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Review

Property rights regimes, resource utilisation and biodiversity conservation in Eastern and Southern Africa

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Natural resources degradation threatens persistence of biological resources in many parts of Eastern and Southern African regions. In these regions, property rights regimes intractably influence resource utilisation and biodiversity conservation. Hitherto, the underlying causes of varied performances of property rights regimes are rarely collated. Consequently, resource policies are often flawed, resulting in pervasive systems failure and biodiversity losses. In this study, this particular information gap is interrogated by systematically reviewing various property rights regimes, their influence on resource utilisation and biodiversity conservation from wealthy of available literature. The results unravelled that the performance of various property rights regimes are influenced by levels of social capital, encompassing stakeholders' participation, trust, commitment and social networking at the base regardless of whether the property rights areby full hegemony or sanctioned by higher authorities.This findingcloselyapproximatestheconceptofenvironmentalsubsidiarityinnaturalresourcemanagement.Furth er, it is concluded that bottom-up self-institutional regulation and top-down state controlplay complimentary if not invasive role to each other. These approaches stimulate sustainable resource utilisation and biodiversity conservation, where legal actors are given full resource property rights to access, own, utilise and exclude intruders to avoid the 'tragedy of the commons'.

Keywords: Collaborative governance, environmental subsidiarity, sustainable development, natural resource management.

INTRODUCTION

Resource property rights are a suite of entitlements or bundle of rights to the bearers, especially over scarce resources (Demsetz, 1998; Klein and Robinson, 2011). Entitlements could relate to the income or utility that can be derived from resources which are sanctioned, or at least condoned, by society and protected by a higher authority (De Alessi, 1983; Bromley, 1992). The bearers may include the state, private actors and local communities. Appropriate rights are therefore imperative especially as human populations are ever growing in the resource dominated areas (Wittemyer et al., 2008), with increasing demands and claims over resources (Giller et al., 2008). Property rights are also theoretical constructs in economics for determining how are source is used and

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owned by individuals, associations or government Leeetal., 1996; Ostrom, 2008). As an economic good, Guerin (2003) has described the attributes of property rights as entitlements to use the goods, earn income from the goods, transfer the goods to others and enforce. Therein are a boundary rules that determine who has the rights to access, control, use and ownership (Denison and Klingler-Vidra, 2012). Thus, these rules define the distribution of the property rights. Over-utilisation and loss of biological resources arise from incompletely defined and enforced property rights (Libecap, 2009) and are dismal (Barbier, 1991; Sinclairetal., 2006; Lindseyetal., 2014). According to Millennium Ecosystem Assessment (2005), anthropogenic activities are among the major causes of biodiversity losses, especially in human-dominated ecosystems such as African savannas.

The property rights can be held under either of four different regimes: open access, public, common and private property regimes (Swanson and Barbier, 1992).Sources of the property rights of access, withdrawal, management, exclusion and transfer are varied. The property rights may be conveyed as *de jure* or *de facto* rights. *De jure* right are given lawful recognition by formal and legal instrumentalities. According to Schlager and Ostrom (1992), *de facto* rights are less secure than *de jure* rights. *De facto* rights originate from cooperative resource users who define, monitor and enforce certain rights but may not be recognised by the state. Thus, property rights institutions range from formal arrangements, including constitutional provisions, statutes and judicial rulings, to informal conventions and customs regarding the allocations and uses of property (Andelson, 1991). These property regimes regulate the actual functioning of the tenure in local settings and at multi-level scales (Berkes, 2006). However, most natural resources are not exclusively private or public, but are governed by a mixture of private and public institutions, which often contradict (Bromley, 1992).

Further, the actors in the administration of property rights would vary from authorised users, claimants, proprietors to owners (Schlager and Ostrom, 1992), and potentially forming institutions of sustainability (Hagedon, 2008;Bromquist,2009).The formation of regimes depends on the transaction costs defining, monitoring and enforcing property rights conferred by the parent institutions (Denison and Klingler-Vidra, 2012).Therefore, the distribution of the property rights would be skewed to actors' affordability. For instance, needs of poor people and small scale users are more likely to be met within common property regimes rather than private property regimes (Rohde et al., 2006; Lawry et al., 2014). Protection of given property rights are provided by the force of etiquette, social custom and formal legally enacted laws supported by the state, developed under rules of first possession (Lueck, 1998).

