Review

# Use of ecosystem services economic valuation for decision making: Questioning a literature blindspot

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## ABSTRACT

Ecosystem Services economic Valuation (ESV) is often seen as a tool that can potentially enhance our collective choices regarding ecosystem services as it factors in the costs and benefits of their degradation. Yet, to achieve this, the social processes leading to decisions need to use ESV effectively. This makes it necessary to understand if and how ESV is or is not used by decision-makers. However, there appears to be a literature blindspot as to the issue of the Use of Ecosystem Services economic Valuation (UESV). This paper proposes a systematic review on UESV in peer-reviewed scientific literature. It shows that this literature gives little attention to this issue and rarely reports cases where ESV has been put to actual use, even though such use is frequently referred to as founding the goal and justification of ESV. The review identifies three categories of potential UESV: decisive, technical and informative, which are usually mentioned as prospects for the valuations published. Two sets of hypotheses are examined to explain this result: either the use of ESV is a common practice, but is absent from the literature reviewed here; or the use of ESV is effectively rare. These hypotheses are discussed and open up further avenues of research which should make the actual use of ESV their core concern.

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## 1. Introduction

High hopes have been placed on economic valuations to influence policy for coping with the accelerating degradation of ecosystem services and biodiversity (NRC, 2005). This was reaffirmed by the release of *The Economics of Ecosystems and Biodiversity* (TEEB) report, during the Tenth Conference of the Parties (COP) to the Convention on Biological Diversity in Nagoya in 2010: economic valuation is expected to serve as a governance resource that could change our individual and collective choices. The COP report itself[5] recognizes economic valuation as a key tool for a more effective mainstreaming of biodiversity. In many publications (e.g. Randall, 1988; Daily et al., 2009) the 'measurement' of monetary values that reflect the social importance of ecosystem services is seen as a prerequisite for better management decisions. Heated debates have been ongoing for many years. In 1997, ecologists Myers and Reichert (1997) made the diagnosis that 'we don't protect what we don't value'. In 2008 the TEEB Interim Report argued that 'you cannot manage what you do not measure' (p. 8). On the contrary, economist Heal stated: 'Valuation is neither necessary nor sufficient for conservation. We conserve much that we do not value, and do not conserve much that we value' (Heal, 2000). Vatn and Bromley (1994) made a similar assertion, claiming that 'valuing (or pricing) of environmental goods and services is neither necessary nor sufficient for coherent and consistent choices about the environment'. Balmford et al. (2011) even made it a positive statement: '[T]here is validity in calling for societal choices, especially in the domain of environmental decision-making, to be made without recourse to valuation or with the results of a cost-benefit analysis being a single component in a larger body of evidence'. Though the debate is obviously still lively today, it is also undeniable that international talks and publications now often promote ESV (Ecosystem Services economic Valuation) as a tool susceptible to make key contributions to biodiversity and ecosystem services protection. Questioning the supposed pragmatism of ESV, while standing clear from ideological statements, is the overall objective of this paper.

Ecosystem Services economic Valuation (ESV) methods have been the subject of a large and fast-growing literature since the beginning of the 1990s (e.g. Adamowicz, 2004; Eftec, 2005; SCBD, 2007; Liu et al., 2010). Yet, economic valuation is in any case not sufficient in itself: if it is to be more than just an intellectual exercise it needs to be considered as a resource for policies and projects design, as it has been acknowledged for a long time (Pearce and Barde, 1991; Pearce and Moran, 1994). The hope that it will become an efficient political lever to alleviate biodiversity and ecosystem services erosion supposes above all that it actually be used for decision-making (OECD, 2002).

For this reason, one of the key issues relating to the development of ESVs is understanding if and how they are used, or expected to be used. Fisher et al. (2008), Gowan et al. (2006), Navrud (in OECD, 2002), Pearce and Seccombe-Hett (2000) and Liu et al. (2010) have underlined the salience of this issue. Others have exposed pessimistic views on the use of cost benefit analysis for European environmental policy (Turner, 2007) or the World Bank (Warner, 2010). Navrud and Pruckner (1997) observe that Europe hardly ever uses ESV. Pearce and Seccombe-Hett (2000) deem that for green accounting indicators, 'while there has been a considerable international "push" for green accounts, it is not obvious that they have met the high expectations of their advocates' (p. 1423). OECD (2001) notes that 'although fairly common in the environmental economics literature, valuation techniques have remained somewhat peripheral to environmental policy-making on major issues' (p. 11). Turner et al. (2003) regret that the qualities required of economic studies for the purposes of informing decision-making are seldom found. The Secretariat of the Convention on Biological Diversity (SCBD, 2007) puts the paucity of ESV use down to its cost. Fisher et al. (2008) observe that 'the integration of ecosystem services analysis directly with agents and processes within decision-making arenas is largely absent' (p. 2063). Liu et al. (2010) point out with respect to technical guidance: 'Indeed, one would imagine that ESV, the process of assessing the benefits of environmental services, must have been applied widely to guide payments for ecosystem services. … In practice, however, ESV results have rarely been applied in setting payment amounts' (p. 2068). This analysis had been preceded by similar observations when Landell-Mills and Porras (2002) surveyed almost 200 PES mechanisms. More recently, Pirard and Billé (2010) reached a similar conclusion. Such observations by authors having discussed some dimensions of the UESV issue suggest at the very least that use is difficult to observe. In fact, there may well be a gap between the ambitions of ESV and its concrete achievements in terms of influencing decision-making.

