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# Evaluating impacts of development and conservation projects using sustainability indicators: Opportunities and challenges

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ABSTRACT

There has been an increased interest in using sustainability indicators for evaluating the impacts of development and conservation projects. Past and recent experiences have shown that sustainability indicators can be powerful tools for measuring the outcomes of various interventions, when used appropriately and adequately. Currently, there is a range of methods for applying sustainability indicators for project impact evaluation at the environment–development interface. At the same time, a number of challenges persist which have implication for impact evaluation processes especially in developing countries. We highlight some key and recurrent challenges, using three cases from Kenya, Indonesia and Brazil.

In this study, we have conducted a comparative analysis across multiple projects from the three countries, which aimed to conserve biodiversity and improve livelihoods. The assessments of these projects were designed to evaluate their positive, negative, short-term, long term, direct and indirect impacts. We have identified a set of commonly used sustainability indicators to evaluate the projects and have discussed opportunities and challenges associated with their application. Our analysis shows that impact evaluation processes present good opportunities for applying sustainability indicators. On the other hand, we find that project proponents (e.g. managers, evaluators, donors/funders) face challenges with establishing full impacts of interventions and that these are rooted in monitoring and evaluation processes, lack of evidence-based impacts, difficulties of measuring certain outcomes and concerns over scale of a range of impacts.

We outline key lessons learnt from the multiple cases and propose ways to overcome common problems. Results from our analysis demonstrate practical experiences of applying sustainability indicators in developing countries context where there are different prevailing socio-economic, cultural and environmental conditions. The knowledge derived from this study may therefore be useful to a wider range of audience who are concerned with sustainable integration of development and environmental conservation.



## Introduction and background

Among the notable commitments made following the Rio Earth Summit of June 1992 was the formulation of a set of indicators to measure sustainable development (Agenda 21; UNCED, 1992). Since the Rio Summit, a range of sustainability indicators were formulated as a key approach to provide sustainability-related decision-making processes and have been widespread in the international development arena (Dahl, 2012; Mascarenhas et al., 2010; Moldan et al., 2012). They have become popularized among governments, non-governmental organizations, private sectors and the wider public where they are increasingly being used to explain how and why certain trends occur in specified contexts (Bell and Moorse, 2008). Since the Rio Summit, various definitions of what is sustainable and a range of approaches on how to measure sustainability have been published by different authors and promoted by various actors (Belanger et al., 2012; Bell and Moorse, 2008; Havlicek, 2012; McMahon et al., 2012; Moldan et al., 2012; Wang et al., 2012). There is no single universally accepted definition of sustainability and of its indicators and today, its concept remains elusive (e.g. Bell and Moorse, 2008; Moldan et al., 2012). This is because sustainability is context-dependent embracing different temporal and spatial scales and requiring clarity for specific "destinations" (e.g. sustainable for what?) or factual and scientific orientations (Bell and Moorse, 2008). With respect to sustainability indicators, in general, it is agreed that they should quantify characteristics or

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processes of the human–environmental systems in a simplified way in order to ensure their future continuity and functionality (Hak et al., 2007). This, in essence, means that sustainability intrinsically involves the maintenance or continuity of outcomes over time. For example, if a proposed sustainability indicator relates to a short-term gain (such as yield increase due to massive fertilizer input), it is bound to become redundant when the project exits and the treatment ceases. Despite their flaws, when carefully defined and applied appropriately, sustainability indicators can be powerful tools for evaluating and communicating complex phenomena (e.g. Bell and Moorse, 2008). Consequently, they can foster sustainable development through improved governance and decision-making (Bell and Moorse, 2008; Gilbert, 1996; Moreno-Pires and Fidélis, 2012; Rametsteiner et al., 2011).

Although the concept of sustainability has increasingly become popular among governmental, non-governmental organizations and the private sector (Bauler, 2012; Boyd and Charles, 2006; Dale et al., 2013; Fernández-Sánchez and Rodríguez-López, 2010; Gilbert, 1996; Milman and Short, 2008; Ragas et al., 1995; Rennings and Wiggering, 1997; Shaheen et al., 2011), it is in some cases misrepresented (Rametsteiner et al., 2011; Valentin and Spangenberg, 2000). Valentin and Spangenberg (2000) argue that sustainability is an ambitious policy target since it gives environmental, economic, social, and institutional dimension an equal importance. Such complexity poses challenges in the design of its indicators, for example, in the appraisal of research and development projects (e.g. Rametsteiner et al., 2011). Thus in practice, there are challenges in the use of sustainability indicators in research and development processes (Azar et al., 1996; Blancas et al., 2011; Dahl, 2012; Rapport and Hildén, 2013).

