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Concerns about the use of ecosystem services as a tool for nature conservation: From misleading concepts to providing a "price" for nature, but not a "value"

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ABSTRACT

1. By definition, ecosystem services (ES) are the "benefits that people obtain from ecosystems", and this paradigm has been increasingly used in recent decades in ecological planning, for policy development and environmental management.
2. In this short commentary, we highlight the main criticisms suggested by several scientists against the currently used and abused ecosystem services (ES) approach.
3. We underline how this concept needs a more accurate scientific assessment and theoretical development, repeating that one of the most critical concerns is that this paradigm assigns a "price", but not a "value" to nature.
4. We also discuss different theoretical concerns, as for example the replacement of natural "resource" by "service" promoted by the ES paradigm thereby changing the implications of such assessments. Conserving resources is essential for survival of several organisms, while conservation of a "service" is mainly related to the human species.
5. Finally, we warn against the mechanism of 'crowding out' behind the ES approach, which replaces intrinsic motivations (nature) against extrinsic ones (benefits), highlighting that people do not need to attach different values to ecosystems (monetary, cultural, aesthetic, etc.) to understand the value of nature.

KEYWORDS

INTRODUCTION

An operational definition of ecosystem services (ES) is the multitude of ways in which humans benefit from ecosystems (Millennium Ecosystem Assessment 2005). The concept of ES has been increasingly used in recent decades, including the launch of a new journal, 'Ecosystem Services', which specifically addresses this topic. The ES concept was created to provide a bridging communication platform between various stakeholders about the sustainability of the social–ecological systems. Indeed, many important social actors, including scientists, politicians, economists, corporate representatives, nature conservationists and farmers, could potentially find a common language for communication using the ES concept (Seppelt et al. 2011). However, the concept of ES is problematic and in need of a deep and accurate scientific assessment and theoretical development (Currie 2011). A summary of the main controversies surrounding the ES concept is provided by Schröter et al. (2014) and Barnaud and Antona (2014) and includes too much focus on anthropocentric perspectives, vagueness of definitions or classifications promoting the view that nature is just another commodity.

The ES approach is often used in decision-making for the sustainable use of natural resources (NR) to improve human well-being (MEA 2005; Bennett et al. 2015), and theoretically, it is expected that the ES concept promotes the formation of meaningful links between people and nature. Here we discuss how the current framework is still far from being suitable in order to guarantee nature conservation. We consider that one of the most critical concerns about the ES approach is its promotion of a 'price' for ecosystems, not a 'value'. This simple exchange of words, confusing a value with the monetisation of a service, causes a deep conceptual fracture, already noted during the first decades after the advent of this approach (Norgaard 2010). The combination of this problem and other conceptual frailties, as well as their dominant functional interpretation (Steg and De Groot 2015), opens the scenario for im-

portant criticisms. For four reasons, it is necessary to clarify the main issues related to this misunderstanding. First, to assign a price to an object is not necessarily a way to assess its intrinsic value. The science of economy has a long history explaining how a 'price' is a totally arbitrary measure that depends on a calculated or perceived balance between the investments and costs and monetary returns after specific actions, while the social demand at a given time being important in influencing the real inherent value of the object/service (Black et al. 2012). To add imprecision to this definition, the money used to establish the 'price' of an object/service is also subject to strong variation in purchasing power more or less independently of the demand for the object/service in question. A more accurate valuation of any ecosystem or ecosystem function should not be based necessarily on the economically established 'price' or benefits provided to humans. For example, the attempt to explain the importance of 'ecosystem service A' across the effects (direct or indirect) on human well-being is formally incorrect: If we find an alternative way to satisfy the same human demand, does this mean that 'ecosystem service A' lost its value? Some authors are exploring these situations using concepts as ES mismatches between supply and demand (Baró et al. 2015).

This strategy can constitute a biased logic: The attempt to give a value to something by means of a price hides the intrinsic value of the object. The thing has a value only in relation to other things. This approach could be a good example of levelling down: Using money to clarify an ecological concept could be a double-edged sword. Furthermore, if several authors can argue that ES are mainly a convincing argument, a tool concept to persuade policy makers, we believe that this approach could leave the wrong suggestion that ecosystems are replaceable or, if destroyed, get paid. Using a recognised sentence, considering that it is immoral to attribute a price to a human life (even if all human functions and organs can be measured and quantified), in the same way, ecosystems have an intrinsic value not subject to a price. Each ecosystem has the same value, independently of the ES provided. If we examine another example, whilst buffer zones (or ecotones) normally have lower values than core areas in terms of ES, in the natural balance of environments, both are equally important areas for conservation (Hawes et al. 2008).