However, most of the few previous studies on the UESV issue are recollections of their authors' experiences or theoretical expectations regarding UESV (e.g. Navrud and Pruckner, 1997; Pearce and Seccombe-Hett, 2000; Liu et al., 2010). Turner et al. (2003) state that they are performing a 'literature review' but give no indication of the list of references that were used or the reviewing methods employed. Furthermore, although they claim that their aim is to assess the 'policy relevance' of existing ESV, the key question of UESV is actually not addressed by the authors. The article mainly addresses ESV methods, with UESV being kept as a rather abstract horizon. To our knowledge, the article by Fisher et al. (2008) is the one which most closely tries to document UESV cases. After they identified 34 ESV case studies that seemed policy-relevant following their criteria, Fisher et al. contacted the authors with a list of questions such as 'Was the work commissioned by agents within the policy process?', 'Was this research used to influence a policy decision? If so, how?' or 'Was there any form of post-study implementation review or ex-post analysis undertaken?' (Fisher et al., 2008; supplementary material). The researchers received only 14 answers with contrasted perceptions on UESV and, to a large extent, no knowledge of any *ex post* UESV analysis.

This article hence intends to shed light on what we consider as a literature blindspot on UESV. It proposes a systematic review of how the peer-reviewed scientific literature addresses the question of UESV, driven by two questions: (i) What are the expected UESV? (ii) How is the UESV issue addressed by the literature? The extent to which results can be used as a proxy to measure the actual use of ESV is a subject of the ensuing discussion.

The focus of this article is on "ecosystem services economic valuation". It builds on the great interest the 'ecosystem services' concept generates among scientists working on environmental management in general and biodiversity conservation in particular. This follows seminal work by e.g. Daily (1997) and institutionalization with the 2005 Millennium Ecosystem Assessment (MEA, 2005) (Vihervaara et al., 2010). The MEA defined ecosystem services as the benefits people obtain from ecosystems, including provisioning, regulating, cultural and supporting services. The 'ecosystem services' concept clearly draws on a utilitarian approach and facilitates the development of economic valuations in the field of biodiversity conservation. Economic valuation is understood here as a process by which economic analysis is used to allocate a monetary figure to a given entity − hence no difference is made with monetary valuation. Nevertheless, while focussing on ESV, we do allow ourselves to look at literature dedicated to other environmental subjects of economic valuation as deemed relevant for our analysis. It is all the more necessary as many economic valuations regarding similar objects (e.g. nature, species, environment, biodiversity) have been undertaken and discussed before the ecosystem services concept was introduced and mainstreamed.

After a presentation of the material and methods in Section 2, Section 3 on results first provides a synthetic typology of expected uses of ESV (or categories of UESV, namely: decisive, technical and informative), and then analyses how peer-reviewed scientific literature addresses the use issue. Section 4 discusses two sets of hypotheses to explain the literature patterns observed in Section 3, and proposes associated research avenues. Section 5 concludes.

## 2. Material and methods

### 2.1. Structure of the study

A systematic review was performed in order to analyse how UESV is envisaged and addressed in the dedicated literature. There are many terms and no actual consensus (e.g. Hunt, 1997; Cooper and Hedges, 2009) to refer to the process of research synthesis, i.e. the 'attempt to integrate empirical research for the purpose of creating generalizations' (Cooper and Hedges, 2009). The term *systematic review* is used to highlight that, compared to a *standard review* (on our topic, e.g. Turner et al., 2003), it is a process through which one methodically chooses a sample of works, extracts the targeted information and reports the results with transparency on the methods that were used at each step (Hunt, 1997).

Three major analytical steps were followed in this study. The choices made in the design of each step are justified in the subsections below. Step 1 was designed to build a database of peer-reviewed scientific publications to analyse. In Step 2, based on the information found in the publications within our database complemented by some grey literature references, a typology of UESV categories was built. It provided an answer to the study's first question: What are the expected UESV that can be found in the literature? In Step 3 the most influential journal in the ESV sub-area was identified and served as a proxy to observe patterns in the way