Property rights can either enforce or negate 'tragedy of the commons' postulated by Hardin (1968). Ostrom (2008) defines the commons as lands which rural communities possess and use collectively in accordance with community-derived norms. Further, commons maybe defined by the fact of their communal ownership, that they are acknowledged as being the shared property of a definable group of persons, undivided shares whether or not recognised in statutory law but governed by communal norms (Wily, 2011). Tragedy of the commons theory suggests that it occurs when individuals, acting independently and rationally according to each one's self-interest, behave contrary to the whole group's long-term best interests by depleting some common resources (Hardin, 1968).Typically, tragedy of the commons arises when it is difficult and costly to exclude potential users from common-pool resources that yield finite flows of benefits as a result of which those resources will be exhausted by rational, utility-maximising individuals rather than conserved for the benefit of all (Rankin et el., 2007). Tragedy of the commons refers to a particular type of uncontrollable communal property management system where individuals try to gain as much as possible in the short term without taking longer term needs of the community into perspective (Fabricius et al., 2001). Consequently, tragedy of the commons has occurred for instance in fisheries areas with about 80% of stock being fished at beyond their maximum sustained yield (FAO, 2009), wildlife overharvested to levels well below their carrying capacities (Lindsey et al., 2014) and forests degraded at extremely high rates (Alajarvi, 1996; Abdallah and Monela, 2007;ILUA, 2010; Henry et al., 2011; Chidumayo, 2012). On the contrary, appropriate property rights increase the incentives of households and individuals to invest, and provide them with better access to resources, their productivity and use (Deininger, 2003).

Hitherto, the impacts of property rights regimes in natural resources have either been underplayed or misconstrued by policy and decision makers, despite the long debates on issues relating to the subject. This review, therefore, evaluates property rights regimes in the context of their impacts, drivers and suggested solutions to numerous challenges in their implementation. The typology and effectiveness of the particular property rights regimes are discussed from multiple perspectives, giving examples from across the Eastern and Southern regions.

TYPES OF PROPERTY RIGHTS, FUNCTIONAL CONDITIONALITIES AND THEIR EXAMPLES FROM EASTERN AND SOUTHERN AFRICAN REGION

Open access regime

Open access property is a metaphor of the tragedy of the commons (Blewett,1995).Typically, open access property regime entails that the property is not owned by resource users, and no one can exclude anyone else from using it

(Denison and Klingler-Vidra, 2012). Therefore, it lacks resource governance and individuals exploit there sources as hastily as possible, thereby rapidly degrading the resource (Repetto, 1988; Libby, 1994). When effective enforcement is infeasible, users ‘‘who would willingly reduce their own appropriation if others did are unwillingly to make a sacrifice for the benefit of a large number of free riders…’’ (Ostrom, 1999). This scenario creates crisis to the resource management system and gives rise to system’s collapse (Folke et al., 2010). If, however, the government or the subsidiary authorities start to control the use of resources on that property then it ceases to be an open access property and is converted to state property (Guerin, 2003).

There are several examples of open access regimes that have occurred in Eastern and Southern Africa. Examples of open access resources in Eastern and Southern Africa include fisheries, forests and other non-renewable energy sources such as coal (Leal, 1998). For instance, Lake Kariba of Zambia and Zimbabwe was overfished because it did not have imposed rules like the “fish ban” (Submanian, 1996). In South Africa, the communal small farm areas of Leliefontein of Namaqualand experienced persistently higher stocking rates of livestock which led to a depletion of palatable perennials and loss of vegetative cover due to open access regimes (Todd et al., 1999). In Zambia, bush meat poaching can be considered as ‘prima facie’ evidence of market failure in sustainable resource utilisation as individuals receive benefits yet share the damage to the commons (Lindsey et al., 2014).Another example is overgrazing by mass introduced livestock on the Kafue flats in Zambia, depleting wildlife forage (Haller and Chabwela, 2009).

Public property regimes

Public property regime allows for cooperative ownership, where access of the resources is controlled by the authorities like the government (Guerin, 2003). Examples are state owned and managed national parks in many of states or expansive state farms for internationally marketed tobacco, tea and sugar (Adams et al., 1999). In some cases, the public property rights are enjoyed by responsible states at the expense of impoverished rural communities who receive limited benefit streams (Knox, 1996).Management effectiveness of state owned and managed protected areas is strongly linked to community involvement and benefit streams (Coad et al., 2010; Leverington et al., 2010). In the recent decades, several synergetic novel initiatives that include contractual parks and trans frontier conservation areas have been experimented upon to marshal multi-level support to property regime functions under collective property, owned by a group of individuals, whose access and use are biodiversity conservation and appear to be promising (Quan,2000;Child,2009a;GrossmanandHolden, 2009).

