end of this process, decision-making may be better informed by an integrated process where different values of ES are articulated for the decision context, supported by previous stages of information collection. Engagement of relevant stakeholders may continue during follow-up and monitoring stages, after the decision (e.g., a selected alternative) is implemented.

The value articulation tasks proposed in Fig. 1 may be conducted in a participatory workshop, to which interested parties affecting or affected by the decision at stake are invited. Supplementary material provides a detailed script supporting the activities to be conducted in this value articulation workshop, including the role of participants and the research team, as well as the methods and materials needed for each task.

3. Results

3.1. Case study

The ANP case study area was used previously for testing a participatory ES scoping and systems mapping process (Lopes and Videira, 2015, 2016, 2017). From those previous experiences, it was found that stakeholders give high importance to provisioning and cultural services. A set of meetings with the park management team was organized in order to select the decision-making processes to which the proposed approach would be applied. Two prominent decisions surfaced regarding a pressing environmental conflict: expansion of the vineyards land-use category in the park, and comparison of project alternatives for regulating access to protected beaches and recreational activities. These meetings also allowed to capture park managers’ perceptions on the relevant alternatives to assess during the process.

A participatory workshop took place in April 2016 at Casa da Baía, Setúbal gathering fourteen participants from different backgrounds and representing different stakeholder groups: public administration (nine participants), research institutions (one participant) and local businesses (four participants). These participants were selected based on a

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