



Is the ecosystem service concept improving impact assessment? Evidence from recent international practice



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ARTICLE INFO

Article history:

Received 2 December 2013

Received in revised form 11 September 2014

Accepted 12 September 2014

Available online xxxx

Keywords:

Ecosystem services

Mining

Environmental and social performance standards

Biodiversity

Mitigation

Integration

ABSTRACT

Considering ecosystem services (ES) could foster innovation and improve environmental and social impact assessment (ESIA) practice, but is the potential being fulfilled? In order to investigate how ES have been treated in recent international practice, three questions are asked: (i) were the tasks of an ES analysis carried out? (ii) how is such analysis integrated with other analysis presented in the ESIA? (iii) does ES analysis result in additional or improved mitigation or enhancement measures? These research questions were unfolded into 15 auxiliary questions for reviewing five ESIA reports prepared for mining, hydroelectric and transportation infrastructure projects in Africa, Asia and South America. All cases incorporated ES into ESIA to meet a requirement of the International Finance Corporation's Performance Standards on Environmental and Social Sustainability. It was found that: (i) in only three cases most tasks recommended by current guidance were adopted (ii) all reports feature a dedicated ES chapter or section, but in three of them no evidence was found that the ES analysis was integrated within impact assessment (iii) in the two ESIA's that followed guidance, ES analysis resulted in specific mitigation measures. Few evidence was found that the ES concept is improving current ESIA practice. Key challenges are: (i) integrating ES analysis in such a way that it does not duplicate other analysis; (ii) adequately characterizing the beneficiaries of ES; and (iii) quantifying ES supply for impact prediction.

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Introduction

The benefits that society obtains from ecosystems have been called ecosystem services (ES). A conceptual innovation aiming at improving the understanding of the relationship between ecosystems and human well-being, it can be applied to a number of decision-making contexts and tools, including environmental impact assessment (EIA).

Applying the ecosystem services concept to EIA is a path to strengthen theory (Slootweg et al., 2010) and to improve practice (Landsberg et al., 2011), as it has a potential to overcome perceived shortcomings of the conventional approach for EIA (Baker et al., 2013; Honrado et al., 2013; Karjalainen et al., 2013).

Considering ecosystem services in environmental and social impact assessment (ESIA) is now required by the Performance Standards on Environmental and Social Sustainability (PS) of the International Finance Corporation (IFC, 2012a). This requirement is aligned with the recommendations of the Convention on Biological Diversity (CBD, 2004) of employing an ecosystem approach to decision making, and the Millennium Ecosystem Assessment (MEA) report (Hassan et al., 2005), which concluded that 60 per cent of the ecosystem services evaluated are degraded or used to an unsustainably way.

One way of conceptualizing society-ecosystems relationships was proposed by de Groot (1992), who described the “functions of nature”, i.e. “the capacity of natural processes and components to provide goods and services that satisfy human needs, directly or indirectly”. While human needs and activities are dependent on goods and services provided by ecosystems, its activities affect the ecosystems, thus impairing their ability to deliver such goods and services. Managing these interactions is a focus of environmental decision making (de Groot, 1992).

The ecosystem approach to environmental management acknowledges the importance and intrinsic value of biodiversity, which is closely linked to the ecosystems' capacity of providing services to Humanity (Haines-Young and Postchin, 2010). The ecosystem approach recognizes the ES concept as a strategic argument to reach its main objectives, i.e. finding adequate ways to manage natural resources and promoting the conservation of biological diversity (CBD, 2004).

Environmental impact assessment, on the other hand, is one of the most important tools for sustainability-oriented decision-making (Morgan, 2012; Sánchez and Croal, 2012). Two Conferences of the Parties of the CBD (in 2002 and 2006) approved the voluntary guidelines on Biodiversity-Inclusive Impact Assessment that recommend the adoption of the ES concept for environmental assessment purposes.

This research aims at investigating how are ecosystem services being considered in impact assessment practice. Five cases of Environmental and Social Impact Assessments (ESIA) prepared to meet IFC's

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Performance Standards were reviewed in order to enquiry at the actual contribution of ES analysis to improve ESIA. Three aspects of practice were investigated: performing recommended tasks, integrating ES consideration to other analysis in ESIA, and recommending specific mitigation measures. Three questions were formulated to guide the research: (1) Were the tasks of an ES analysis carried out? (2) How is the ecosystem services analysis integrated with other analysis presented in the ESIA? (3) Does ecosystem service analysis result in additional or improved mitigation or enhancement measures?