Common property regimes

Common property regimes are controlled by the joint owners (Ostrom, 2008). Due to difficult in excluding or limiting users, common-pool resources are prone to degradation (Ostrom, 1999).Therefore, tragedy of the commons occurs when unconstrained consumption of common-pool resources takes place (Dodds, 2005). The common property regimes differ from open access regimes in so far as there would be well defined ownership, access, use, controls through legitimate resource management institutions. However, the use rights of individuals can be delimited and regulated so that over exploitation of the resource does not result. For instance, grazing schemes in Zimbabwe’s communal lands demonstrated that when access to grazing was unrestricted, exploitation of communal grazing land by privately held livestock inevitably resulted in ‘tragedy of the commons’ (Barnes, 1978).Unconstrained use of common-pool resources by local communities and commercial users is a major conservation concern and continues to be a major cause of decline of biodiversity despite the key role the traditional leadership plays in enforcing management rules and local resource regimes (Wilson et al., 2006; Marks, 2009).

In Eastern and Southern Africa, several examples of natural common-pool resources abound and include fishing grounds, forests, populations of animal and plant species, wetlands and grazing lands for livestock, wood supply, medicines and farm land (Adams, 2004).Some southern African societies developed relatively effective indigenous institutions for the management of entire landscapes and their component ecosystems, when this was in their economic interest but these have not been resilient to emerging changes (Magole et al., 2010). Colonial legacy, later inherited by post-colonial governments, buttressed governance systems that ignored indigenous knowledge and commons practice (Haller and Chabwela, 2009; Magole, 2009; Mhlanga, 2009). In some cases, indigenous management regimes were replaced by sectorial or fragmented systems that focused on technical, anti-political rationales (Büscher, 2010).

In the case of wildlife resources, since many native communities were evicted by colonial governments from their ancestral lands when protected areas were proclaimed, local communities generally developed antipathical view of wildlife (Mwima, 2001; Child, 2004; Mbaiwa, 2007). Traditionally, conservation has focused on the establishment of protected areas under central government control and eviction of people residing in these areas but it has negative impacts on local livelihoods and sometimes results into increased poaching pressure (BrockingtonandIgoe, 2006; Makagon et al., 2014). To address such antipathy, government agencies and non-government organizations (NGOs) joined forces in the 1980s and 1990s to develop community-based wildlife programmes aimed at providing benefits to affected communities (Murphree, 1993).

However, common property rights which were based on traditional leadership were evinced and proclaimed by the state as flawed systems which caused natural resource degradation, legitimising state intervention in management of the commons (Leach and Mearns, 1996). Thereafter, local communities retained legacies as hunters and gatherers (Child, 2004; Marks, 2009). Exacerbated by extreme poverty and low literacy levels of resource harvesting, in many cases biodiversity conservation efforts involving local communities have been deemed unsuccessful in favour of 'fortress conservation' that seeks to exclude local people from resources in order to ensure their conservation (Büscher and Dressler, 2007). The intervention was a zeal for reform entailing mainly privatisation and nationalisation of communal resources (Magole, 2003).

However, one of the deterministic strategies the Eastern and Southern regions spearheaded was the return of rights from the state to local communities through the community based natural resource management (CBNRM) programmes (e.g. ADMADE in Zambia; CAMPFIRE in Zimbabwe, LIFE in Namibia and TRANSFORM in South Africa) and various partnerships (Hulme and Murphree, 2001; Fabricius and Koch, 2004; Dressler et al., 2010). CBNRM was poised to address the biodiversity conservation challenges through trans-formative collective action and devolution of resource user rights (Child, 2004). Unlike in open-access property regimes, common property owners have greater ability to manage conflicts through shared benefits and enforcement (Klein and Robinson, 2011). However, widespread central control of common-pool resources by the state occurs due to perceived inertia among the local actors (Rankin et el., 2007). One of the key challenges in managing common-pool resources is society complexities due to heterogeneity in actors' values and norms about commonly owned property resource management and inadequate supportive legislation. In order to minimise the challenges in managing common resources, membership rules have been applied to exclude non-members from common resources (Lawry et al., 2014). Subsequently, CBNRM models have either been unsuccessful or successful. For instance, CBNRM in Namibia has encouraged the recovery of wildlife and generated significant incomes (NACSO, 2008) while in Mozambique and Zambia both wildlife and associated incomes have dwindled over time (Lindsey et al., in press). The differences in the outcomes of common property rights in Namibian verses Mozambican and Zambian scenarios were due to unclear and weak proprietary rights to the resource users coupled with weak relational social capital among the resource actors like communities and wildlife agencies.