Sustainability indicators attempt to encapsulate complex and diverse processes in relatively few simple measures, while at the same time maximizing unique and relevant information. Subsequently, their selection is often subjective (Fricker, 1998) and there is no silver bullet solution that depicts the best choice of a given sustainability indicator (Bell and Moorse, 2008). The choice of a sustainability indicator therefore depends on multiple factors including scale, availability of resources, feasibility of measurement, time constraints and data availability (Azar et al., 1996; Bauler, 2012; Blancas et al., 2011; Boyd and Charles, 2006). Some crucial aspects to be assumed are temporal and spatial scales of assessment, for example, sustainable 'where' and for 'how long'. Besides, the choice of a sustainability indicator is context-dependent and it is often the project managers' decision to identify which ones best suit a given situation or setting based on defined selection criteria (Dale et al., 2013).

Sustainability indicators may be confused with traditional indicators which can be limited in scope and vision since they often fall short of covering sustainability issues (e.g. Adger and Florian, 1994; Dahl, 2012). Traditional socio-economic and environmental indicators, such as income per capita and amount of generated wastes are so generic that they at times fail to address important sustainability issues such as wealth distribution, equitable access to resources, living costs and behavioral dynamics of a given population (Adger and Florian, 1994). For example, rather than only quantifying solid wastes recycled by a company under traditional indicators, sustainability indicators would show the links between the amount of recycled product and its level of acceptance and subsequent use (e.g. the percentage of the recycled product that is actually being utilized by a given population). Similarly, a traditional economic indicator such as 'number of jobs created' offers little understanding of the resilience and flexibility of a job market, if subjected to economic change. In contrast, a sustainability indicator would focus on parameters such as income distribution, cost of operations, job diversity and required skills.

Sustainability indicators echo the reality of interconnections between economy, society and the environment and their influence on a given change that is to be measured (e.g. Azar et al., 1996; Bowen and Riley, 2003; Dahl, 2012; Fricker, 1998; Rametsteiner et al., 2011). For this reason, interest in the use of sustainability indicators for evaluating impacts of development interventions has increased due to their potential to improve project management (Fernández-Sánchez and Rodríguez-López, 2010). Indeed, impact evaluation is a powerful tool for assessing appropriateness and effectiveness of development interventions (Baker, 2000) and is a vital stage in any project cycle (e.g. Evans et al., 2009; Fernández-Sánchez and Rodríguez-López, 2010). In most cases, impact evaluation focuses on measuring actual effects of interventions and thus may put less emphasis on delivery and management processes (IFRCRCS, 2011). Since impact evaluation exercises involve the assessment of both positive and negative outcomes (e.g. Stem et al., 2005), sustainability indicators are necessary for this process. This is because sustainability indicators reflect the reality that development interventions can produce both intentional and unintentional outcomes. For instance, introducing a new crop/animal breed could lead to cultural erosion in a community and/or social exclusion for non-project beneficiaries.

Today, sustainability indicators are a key aspect of project management and are widely used to monitor and evaluate development interventions (Fernández-Sánchez and Rodríguez-López, 2010). They can help to assess project performance and provide important knowledge base and critical inputs for design of future programs (e.g. Grainger, 2012; Hezri, 2004; Rapport and Hildén, 2013; Ugwu and Haupt, 2007). On the other hand, applying sustainability indicators is technically complex, requiring robust methods which can fully embrace socio-economic, cultural, political and environmental determinants of changes brought by a particular intervention (Dale et al., 2013; Reed et al., 2006; Shen et al., 2011). No empirical work has been done to compare experiences of evaluating development and conservation projects using sustainability indicators, between Kenya, Indonesia and Brazil. This paper fills this gap and uses multiple cases drawn from these countries where different projects have been implemented to conserve biodiversity as well as improve socio-economic human well-being. Our core intention is to present experiences and lessons learnt from these projects by highlighting opportunities and challenges associated with application of sustainability indicators. We first present brief contexts of the three cases, followed by the methods used for the analysis. We then present key sustainability indicators that were used in the cases, their practical benefits and associated problems. Finally, we outline key lessons learnt, opportunities, challenges and key strategies for improving impact evaluation using sustainability indicators. We believe that our analysis will benefit a wide range of audience from academic readership, project managers, private sector, the public and others working at the development–environment interface.

## Study context

### *Case study 1: Mara River Basin (MRB), Kenya*

A conservation and development project was convened in the Mara River by an international NGO in the early 2000. With funding from multiple donors, the project set out to promote sustainable management of the trans-boundary Mara River (size: approximately 13,750 km$^2$; length: 395 km) which originates from Kenya (35%) and enters into Lake Victoria in Tanzania (65%). The Mara River Basin (MRB) ecosystem has a rich biodiversity which are of local, national and global importance. It supports valuable economic activities such as tourism, agriculture and mining in both Kenya and Tanzania (Lake Victoria Basin Commission and WWF ESARPO, 2010). Up to 80% of the population in the MRB is engaged with agricultural activities, yet poverty, hunger and malnutrition are prevalence affecting the majority of its inhabitants. Problems such as over-exploitation of natural resources, water scarcity, pollution, soil erosion, sedimentation and climate change have serious negative environmental and socio-economic impacts on the MRB.

The Mara River Basin Project (MRBP) was convened in response to these critical issues. With three phases running on a 3-year interval, the Project set out to promote good water quality, adequate water supplies and improved biodiversity across the MRB, using an integrated