



Ecosystem valuation: Changing discourse in a time of climate change

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ABSTRACT

Alternative ecosystem valuation methodology can inform policy choices to better reflect local needs, improve living standards and facilitate more effective climate change adaptation strategies. In the context of the South Pacific Island Countries and their reliance on marine resources, this paper outlines the urgent need for exploring alternative ecosystem valuation methodology. The objective behind alternative ecosystem valuation methodology is to enable a more comprehensive identification and elicitation of the various types of ecosystem values. This paper demonstrates how the commonly adopted monetary approach to conducting ecosystem valuation impedes the exploration of climate change adaptation strategies based on non-monetary aspects. These include value-indicators such as time, labour, geographical distance and collective community efforts along with social value, e.g. community incentives to protect and sustain local ecosystems. The paper compares and contrasts various combinations of ecosystem valuation methods that can enable social and non-monetary valuation of ecosystems in low-income settings that reflect social norms and cultural value systems. The paper concludes with a discussion of how alternative ecosystem valuation methodology can enable new pathways towards climate change adaptation and the improvement of living standards that would be particularly suitable for low-income settings where natural resources are vulnerable and financial resources scarce.

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1. Introduction

As a global community, we face a tremendous challenge: to adapt to climate change in a time where natural environments are degrading at an alarming rate and where the exact extent of these implications remains uncertain (Bell et al., 2011; Liu et al., 2010; Jacobs et al., 2016; Pecl et al., 2017). This challenge is particularly pronounced in South Pacific Island Countries (SPICs) where the effects of climate change are expected to be severe and where the financial resources for adapting to these changes are scarce (Gonzalez et al., 2017; Moberg and Folke, 1999). An important aspect of ecosystem valuation is improving our understanding of the benefits that ecosystems provide to human societies (Arias-Arevalo et al., 2017; Costanza et al., 1997; Kenter et al., 2015; Pascual et al., 2010; de Groot et al., 2012). Local ecosystem valuation serves as an important insight into how local communities value their surrounding ecosystems, which can inform policy decisions and help design ecosystem and adaptation programs based on people's willingness-to-pay (WTP). Given the scarcity of financial resources in many of the SPICs, the WTP in monetary terms for preservation and adaptation programs is likely to be low, despite high reliance on ecosystems for sustaining livelihoods in most communities. However, individuals in these communities may be able to express their WTP in other units of wealth, e.g. time, food, etc. That is, the total incomes received through the direct use of natural resources may be high even though the monetary incomes are low. Alternative approaches to conducting ecosystem valuation are, therefore, especially important in the SPICs. Too often, the economic contribution of marine-based ecosystems is under-valued due to socio-economic and cultural aspects that differ substantially from Western societies, making it difficult to communicate the value of ecosystems in monetary terms (Gonzalez et al., 2017). First, monetary valuation mechanisms are often inappropriate for eliciting ecosystem value in the SPICs due to the low monetary income-levels. Second, decisions in the SPICs communities are commonly based on group discussions and local community well-being, rather than on individual benefits, which makes the individual utility approach unsuitable (Alam, 2006; Cvitanovic et al., 2016; Christie et al., 2012; Gonzalez et al., 2017; Kenter et al., 2011). Non-monetary valuation – and the social valuation – of ecosystems may offer a more inclusive approach for assessing and understanding the values that ecosystems provide for human well-being (Kenter et al., 2015). The 'social value of ecosystems' broadly refers to the non-use values that are commonly derived through a social or group setting, e.g. cultural, educational, religious, spiritual values of ecosystems (Christie et al., 2012; Bryan et al., 2011). Kenter et al. (2015) defines social values as the values or norms that are shared within a particular community or group of people, without specifically distinguishing social value from economic value. Although social values may also include monetary values in particular contexts (e.g. social WTP), Christie et al., 2012; Bryan et al., 2011 maintain that the social value of ecosystems present a much broader 'umbrella' of values than economic values. Therefore, social value has previously been challenging to elicit, as it commonly requires non-monetary approaches with no specific units of measurement. These include (i) deliberative approaches, such as group-discussions or opinion polls; or (ii) analytical-deliberative approaches, such as participatory modelling, multi-criteria analysis, or deliberative (group) monetary valuation (Kenter et al., 2015). Alternative ecosystem

valuation methodology may enable an identification of a broader set of climate change adaptation (CCA) strategies for communities that lack financial resources but possess tremendous natural capital along with incentives to act, e.g. for island countries that will be severely affected by climate change. Although a wealth of literature on the economic value of ecosystems has been produced a considerable gap remains in terms of supporting environmental decision-making and creating methods that are transparent, practical and feasible, and that lead to tangible environmental improvements (Olander et al., 2017; Kenter et al., 2015; Braat and de Groot, 2012). In addition, Van den Belt and Stevens, (2016) conducted a qualitative discourse analysis of the most cited articles in the journal *Ecosystem Services* in the first four years of the journal, and identified the need for forming valuation methodology that incorporates the needs of low-income societies and future generations as one of several research gaps in the ecosystem services literature.

In the context of the marine systems in the South Pacific, this paper proposes an expansion of ecosystem valuation methodology by means of combining non-monetary aspects of ecosystem values with the elicitation of the social value of ecosystems. The opportunities for expanding the mainstream valuation methodology from a monetary and individualistic focus to more inclusive means of assessing ecosystem values are tremendous. However, this paper specifically concentrates on the opportunities for eliciting ecosystem value in non-monetary terms in the SPICs, due to their low-income levels. In addition, this paper adopts a social focus on value elicitation, as opposed to the individual utility approach, due to the high compatibility with the cultural and social settings of many SPICs. While "integrated valuation allows for the ecological, socio-cultural and economic values of an ecosystem to be identified" (Villegas-Palacio et al., 2016, p. 297), this review focuses exclusively on the non-monetary and social valuation of ecosystem services in relation to the value of ecosystems in the SPICs. Therefore, studies that explore other aspects of integrated valuation, e.g. monetary valuation and/or individual utility, have not been included as these are outside the scope of this review. The terms "integrated valuation" and "alternative valuation" are used interchangeably throughout the paper, and refer to valuation methodology that integrates different aspects of ecosystem value through new and alternative means.

This paper applies recent theory on integrated valuation and shared values in the concrete context of SPICs, and argues that alternative valuation methods are needed to elicit relevant values and improve decision-making, i.e. the values of ecosystems to communities that are not (necessarily) market-based. A literature review on ecosystem valuation methodology is conducted which is intended to encourage the exploration of new and alternative ways of valuing ecosystems. The aim of eliciting alternative values of vulnerable ecosystems is twofold: (i) to enable a more inclusive elicitation of ecosystem values in low-income societies that reflect cultural values and social norms, and (ii) to explore the opportunities for forming CCA strategies, conservation programs and sustainability management based on the values and aspirations of communities with low or nil WTP. First, the paper reviews the various objectives of investigating the value of ecosystems in terms of their economic contribution, with specific focus on monetary value. Second, a discussion of the merits and shortcomings of the mainstream techniques in non-market valuation (NMV) methodology is discussed. Third, the paper evaluates the

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