In Malawi, CBNRM focuses on natural resources within protected areas and allows the consumptive use of resources by communities adjacent to national parks and wildlife reserves but wildlife remains the property of the state (Arntzen et al., 2003).Mesterton-Gibbons and Milner-Gulland (1998) posited that Zimbabwean local communities used cooperative game theory to determine the conditions under which community self-monitoring would ensure conservation occurs. These researchers in Zimbabwe concluded that ''no self-monitoring agreement can be sustainable without a payment to each individual that exceeds the opportunity cost of monitoring even if no one is poaching''.

In Botswana, like in other states in the region, assumption was made that once local communities fully participate in natural resource management and derive benefits, they can develop a sense of ownership and will use their natural resources sustainably (Mbaiwa, 2007). In all the above stated illustrations, the focus was bottom-up programmes implementation. Users were usually local residents that traditionally relied upon the common-pool resource for subsistence and self-regulated consumption by imposing their own enforcement of restrictions, or partnering with local authorities to do so (Gibson and Marks, 1995; Ostrom, 1999). Simultaneously, they depended on the top-down regulations by the state for their legitimacy (Child, 2004).

Caughley and Sinclair (1994) and Mphale et al. (1999) gave an account of a pilot range management project in Lesotho, where the Government of Lesotho and the United States Agency for International Development (USAID) established a successful grazing association at Sehlabathebe in the Drakensburg Mountains, and gave it management control over a badly degraded watershed. A popularly elected executive committee was responsible for administering a grazing management plan which provided for the seasonal rotation of livestock among winter grazing areas near villages and summer grazing areas in the surrounding mountains.

Livestock found grazing in violation of the plan were subject to impoundment by range riders. Local sanctions and rules helped to control 'free riders', who could otherwise degrade the rangeland further. Other similar examples are found in such countries as Botswana, South Africa and Zimbabwe in Southern Africa (Scoones and Cousins, 1991; Rohde et al., 2006). Despite these innovative collective actions, several other areas remained exposed to 'free riders' of the commons, effectively giving rise to open access resource regimes (Dore, 2001), including where local institutions existed (Lindsey et al., 2014).Therefore, strong investments in capacity development of local institutions and governance structures are required (Fabricius and Collins, 2007).

Private property regimes

Private property regime is both excludable and rival, while rights to access, use, exclusion and management, appropriate stream of economic rents from use of and

investments in the resource, and the rights to sell or otherwise transfer the resource to others are controlled by a private owner or a group of legal owners (Repetto, 1988; Guerin, 2003). To a considerable degree, Eastern and Southern Africa have legalised and privatised the use of wildlife, encouraging hunting, tourism and the sale of meat, hides and horns for wildlife that remains *res nullius* (without formal owner) or state-owned (Hill, 1994; Lindsey et al., 2009). If certain conditions are met, governments have delegated to the owners of private land the full rights to control the use of wildlife on their land (Jones and Murphree, 2004). With incentive to reap the benefits, investment in the resource base will optimise the benefits received, and will ensure the resource is not depleted over time (Andelson, 1991).

For example, due to incentives to invest by the private owners, management of wildlife was enhanced in Zimbabwe, raising the average return on investment from 1.8 to 10.5%as compared to non-private wildlife entities (Moyo,2000). In the Southern Africa, private rights conferred on land owners such as game ranchers resulted in drastically increased wildlife revenues, expanded wildlife populations and enhanced habitats (Child, 2009b). Establishment of *de facto* private rights to wildlife reversed declining Namibian wildlife populations, and resulted in an 80% increase in wildlife on freehold land and a major boost to the national economy (Jones, 1999). In South Africa, game ranching developed rapidly and contributed significantly, ecologically and to local and national economies (Van der Waal and Dekker, 2000; Child, 2009b). In Zambia, game ranching industry has alsogrownrapidlysince1980s, contributing to biodiversity conservation, job creation and economies (Lindsey et al., 2013). However, implications of the contemporary global pressure created by 'land rush' (Cotula and Polack, 2012) regarding resource property rights regimes needs to be further studied.