Last but not least, the payment approaches derived from ES strategies, which have as their end goal to assign a value to everything living, are based on a willing buyer–willing seller model. As explained by Ferraro and Kiss (2002), sellers deliver conservation outcomes in exchange for a negotiated payment in cash or in kind. However, direct payment approaches may displace biodiversity loss to other areas, may be misappropriated or misused and may create social conflict, as well as result in insufficient protection of overall biodiversity.

Second, whilst the ecosystems involved in quantification of NR are relatively easily studied, it is clear how each ecosystem can contribute to the provisioning of different natural resources. Under the ES approach, this simple procedure becomes more problematic. By definition, NR are represented by natural elements such as a forest, a mineral deposit or freshwater, which is found in nature and is useful for humans (Worthington 1964). In contrast, ES are by definition the benefits that people obtain from ecosystems (Millennium Ecosystem Assessment 2005). The translation of 'resource' (NR paradigm) to 'service' (ES paradigm) completely changed the nature of such assessments. The first lesson that we learn from the NR paradigm is that conserving resources is essential for survival of humans and other organisms alike. The equivalent, under the ES paradigm, goes like this: Conserving ES is essential for saving money and securing the well-being of humans. The implications of each of these two concepts are clearly different.

Third, some of the confusion about ES arises from the fact that not only humans but also domestic animals and plants consume resources that would otherwise be exploited by wild free-living organisms. There is even the possibility of biotic interspecific interactions between wild organisms and domestic animals. Surprisingly, such a distinction between effects of interactions is apparently absent from all studies of ES.

Finally, the combination between natural ecosystems (or resources) (forest, carbon storage, water, pollination, etc.) and anthropogenic ones (farmland, livestock, etc.) and even cultural ones (recreation) promoted by the ES approach makes it hard to handle these totally different quantities. For example, a topic intensely investigated in recent years is the possibility to map areas with all ES or ES bundles working in synergy, maximising the overall values of all ES, to establish hotspots or win–win areas (Egoh et al. 2009; Rodríguez-Loinaz et al. 2015). Several studies have failed to show an overall spatial congruence amongst all ES or different ES bundles in nature (Raudsepp-Hearne et al. 2010; Qiu and Turner 2013;). Somehow this congruence should be an ecological non-sense (areas where forest ESs increase have farmland-related ESs that simultaneously decrease!), more and more studies have focused on finding this 'holy grail' of multifunctional ESs. Likewise, the idea to relate economic valuation of ES with more solid concepts such as biodiversity measures has failed the attempt to capture any congruent pattern (Carrasco et al., 2014). We emphasise the necessity of further developments to study mismatch and congruence between ES bundles and biodiversity, in order to make clear if biodiversity makes or does not necessarily functions, which in turn provides services: Thus 'biodiversity' is the intrinsic value of biodiversity.

From a more ecological point of view, the idea that ecosystems should be assessed mainly on the basis of the well-being provided to humans is partially lack of a sense. From some aspects, it looks like a jump into the past; in some frameworks, from the Middle Ages. Humans are part of nature, not the final actors, not the centre of the 'creation' and, for this reason, not the right measure to understand the value or the lack of value of each thing. Evolution must teach us how each species is equally important as any other, how each ecosystem is equally important as any other, of from the goods provided to a single dominant species. In short, each ecosystem is valuable in the balance of nature. No additional attributes are necessary

to assess that. Under the ES approach, people need to attach different values to ecosystems (monetary, cultural, aesthetic, etc.) to understand the value of nature. Here, we reiterate that the main challenge for science is to make people understand that the value of nature is nature. The take-home message is that we need to step back in order to make progress. Taking a lesson from the NR approach, the ES approach needs to evolve first of all by separating NR from anthropogenic production of biological material. Second, we have to learn that the primary need for human beings is not the well-being of species but conservation of the functioning of ecosystems to allow us to be able to survive as individuals. Any component of human well-being must be seen in the light of this assumption.

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