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Analysis

Ecosystem Service Arguments Enhance Public Support for Environmental Protection - But Beware of the Numbers!

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ABSTRACT

The trend in the discourse around environmental protection towards arguments based on ecosystem services and monetary valuation has prompted considerable controversy among academics and practitioners concerned with conservation. This paper informs the debate by exploring which arguments are most effective in garnering support for environmental protection. In a survey-based online experiment, participants stated their level of (dis)approval of a large-scale hydropower dam project after being presented with various kinds of arguments and information about the environmental impacts. The results show that ecosystem service arguments reduced levels of approval of the dam significantly (i.e. they increased support for environmental protection). However, moral-ecological arguments for protecting the environment proved even more effective, while a combination of both types of arguments reduced the dam approval ratings the most. Including a cost-benefit analysis (CBA) with monetary valuation of the costs of losing ecosystem services altered dam approval upwards or downwards, depending on the outcome of the CBA. The approval rates of males, of older participants and of politically right-wing participants were particularly sensitive to the outcomes of monetary valuation. More research is needed to understand the short and long term influence of different environmental discourses on peoples' judgments and levels of environmental concern.

1. Introduction

All over the world, proposals for new infrastructure projects, agricultural expansion or resource extraction often prompt fierce public debate, reflecting a major global challenge of striking a balance between economic progress and protecting the natural environment (Krausmann et al., 2009; Rockström et al., 2009). Is it desirable, for example, to build a dam that provides electricity to millions but involves flooding a natural ecosystem? In view of these struggles, governmental agencies and non-governmental environmental organizations are keen to understand the factors that shape public concern for environmental protection in order, among other things, to develop effective awareness-raising campaigns (see, e.g., EC, 2008, Crompton and Kasser, 2009).

Since at least the early 20th century, various justifications for environmental protection have been brought forward (Blandin, 2009). In the public discourse, arguments based on a duty to preserve species and natural ecosystems, grounded in a recognition of their intrinsic value,[1] dominated for a long time. More recently, arguments emphasizing the ways nature renders 'ecosystem service' benefits to human well-being have taken over (De Groot et al., 2002; Norgaard, 2010; Mace, 2014; Kareiva, 2014). The ecosystem service discourse is supported by a rapidly growing body of research that focuses on better understanding the processes by which nature has value for human well-being, including carbon sequestration, flood protection, sediment reduction, pollination, and tourism (Doak et al., 2014). An ecosystem service approach to evaluating and communicating environmental impacts can be operationalized in many ways. For instance, relevant ecosystem services may be evaluated and communicated in qualitative - or at least non-monetary - terms, potentially supported by quantitative biophysical measures such as the carbon balance, trends in the loss of pollinators, or hydrological data (Christie et al., 2012). Recent methodological

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[1] For want of more precise nomenclature, such arguments will be referred to in the following as "moral-ecological" arguments.

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advances include numerous participatory assessment approaches and tools to better integrate the social and cultural values of biodiversity (Chan et al., 2012; Scholte et al., 2015). Despite these advances, practical applications that focus on ecosystem service arguments typically involve a monetary valuation of the costs and benefits from changing ecosystem services (Balmford et al., 2002; TEEB, 2010; Marvier, 2014; Costanza et al., 2014) and promote the inclusion of these monetary values within an 'environment-inclusive' cost-benefit analysis[2] (CBA). CBA has a long tradition as a decision support tool for the evaluation of environmental impacts, in particular in the US (Arrow et al., 1996; Pearce et al., 2006), although its use has always been controversial (Hanley and Spash, 1993). In spite of significant advances in methods and tools to calculate the monetary values of ecosystem services (Fisher et al., 2008; Christie et al., 2012), a range of concerns remain about the philosophical foundations of CBA and ecosystem service valuation, and about their methodological limitations and shortcomings (Wegner and Pascual, 2011, Jax et al., 2013).

The trend towards an environmental discourse based on ecosystem service arguments has led to controversy not only in academic circles but also in the realm of environmental policy making and among NGOs. Various critiques of the ecosystem service approach have been formulated including, for example, a rejection of its anthropocentric and instrumental view of nature conservation on philosophical and ideological grounds (O'Neill, 2001; The Economist, 2002; McCauley, 2006; Spash, 2008; Redford and Adams, 2009; Soule, 2013; Kareiva, 2014; Fisher and Brown, 2014). The debate also encompasses diverse views about the effectiveness of such an approach in heightening public concern, which is the focus of this paper. Proponents of the ecosystem service approach argue that "broadening the message to include benefits for people will not lose those who value nature for its own sake but will gain additional supporters" (Marvier and Wong, 2012). Further, Costanza et al. (2014) write that "[monetary valuation] can help to raise awareness of the importance of ecosystem services to society and serve as a powerful and essential communication tool". Opponents of the ecosystem service approach, on the other hand, argue that "protection of the environment is best served by […] defending environmental goals in terms of established ethical, aesthetic, political and scientific standards" (O'Neill, 2001), even fearing that "economic arguments about services valued by humans will overwrite and outweigh noneconomic justifications for conservation" (Redford and Adams, 2009) and that "monetary valuation's framing and crowding effects can decrease (demand and support for) environmental protection" (Neuteleers and Engelen, 2015). It has been pointed out, however, that these arguments require more empirical evidence (Skroch and Lopez-Hoffman, 2010; Adams and Redford, 2010).