Further, in Savé Valley Conservancy in Zimbabwe private actors partnered with the local communities to enhance benefits to local economies through improved conservancy financing and management (Lindsey et al., 2009). Partnership was born out of realisation that wildlife could not be effectively conserved in protected areas or on private land without the support of neighbouring communities (Kreuter and Simmons, 1994).Again, another example comes from contractual parks as one innovative conservation mechanism which has been popular in South Africa since the 1980s (Reid and Turner, 2004; Grossman and Holden, 2009). This kind of contractual parks are established on land owned privately, either by individuals or community groups, which are then managed by the national conservation authorities and effectively become part of the national protected areas estate. Management of contractual parks is carried out in accordance with a joint management agreement devised by a board comprising representatives of both the landowners and the conservation authorities.

Therefore, building relational social capital in such arrangements is inevitable in fostering partnership.

RESOURCE PROPERTY RIGHTS VS. BIODIVERSITY CONSERVATION

Resource property rights, resource use and biodiversity conservation are intractably linked. Accelerated over-harvesting of forest products and degradation of forests occurred after national governments declared themselves to be the owners of forested land (Ascher, 1995). Similar problems of overexploitation have occurred with inshore fisheries when national agencies presumed that they had exclusive jurisdiction over all coastal waters (Finlayson and McCay, 1998). The states usurp the rights from users based on pessimism about the possibility of users voluntarily cooperating to prevent overuse, leading to widespread central control of common-pool resources (Hardin, 1968). Consequently, the tragedy of the commons arises when it is difficult and costly to exclude potential users from common-pool resources that yield finite flows of benefits. As a result, the resources will be exhausted by rational, utility-maximising individuals rather than conserved for the benefit of all (Guerin, 2003). Thus, the problem of over exploitation is a result of the resources being under public rather than private ownership (WentworthandRatté,2002).Where government manages public resource property, the neighbouring local communities should be involved in beneficial partnerships with the state to ensure resource protection(Child, 2009a).Such engagement with local communities may follow the principle of environmental subsidiarity, where local communities will have the right to make choice of rational decisions over resource use and management (Ribot et al., 2010).

RESOURCE PROPERTY RIGHTS VERSUS COLLABORATIVE GOVERNANCE

Collaborative governance of natural resources is a multi-actor based social processing a collective action (Imperial, 2005). Such collective action can greatly caution decimation of natural resources in transient resource property rights governance especially where state governance structures become inadequate to counteract resource depletion (Gibson and Marks, 1995). CBNRM was founded based on the common property theory which was applied to discourage open resource access though promotion of resource ownership, control and use by local communities (Rihoy and Steiner, 1995) and emphasised participatory approaches (Twyman, 2000). It was realised by practitioners and scholars that local communities can only conserve and use these natural resources in a sustainable manner when they

Table 1. Key conditions determining the likelihood for success of a particular property regime in Eastern and Southern Africa.

Type of property regime	Key conditions for success or failure	Selected references
Open access regime	Absence of controls leads to systems failure. Implementation of effective internal and external controls by way of local rules, norms and practice as well as sound policies and effective management result in sustainably managed resources.	Submanian, 1996; Todd et al., 1999; Guerin, 2003; Folke et al., 2010; Lindsey et al., 2014.
Public property regime	Though exclusionary policies may appear enticing for policy makers and resource managers, community involvement has shown to be promising. Local integration in resource management and beneficiation enhances sustainable resource management. Through local involvement, transactional costs for resource management are lowered, thereby increasing success rates for biodiversity conservation.	Child, 2009b; Grossman and Holden, 2009.
Common property regime	Like in other regimes such as public and private property regimes, relational social capital plays a critical role in improving positive outcomes of resource management. In addition, clear proprietary rights and associated benefits to the resource users are crucial.	Wilson et al., 2006; Marks, 2009; Magole et al., 2010; Lawry et al., 2014.
Private property regime	Increased incentives, including ownership and use rights of the resources within a given jurisdiction and sound relational social capital environment stimulate sustainable utilisation and biodiversity conservation.	Moyo, 2000; Grossman and Holden, 2009; Child, 2009b; Lindsey et al., 2013.

derive benefits from them (Swatuk, 2005). In order to address these biodiversity conservation challenges, various models of institutional arrangements have been piloted in Eastern and Southern region (Lund and Treue, 2008; Child, 2009a) and their effectiveness are mostly yet to be assessed.

