Evaluating Social-Ecological Aspects of Buffer Zones at the Borders of Etosha National Park, Namibia

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Abstract—The study aims to investigate the premise that the implementation of a buffer zone around a national park provides opportunities for local communities to become active in the management of such areas. The study focuses on the Etosha National Park in Namibia, where the implementation of a buffer zone has been proposed, since the park fence is a potential barrier for ecosystem and social-ecological integrity. The research explores the extent to which the park fence influences the livelihoods of landowners and resource users in selected areas, by assessing local perspectives on the artificial boundary between them and their natural environment. Effectively implementing a buffer zone will require innovative solutions, dependent on consensus building and the formation of partnerships between the park and its neighbours. The study aims to assess the social-ecological edge effects and resulting land use conflicts at the borders of the park, as this will aid in identifying suitable implementation strategies. Current and potential institutional arrangements and linkages are to be investigated to further adaptive co-governance of land and natural resources.

Introduction

Situated on the southwestern coast of Africa, Namibia is best described as the continent's driest country south of the Sahara, one of its most recently independent states, with one of the world's highest income disparities and an unrivalled concentration of endemic dryland biodiversity. Rainfall is highly variable over space and time, while the combination of poor soils and low rainfall means that primary production is low with arable land accounting for less than 1% of the country (FAO 2011). This leaves Namibians to cope with considerable uncertainty regarding food security and environmental outcomes, with drought being a common phenomenon. The means of coping is largely by developing diversification strategies at different levels, including a combination of livestock farming, use and sale of wild fruit, timber, fish as well as crop farming (Jones 2003). Many are turning to 'natural resource production', which is the use and management of indigenous plant and animal resources for commercial purposes (Mendelsohn et al. 2006).

Presently, approximately 17% of the country is classified as formally protected and is encompassed within 22 national parks, game reserves and recreational areas (Mendelsohn et al. 2006). This protected area system serves as an important core to the greater system of areas dedicated to conservation, which are ecologically and economically linked (Turpie et al. 2010). Formal, state owned protected areas are supplemented by a cluster of adjoining conservancies and similar privately protected areas on private and communal land, which further contributes to the conservation estate. Collectively, almost 40% of Namibia is under conservation management (Jones et al. 2009) through communal conservancies, freehold conservancies, tourism concessions and community forests and protected areas on state land (Figure 1). This conservation landscape presents unequivocal and unique conservation opportunities. The potential for rationalising management exists to facilitate the delivery of greater ecological and social benefits (Brown et al. 2005). On a regional level, the consolidation of protected areas into biosphere reserves or transboundary 'peace parks' is also a valuable prospect. In order to effectively expand, manage and develop protected area networks that will adequately protect natural diversity and landscapes, a need lies in devising a system of integrated land and natural resource management.

In terms of conservation, the most important areas in the north-west zone, where the present study is being conducted, include Etosha National Park (ENP), Skeleton Coast Park (SKP) and the conservancies in western Kunene. Due to its climate, elevation and substrates, the northw estern escarpment and desert is inhabited by many of the country's endemic species. Here the occurrence of free ranging herds of wildlife, together with the world's only expanding population of black rhinoceros (*Diceros bicornis*) outside of a park, adds to the attraction value of the area (Brown et al. 2005). A key challenge in this zone is enabling the continued growth of wildlife numbers, while simultaneously reducing conflicts between humans and wildlife. The ENP fence itself has been identified as interference for ecosystem integrity as well as for social-ecological integrity, due primarily to the contrasting land use strategies between the ENP and