It is indeed possible that arguing for the importance of environmental protection in terms of ecosystem services rather than moral duties and intrinsic ecological value might not be as effective in altering public opinion. Ample evidence from literature in psychology and linguistics suggests that the frame in which a message is presented matters for opinion formation and decision making in the context of environmental protection (Tversky and Kahneman, 1981; Liberman et al., 2004; Hsee and Rottenstreich, 2004; Lakoff, 2010; Satterfield et al., 2000). Experimental studies have shown that framing environmental conservation in moral terms can be more effective than doing so in terms of monetary self-interest if the aim is to increase personal pro-environment behaviour, such as recycling (Evans et al., 2013), checking tyre pressure (Bolderdijk et al., 2013), and saving energy (Steinhorst et al., 2015). Other studies have investigated the drivers of public support for climate change policies (Drews and van den Bergh, 2015; Bain et al., 2016). Bernauer and McGrath (2016) suggest that arguments based on "co-benefits" (economic, health) do not fare any better in enhancing support compared to justifications based on "direct climate risks". Thus far, little empirical work has been done on the influence of the type of discourse on public concern for the natural environment. Marvier and Wong (2012) present data from two national surveys in the US that asked participants to state their preferences among different arguments for nature conservation. The population was evenly divided between favouring arguments based on the intrinsic value of nature and arguments based on ecosystem services. Crompton et al. (2014) find that intrinsic primes focusing on people's inherent appreciation of nature fared better than economic primes in prompting intentions to offer non-financial support to a nature conservation organization, but that these did not increase intentions to offer financial support. Further empirical evaluation of the effectiveness of different arguments has hitherto been lacking.

This paper presents the results of a survey-embedded experimental study that provides a controlled testing ground. We use the case of a hydropower project in the Amazon to explore the effects of a discourse using ecosystem service arguments on people's level of support for environmental protection, and how they compare to presenting moral-ecological arguments. We test the effect of a qualitative presentation of the ecosystem services affected by dam construction on people's support for building the dam versus support for environmental protection. At the same time, we investigate people's sensitivity to including a monetary valuation of ecosystem services within a CBA.

2. Method and Materials

2.1. Test Case

We used the Bala hydropower project in the Bolivian Amazon as a decision context to empirically assess the effectiveness of different arguments in shaping people's support for environmental protection. The Bala dam construction has been considered several times since the 1990s, recently being spurred on by Brazilian demand for energy imports. In 2016 discussions about the Bala dam are ongoing. In the survey, participants indicated their (dis)approval of the dam project after exposure to different types of arguments for environmental protection. The participants were not from Latin America, so they did not have a personal stake in the specific decision context. It is true that public opinion expressed within the same jurisdiction as the project concerned is usually decisive in influencing policy decisions. Personal stakes can complicate the analysis, however: they may generate strategic responses or self-serving biases (Babcock and Loewenstein, 1997; Rode and Le Menestrel, 2011). In our attempt to set an empirical benchmark to investigate the effectiveness of environmental discourses, we chose to avoid a setting involving strong personal stakes.

2.2. Participants

The online survey was programmed in Qualtrics (www.qualtrics.com) and participants were recruited via the Prolific Academic platform (www.prolific.ac, a service providing online participant recruitment for academic studies). A screening filter ensured they were at least 16 years old and had high English language proficiency. In line with the procedures of the recruiting platform, participants were told in advance that they would receive a lump sum payment of GBP 4.00 for an average duration of 45 min. A total of 383 participants finished the study, but the data of six participants were excluded from the analysis because they finished the study in an unrealistically fast time or provided clearly inconsistent and nonsensical answers. The remaining 377 participants were between the ages of 17 and 72 (mean 31.3); 200 (53%) were male and 177 (47%) female. They had over 20 different nationalities, but the vast majority was from the UK (193) and the US (91).

[2] In the following, "environment-inclusive cost-benefit analysis" will be used to designate a CBA that takes account of the monetary value of ecosystem services.