RESOURCE PROPERTY RIGHTS VERSUSSUSTAINABILITY

Sustainability of the property rights depends on legitimisation of the rights by local and state authorities (Mbote, 2005). Property rights play an important role in the sustainable use of resources as they create wealth to local communities and land owners, and enhance protection of resources and convey rights (Lyons, 1998; Anderson et al., 2013). The stronger the institutions and the rights, the less danger there is likely to the persistence of the common-pool resources (Schlager and Ostrom, 1992). Property rights ought to empower actors evenly within the existing institutional arrangements responsible for resource management (Brockington et al., 2008). Strong institutional functionalities, including use of formal and informal rules to give incentives to the actors, are essential for sustainable natural resource manage-ment (Hagedorn, 2008; Bromquist, 2009).Securing of property rights in resource management serves to provide for incentives for sustainable natural resource management and rural development (Demsetz, 1998). Convincing participants to have beneficial behaviour to the rest of the group requires that individuals trust that the desired outcome is attainable and that free-riders will not benefit (Rankin et el., 2007). If gains can provide the economic incentive to landowners to manage natural resources on a sustained-yield basis, species will be saved (Hobley, 1996). However, there are several threats to sustainability that need to be dealt with. For instance, oppressive state control and rent seeking behaviour can put the resource base at risk (Benjaminsen et al., 2013). Further, essential research on attributes of property rights would contribute to sustainability of biological resources (Diekert, 2012; Nkhata et al., 2012). As the tragedy of the commons is increasingly part of the conventional wisdom in environmental studies, economics and ecology (McEvoy, 1988; Leach and Mearns 1996), results and lessons from the tragedy of commons could proof relevant in the formulation of strategies and policies for sustainable natural resource management.

KEY REASONS FOR FAILURE OF VIABLE RESOURCE PROPERTY RIGHTS

There are several reasons for failure of what would be otherwise viable resource property rights. Key conditions for success or failure of a particular property regime in Eastern and Southern Africa are given in Table 1. The following are reasons considered to influence impacts of property regimes on resource utilisation and biodiversity conservation, and these can be dynamic and site specific. According to Lawrence (2000), failure to provide necessary conditions for a property rights regime to propel resource conservation through ownership rights results in degradation of the resource base. For instance, individual land ownership having more secured formal

property rights to land have resulted in more investment and improved productivity per unit area (Feder and Feeny, 1991). In different instance, fishermen who have clearly defined private rights are able to increase efficiency in the use of space and technology (Schlager, 1994) and generate a positive incentive for conservation (Bodal, 2003). A property rights system which includes the right to alienation is often considered the most efficient as it can be defined as equivalent to private property (Ostrom, 2003).Failures to implement alienation rules and participatory collective action have often led to degradation of the natural resources (Haller and Merten, 2008; Chabwela and Haller, 2010).

Previously, failure by governments to provide adequate preliquisite developmental facilities to local communities coerced local communities to become dependent on revenue remittances by the states from resource utilisation. Although CBNRM initially focussed on conservation approach, the rural development became more prominent over any other objective (Arntzenet al., 2007).This mismatch in the implementation of set objectives occurred even when certain local communities received exclusive rights and responsibilities over natural resource management from the state (Arntzen et al., 2003). Thus, failure to directly link conservation and development to cement promotion of environmental conservation and rural economic development through local community participation in natural resource management and other derivatives such as tourism development facilitated increased resource degradation (Leach et al., 1999; Twyman, 2000; Mbaiwa, 2004).

The property rights are often simplified and frail to articulate representation of a complex social-ecological system. For example, common-pool resources theory tends to concentrate on simple systems and common resource generates a predictable, finite supply of one type of resource unit (for example wildlife or tons of fish) in each time period (Ostrom, 2008). Further, resource users are assumed to be short-term, profit-maximising actors who have complete information and are homogeneous in terms of their assets, skills, cultural views and discount rates on harvesting.

The other limiting factor to improved resource property regimes is that transaction costs for establishing, implementation and monitoring can be prohibitive. For instance, Tanzania continues with one of the highest rates of deforestation in Africa despite having forest laws supporting participatory forest management, and local communities entering into agreements with the Forest Department to manage local forestland and forest resources (Abdallah and Monela, 2007). According to Abdallah and Monela (2007), local communities can also designate village land as protected forestland and can develop plans for sustainable use and conservation. To date, however, the country's participatory forest management experience has not significantly reduced the rate of deforestation and land degradation: programmes are expensive and time-consuming to establish; local forest departments often lack sufficient human and financial resources; and the benefits to communities have not been sufficient to offset their loss of unrestricted use of the forest resources. Similar scenarios have been experienced in Zambia's forests following Joint Forest Management pilot projects (ILUA, 2010).