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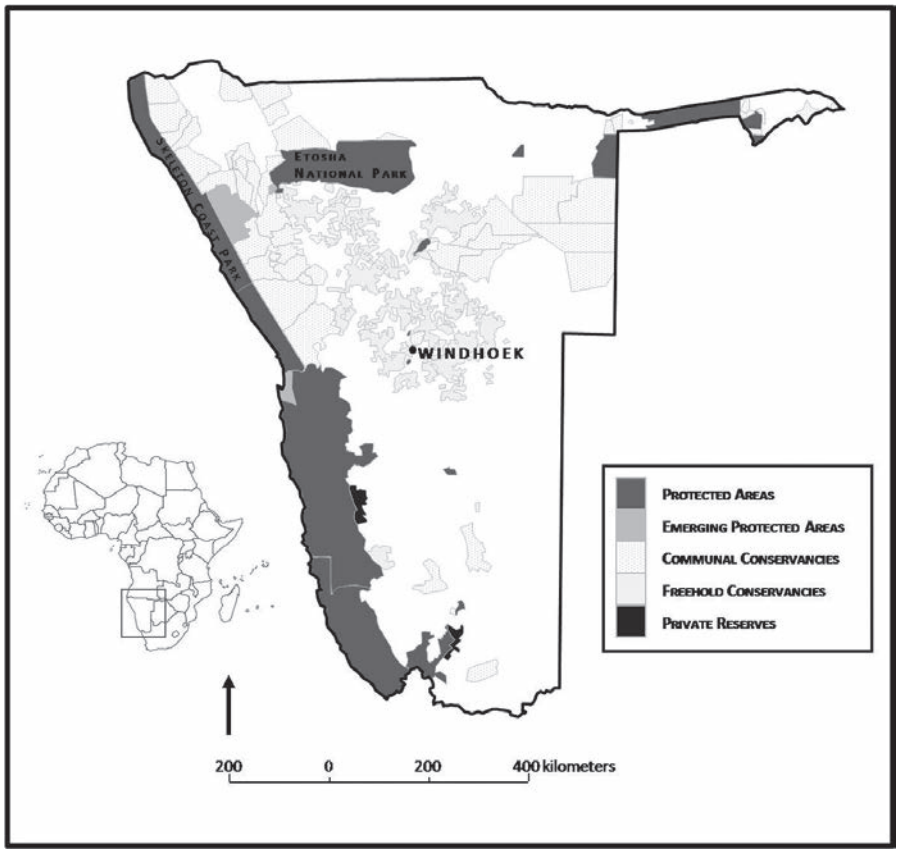

Figure 1—Map of Namibia's Protected Areas.

its surrounding areas (Göttert and Zeller 2008). It has been recommended that ENP management and park neighbours would benefit from entering into strategic conservation agreements to ease pressure on Etosha's boundaries (Brown et al. 2005). Addressing the issue requires innovative solutions, dependent on consensus building and the formation of partnerships between the park and its neighbours. In the context of adjacent land use and low population densities, ENP is ideally situated compared to many other African parks and as such, an excellent opportunity presents itself for implementing a park-and-neighbours strategy focused on developing surrounding areas towards effective buffer zones for the ENP (Figure 1).

Buffer zones overcome artificial boundaries between society and its natural environment (Wells and Brandon 1992). Based on the concept of linking a strictly protected core area with additional zones, buffer zones and transition areas allow for the use of resources (e.g. natural resource use by local communities, non-consumptive tourism etc.) according to fixed criteria (e.g. IUCN categories IV-VI). The concept rose to prominence as a conservation tool in the 1970's when it became an integral part of the management approach of UNESCO's 'Man and Biosphere Programme', which emphasised the incorporation of local peoples' needs and perceptions in the conception and management of reserves (Batisse 1986, Martino 2001, Neumann 1997, UNESCO 2000, Wells and Brandon 1992; 1993). Theoretically, such biosphere reserves consist of a protected core area surrounded by a buffer zone, the use of which is limited to activities compatible with the protected core area, such as research, recreation, tourism, education and training (Batisse 1986, Hough 1988, Wells and Brandon 1993).

Initially, ecological and biological concerns typically steered the design of buffer zones, while they are now increasingly also presented as a means of strengthening local land and resource claims (Makombe 1993, Mbano et al. 1995, Newmark 1993). Properly understanding the interaction between human activities and ecosystem functioning and the resulting dynamics is a complex issue. As such, determining appropriate land uses is complicated. Buffer zones potentially perform a corridor function, alternatively, such areas could themselves provide refuge for valuable species, such as those dependent on traditional forms of agriculture for example. Restricting human activities in buffer zones could also impose costs on local landowners and users, raising the question of compensation. Land use management thus plays a critical role in the extent to which buffer zones can be used as effective conservation tools. Lastly, buffer zones may be designated not only for their restrictive 'buffering' purpose, but also as less strictly protected core areas, thereby ensuring connectivity within large transition areas. This is particularly relevant in cultural landscapes, in which the buffer zones may have a defined conservation function of its own (UNESCO 2005).

Despite the concept of a buffer zone being rather straightforward, its design and on the ground functioning raise many challenges. Considerable confusion exists over key issues, such as the purpose, location and management of buffer zones as well as what criteria should determine their shape, area and permitted uses (Martino 2001, Wells and Brandon 1993). The buffer zone concept has been criticized in the literature since these areas potentially influence the rate of environmental degradation of protected areas, increase the exploitation of natural resources, fail to take local communities into consideration and primarily promote top-down approaches to development and management (Lynagh and Urich 2002). Rathore (1996) argues that, due to pressures from adjacent settlements, most forest buffers have been reduced to a degraded status. In India, studies have shown that core protected areas are not at all pristine or unspoiled areas of wilderness and that 69% of surveyed protected areas had human populations and resource use activities inside them (Kothari 1996, Suri 1996). Kemf (1993) reports that in South America, 86% of protected areas are inhabited at times, while in Thailand many parks have at least 10% of the total area cleared and occupied by people from the surrounding areas. One of the biggest criticisms of buffer zone implementation is the unlikelihood that limited benefits to local people will change their behaviour or reduce pressure on natural resources in the protected area, and thereby enhance the conservation of biological diversity (Wells and Brandon 1992). The objectives of buffer zones are often viewed as controversial, contemplated as a bribe to lessen local resistance to the establishment and expansion of parks and reserves, rather than an alternative sustainable livelihood option (Ghimire 1994).