Methods

In order to establish the need for a sampling strategy, a search of ESIA reports incorporating ecosystem services was done. As the requirements are recent, it was expected that only ESIA's finalized after 1 January 2012 (when the new PS came into force) would contain mentions to ecosystem services. Three approaches were used to identify such reports: (i) searching the IFC website for publicly available ESIA's; (ii) directly asking IFC officials about ESIA's that could have not yet been available in the website; (iii) performing an internet search using "ecosystem services", "environmental and social impact assessment", "ESIA" and "impact assessment" as key words. As only five cases were found, all ESIA reports were reviewed. The review was based on a simplified content analysis (Crano and Brewer, 2002) in order to locate mentions to ecosystem services in each ESIA report and then scrutinizing how are they treated, aiming at finding evidence to answer the three research questions. Only the documents were reviewed, i.e. the process of preparing the report and any changes in the levels of collaboration between specialists possibly associated with the application of the ES framework were not in the scope of the research.

Table 1
Research questions and categories for analysis.

Research question	Auxiliary questions and categories for analysis
1. Were the tasks of an ecosystem service analysis carried out?	Are affected ecosystems described in a dedicated ES chapter? Is there an identification of potentially affected ES? Are the beneficiaries of each ES described? Are the ES prioritized? Is an ES study area delineated? Is there a dedicated baseline for priority ES? Is there any form of ES impact prediction? Are the impacts on priority ES assessed? Are mitigation measures indicated?
2. How is ecosystem services analysis integrated with other analysis presented in the ESIA?	Which is the percentage of pages in the ESIA dedicated to ES? How many times information provided in other chapters is called upon in the ES chapter? Are there mentions to ES in other chapters? How many ES are impacted? Are these services assessed in the ES chapter or in other chapters (alongside other impacts)?
3. Does ecosystem services analysis result in additional or improved mitigation or enhancement measures?	Are there recommendations for mitigation or enhancement resulting from ES analysis? Are there recommendations or commitments in the environmental and social management plan that clearly result from the ecosystem services analysis?

The three questions that frame the research were unfolded into 15 auxiliary questions for analysis (Table 1).

The first research question aims at checking if the ESIA's performed the main tasks of an ES analysis, as recommended by currently available guidance (IFC, 2012b; Landsberg et al., 2011, 2013; Sloomweg et al., 2010). There is no rigidly prescribed way to address ES in ESIA, but guidance in convergent on a number of essential tasks that must be carried out. A list of essential tasks was compiled from these sources and evidence of compliance was collected through content analysis. The answers to this set of questions are binary (yes or no).

The second research question inquires about integration of ES analysis with other analysis. It flows from the standpoint that the usefulness of such analysis is dependent on how well it is integrated into the ESIA. Having observed that all ESIA reports featured either a chapter or a section dedicated to ES, cross-referencing in the reports was taken as a surrogate of integration, as quotations can be viewed as evidence that information or analysis presented under any heading are actually used in other chapters.

The third question looked at the mitigation measures resulting of ES analysis. This outcome is mentioned in the literature (Baker et al., 2013; Honrado et al., 2013; Landsberg et al., 2013) as one of the its most important contributions of ES for improving EIA practice. It can be observed that mitigation also appears as an item in the first research question, where its presence or absence is noted. However, in order to obtain evidence to answer to the third research question, a review of the contents of proposed mitigation measures was undertaken.

The conceptual background over which the three research questions were based is presented in the next section.

Ecosystem services in impact assessment

The IFC's Performance Standards on Environmental and Social Sustainability (IFC, 2012a) are applied to assess impacts and risks of development projects prior to making decisions about project or corporate financing. The Performance Standards are also employed by Equator Principles banks, an association of financial institutions, including export credit agencies, that voluntarily adopt these principles for "environmental and social risk management for project finance" (www.equator-principles.com). The adoption of the Performance Standards by the Equator banks enlarges their application to a big number of projects worldwide.

The 2012 version of the Performance Standards represents an improvement of the previous standards, launched in 2006 (IFC, 2006). The revision and update process was conducted in consultation with stakeholders and resulted in requirements that possibly exceed impact assessment provisions of many legislations worldwide.

The PS evolved from the World Bank Safeguard Policies, which in turn emerged in the early 1990s as a response to criticism from civil society organizations that multilateral banks and other donor agencies were not considering the environmental and social impacts in their lending decisions (Walsh, 1986). IFC, specializing in lending to the private sector, developed its own requirements, more suitable to private investment. Their first version came into force in 2006 and was revised considering the experience gained during the first years of application. In May 2011, the IFC Board approved the new version of the PS, disclosed their final version and set their application as starting in January 2012.

The 2006 version of the PS mentioned ES *en passant*, as aiming at avoiding or minimizing adverse impacts to biodiversity, "the assessment will take into account the differing values attached to biodiversity by specific stakeholders, as well as identify impacts on ecosystem services" (PS 6, paragraph 4).

In the 2012 update, the impacts on ES are required to be assessed explicitly by the ESIA, which should provide enough consideration, as appropriate (Table 2). ES are mentioned in three out of the eight PS, namely Assessment and Management of Environmental and Social Risks and Impacts (PS1), Community Health, Safety and Security (PS4)

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