CONCLUSION AND RECOMMENDATIONS

Sustainable natural resource management demands deterministic and collective action to halt momentous loss of biodiversity from overutilization. In Eastern and Southern Africa, much of biodiversity conservation challenges can be attributed to flaws in the implementation of resource property rights and even the absence of the property rights altogether as in the case of prevalent open access regimes. Tragedy of the commons occurs and is expressed in different forms of waning natural resources at multiple temporal and geographical scales. Institutions of governance, which will enable definitive local rules, hegemony and self-governing of actors would play a key role in progressive implementation of property rights beyond existing enabling legal provisions.

The role of local communities and other actors in resource dominant areas is important to safeguarding integrity of biological diversity. Integrative approaches are required to stimulate active participation of local resource actors. In order to maximise benefits and appropriately internalise costs of establishing and implementing appropriate property regimes among the actors, capacity building through information generation and sharing in addition to skills building is essential. Such strategies curtail the challenges of dearth of information, lapses in the taking advantages of economies of scale, internalisation of transaction costs and misinterpretation of legal and policy provisions among the actors. Land tenure should always, thus, be made supportive and clear to the actors. Therefore, functional social networks such as partnerships between governments and other actors are likely to improve collaborative governance of natural resources delivery of the property rights via joint ventures and other initiatives. Vices such as rent seeking and undue political power relations among different actors can be prevented by functional social networks and collective action.

Conflict of interests

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REFERENCES

Abdallah JM, Monela GG (2007). Overview of miombo woodlands in Tanzania. Working papers of the Finnish Forest Research Institute 50:9-23. http://www.metla.fi/julkaisut/workingpapers/2007/mwp050-02.pdf (accessed 7July 2014).

Adams WM (2004). Against extinction: the story of conservation. London: Earthscan.

Adams M, Sibanda S, Turner S (1999). Land tenure reform and rural livelihoods in Southern Africa. London: Overseas Development Institute.

Alajarvi P (1996). Forest management planning and inventory. Lusaka: ZFAP, MENR.

Andelson RV (ed.) (1991). Commons without tragedy: the social ecology of land tenure and democracy.London: Centre for Incentive Taxation.

Anderson J, Colby M, McGahuey M, Mehta S (2013). Nature, wealth and power: leveraging natural and social capital for resilient development. Washington, DC: USAID.

Arntzen JW, Molokomme DL, Terry EM, Moleele N, Tshosa O, Mazambani D (2003). Final report of the review of community-based natural resource review in Botswana: Report no. 1. Gaborone: Centre for Applied Research for the National CBNRM Forum.

Arntzen J, Setlhogile T, Barnes J (2007). Rural livelihoods, poverty reduction, and food security in Southern Africa: Is CBNRM the answer? Washington, DC: International Resources Group.

Ascher W (1995). Communities and sustainable forestry in developing countries. San Francisco: Institute for Contemporary Studies Press.

Barbier EB(1991).Environmental degradation in the third world. In: Pearce DW, Markandya E, Barbier EB (eds.). Blueprint 2: Greening world economy. London: Earthscan.

Barnes DL (1978). Problems and prospects of increased pastoral production in the tribal trust lands. Zambesia 6(1):49-59.

Benjaminsen TA, Goldman MJ, Minwary MY, Maganga FP (2013). Wildlife management in Tanzania: state control, rent seeking and community resistance. Dev Change 44(5):1-23. http://dx.doi.org/10.1111/dech.12055

Berkes F(2006). From community-based resource management to complex systems. Ecol Soc 11(1):45. [online] URL: http://www.ecologyandsociety.org/vol11/iss1/art45/ (accessed on 19 August 2014).

BlewettRA (1995). Property rights as a cause of tragedy of the commons: institutional change and the pastoral Maasai of Kenya. Eastern Econ. J. 21:447-490.

Bodal BO(2003). Incorporating ecosystem considerations into fisheries management large-scale industry perspectives. In: Sinclair M, Valdimarsson G(eds.), Responsible fisheries in the marine, pp. 41-46. Wallingford: CABI. http://dx.doi.org/10.1079/9780851996332.0041

Brockington D, Igoe J (2006).Eviction for conservation: a global overview. Conserv. Soc. 4(3):424-470.