Despite considerable controversy surrounding buffer zones, theoretically, they offer a positive and worthwhile concept and practice. However, there is little empirical evidence showing that buffer zones are effective since the objectives of a specific buffer zone are highly context specific (UNESCO 1995) and variable objectives have been shown to hinder the success of buffer zones (Martino 2001). How then do we establish the objectives of the ENP buffer zone when dealing with a mosaic of land uses, each with its own social-ecological conflicts? A need lies in first understanding those social-ecological issues, from the perspective of resident communities themselves. This will then facilitate the comparison between other examples and the opportunity to learn from these experiences so as to ultimately lead to the involvement of the various stakeholders to promote institutional interplay. Imperative to the development of strategies to overcome the artificial boundaries of the ENP is the incorporation of different forms of land use, where various conflicts occur/potentially can occur and where contextual solutions and approaches are called for. In order to successfully implement a buffer zone and to overcome the artificial boundaries encapsulating the ENP, a need lies in a) incorporating the different forms of land use and their ensuing conflicts; and b) including the opinions of different stakeholders and considering their different interests and needs so as to create ecologically and socially sustainable solutions.

This integration of different ecological and social aspects, stakeholders and functions is central to the study. In particular, it aims to assess the social-ecological edge effects and resulting land use conflicts at the borders of ENP, investigating to what extent the fence influences the livelihoods of landowners and local communities in different areas (private farms, communal farms and communal conservancies). Insight gained will potentially inform the integrated joint governance of land and resources surrounding the ENP.

The intended study aims to give a more holistic perspective on the complex and interdependent conflicts and developments surrounding the buffer zone concept. More specifically, the study objectives are:

1. To identify and map the different groups and stakeholders around the enp so as to assess the social-ecological nature and consequences of the park fence;
2. To analyse how the existing scenario (based on #1 above) compares to other case studies to provide an informed indication of how the implementation of a buffer zone would affect social-ecological dynamics and adaptive co-governance of land and resources;
3. To identify significant collaborations and linkages between relevant stakeholders to foster improved institutional arrangements; and
4. To identify best practice solutions for policy makers, planners, conservationists, businesses and communities around the enp and in general.

Research Questions

- What is the nature and consequences of social-ecological edge effects and land-use conflicts at the borders of ENP (private land, communal land and communal conservancies)? (i.e., what is the significance of the fence in the social-ecological context?)
- How does the ENP and its proposed buffer zone compare to other case studies in Africa?
- What are the significant existing collaborations and institutional interplay in and between communities, different forms of land users, national park management and NGO's?
- What are the potential/alternative institutional arrangements and linkages?

Conclusion

A great deal of research has been dedicated to comprehending the complexity of social and ecological systems and the need to understand the linkages between these systems in adaptive management aimed at conserving resilience (Berkes and Folke 1998, Berkes et al. 2003). The proposed study aims to identify means for achieving biodiversity conservation through effective links between national parks management and natural resource use by resident communities, as alternatives to fence-and-fines approaches that typify much of present-day national parks management. Conservation literature is replete with concerns about the increasingly island nature or isolation of protected areas, corresponding threats to ecological integrity and biodiversity protection within parks, and growing threats to biodiversity on the landscape level surrounding designated protected areas. Many have argued that the way forward is to integrate

conservation with community development. The research aims to apply the theory of complex social-ecological systems, managing for both ecological and social resilience (Berkes et al. 2003, Holling and Meffe 1996). A specific research objective of the study is to identify and understand institutional linkages and interplay, both horizontal and vertical (Berkes 2004, Young 2002), involved in the implementation of a buffer zone on the ENP border. The identification of possible institutional arrangements and network structures to re-couple local people and protected areas is also central to the research. Biodiversity conservation in protected areas and its adjacent land use conflicts and edge effects, demand partnerships in collective action among multiple stakeholders. In terms of practical outcomes, the case study will also contribute to Namibia's Ministry of Environment and Tourism current attempt at strengthening the country's protected area network. The findings could assist various agents in creating cooperative or partnership management approaches. The research is topical in terms of emerging new fields of interdisciplinary inquiry concerning the future of community-based conservation and evolving community management models for national parks and protected areas, particularly concerning adaptive co-governance of natural resources.

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