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Greater than the sum of their parts: Exploring the environmental complementarity of state, private and community protected areas

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ABSTRACT

In a context of unprecedented environmental crisis, protected areas are expected to play a central role. Although considerable work has been done to understand the effectiveness of different types of protected area, there has been limited investigation of how a combination of different types of protected area within a system affects its overall environmental outcomes. Defining and using the concept of environmental complementarity, the paper explores whether or not the presence of private, state and community protected areas in a landscape has a positive effect on biodiversity conservation outcomes. Based on a Kenyan case study, it emphasizes the important and currently undervalued role of state protected areas and shows that other types of protected area can be analyzed as being a support. It suggests there is a complex array of complementarities between community, state and private protected areas. Differences in management capacity, staff skills, social acceptability, access to financial resources, tourism products, ecological resources, etc. between types of protected area were found to drive additionality and synergistic complementarities that undeniably contribute to strengthening the overall protected area system and increasing its resilience, as well as its capacity to generate environmental outcomes.

1. Introduction

The Millennium Ecosystem Assessment clearly demonstrated that all the Earth's ecosystems have now been dramatically transformed through human actions. The resulting biodiversity loss is undermining the provision of a wide range of ecosystem services on which humanity depends (MA, 2005). In this context of unprecedented crisis (IUCN, 2010), Protected Areas (PAs), which have long been the cornerstone of biodiversity conservation, are expected to play a central role

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(Bruner et al., 2004). According to IUCN, a protected area (PA) is "*a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural value*" (Dudley, 2008). Currently, some 14.6% of land and 9.7% of coastal waters are under some form of protection (UN, 2013). Protected areas are, however, not uniform. On the basis of ownership, three main categories of PAs may for example be differentiated: state PAs (SPAs) owned by government or its agencies, private PAs (PPAs) owned by individuals or companies with private land titles, and community PAs (CPAs) owned collectively by communities. In most large conservation landscapes, a mixture of state, private and community PAs exists, generally resulting from a complex series of events over decades.

Interestingly, although considerable work has been done to understand the effectiveness of these different types of PAs, it appears that there has been limited investigation of how a combination of different types of PAs within a system affects its overall environmental outcomes, and thus, how a PA network can be improved, using these different types of PAs as management tools.

No articles currently specifically define or discuss environmental complementarity between different types of PAs, or provide any methodologies for analyzing or measuring it but a number of related concepts exist.

For example, for Margules and Sakar (2007), complementarity is a central concept to systematic conservation planning. In this context, complementarity is understood as a measure of the extent to which an area contributes to adding unrepresented features to another area (Vane-Wright et al., 1991; Margules and Pressey, 2000). Thus, literature on systematic conservation planning mainly contributes to assessing the ecological complementarity between different sites rather than the complementarity between different types of PAs.

Complementarity between PA types is also indirectly touched on in the literature mainly to argue the case for one type of PA. For example, the role of CPAs in enhancing connectivity in the landscape by providing dispersal areas in fragmented landscapes is emphasized by White and Martin (2002) and Bhagwat and Rutte (2006) while Shahabuddin and Rao (2010) argue that CPAs enhance the effectiveness of SPAs by providing corridors allowing wildlife movements, and a buffer against extractive pressures. For Fitzsimons and Wescott (2008), PPAs enhance larger SPAs by providing linkages in the surrounding landscape in south-eastern Australia. In South Africa, Gallo et al. (2009) suggest that not only do private PAs increase the total area of land conserved, but the addition of private PAs to state PAs also nearly triples the number of conservation targets achieved. The literature also highlights that PAs complement each other by increasing the diversity of habitats and species protected. Fitzsimons and Wescott (2004) and Gallo et al. (2009) show that PPAs complement SPAs in the type of biomes/habitats represented. The role of CPAs in protecting key species is highlighted in research on sacred forests, which shows that these forests comprise species that are not found in the SPA systems in India (Bhagwat and Rutte, 2006), Tanzania (Mgumia and Oba, 2003) and Kenya (Kibet and Nyamweru, 2008). Finally, Western et al. (2009) hint at environmental complementarity when they point out that an estimated 65% of all wildlife is found outside SPAs. For Nelson (2012) PPAs and CPAs protect significant populations of highly endangered species including Grevy's zebra, wild dog, cheetah and elephants in Kenya.

The academic literature on complementarity was thus found to be limited and mostly focused on the ecological attributes of different PAs, and on achieving optimal biodiversity representation or coverage. However, few insights were found about the underlying factors that enable the delivery of these benefits. Consequently, the purpose of our study carried out over 18 months (2011–2013) was to fill this knowledge gap. It seeks to shed light on the added value that different types of PAs bring to the PA system as a whole, which appears to be an untested lens through which to understand PA interactions, defining and using the concept of environmental complementarity, our research explores whether or not the presence of different types of PAs in a landscape affects positively biodiversity conservation outcomes. In other words, its focus was to find out, in the words of Aristotle, whether the whole (i.e. the PA system) is greater than the sum of its parts (i.e. the individual PAs that make up the system).

2. Material and methods

2.1. Study area

Kenya was selected as the study's focus due to the wide spectrum of PA types represented in the country and the rich information available. The methodology incorporated (i) a comprehensive literature review to explore the meaning and application of the term "complementarity" within a PA context and identify existing methods for assessing and measuring complementarity; (ii) A series of twenty-four in-country stakeholder interviews using a set questionnaire with representatives of government, donors, private sector, landowners, NGOs and communities to determine their perspectives on the nature of complementarity between different PAs, the origins and evolution of the Kenyan PA system and the current threats and opportunities faced by the different PAs; (iii) The development of an analytical framework for assessing complementarity at the PA system level based on expert consultations, the in-country stakeholder interviews and the literature review; (iv) The refinement of this framework at an expert workshop held in London and (v) Pilot applications of the complementarity assessment framework in two case study sites: the Ewaso and Mara ecosystems (see Fig. 1). Case study data were collected through desk research and sixty-one key informant interviews with representatives of the different types of PAs, NGOs, and tourism operators.