Brockington D, Duffy R, Igoe J(2008). Nature unbound: conservation, capitalism and the future of protected areas. London: Earthscan.

Bromley DW (1992). Property rights as authority systems: the role of rules in the resource management. In: Nemetz P (ed.), Emerging Issues in forest policy, pp. 867-877. Vancouver: University of British Columbia Press.

Bromquist W (2009). Multi-level governance and natural resource management: in the challenges of complexity, diversity and uncertainty. In: Beckmann V, Padmananbhan M (eds.), Institutions of sustainability, pp. 109-126. Dordrecht: Springer Science and Business Media BV. http://dx.doi.org/10.1007/978-1-4020-9690-7_6

Büscher B (2010). Anti-politics as political strategy: neoliberalism and transfrontier conservation in Southern Africa. Dev. Change 41(1):29-51.

BüscherB, Dressler W (2007). Linking neoprotectionism and environmental governance: on the rapidly increasing tensions between actors in the environment-development nexus. Conserv. Soc. 5:586-611.

Caughley G, Sinclair ARE (1994). Wildlife ecology and management. Oxford:Blackwell.

Chabwela HN and Haller T (2010). Governance issues, potentials and failures of participatory collective action in Kafue Flats, Zambia. Int. J. Commons 4(2):621-642.

Chidumayo EN (2012). Development of reference emission levels for Zambia. Lusaka: FAO.

ChildB (2004). Growth of modern nature conservation in Southern Africa. In Child B. (ed.). Parks in transition: biodiversity, rural development and the bottom line, pp. 5-27. London: Earthscan.

Child B (2009a). Recent innovations in conservation. In Suich H, Child B and Spenceley A (eds.), Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas, pp. 277-288. London: Earthscan.

Child B (2009b). Private conservation in Southern Africa: practice and emerging principles. In Suich H, Child B and Spenceley A (eds.), Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas, pp. 103-111. London: Earthscan.

Coad L, Abernethy K, Balmford A, Manica A, Airey L, Milner-Gulland EJ (2010)

Distribution and use of income from bushmeat in a rural village, Central Gabon.Conserv. Biol. 24:1510-1518.

Cotula L, Polack E (2012). The global land rush: what the evidence reveals about scale and geography. London: IIED.

De Alessi L(1983). Property rights and transaction costs: a new perspective in economic theory. Soc. Sci. J. 20:59-69.

Deininger K(2003). Land polices for growth and poverty reduction. New York: Oxford University Press.

Demsetz H(1998). Property rights. In: Newman, P. (ed.), The new palgrave dictionary of economics and the law, New York: Stockton Press. 3: 144-155.

Denison M, Klingler-Vidra R(2012). Annotated Bibliography: property rights. London: Economic and Private Sector PEAKS.

Diekert FK (2012). Growth overfishing: the race to fish extends to the dimension of size. Environ Resource Econ 52:549-572.
http://dx.doi.org/10.1007/s10640-012-9542-x

Dodds WK(2005). The commons, game theory, and aspects of human nature that may allow conservation of global resource. Environ. Value 14:411–425.http://dx.doi.org/10.3197/096327105774462683

Dore D (2001). Transforming traditional institutions for sustainable natural resource management: history, narratives and evidence from Zimbabwe's communal areas. African Studies Quarterly Volume 5, Issue 3. Florida: University of Florida, Center for African Studies.

Dressler W, Büscher B, Schoon M, Brockington D, Hayes T, Kull C, McCarthy J, Streshta K (2010). From hope to crisis and back?: a critical history of the global CBNRM narrative. Environ. Conserv. 37:5-15. http://dx.doi.org/10.1017/S0376892910000044

Fabricius C, Collins S (2007). Community-based natural resource management: governing the commons. Water Policy 9(2):83-97.

Fabricius C, Koch E, Mangome H (2001). Community wildlife management in Southern Africa: challenging the assumption of Eden. London: IIED.

Fabricius C, Koch E (2004). Rights, resources and rural development: community-based natural resource management in Southern Africa. London: Earthscan.

FAO (2009). The state of world fisheries and aquaculture, 2008. Rome: FAO.

Feder G,Feeny D(1991). Land tenure and property rights: theory and implications for development policy. World Bank Econ. Rev.5:135-153. http://dx.doi.org/10.1093/wber/5.1.135.

Finlayson AC, McCay BJ (1998). Crossing the threshold of ecosystem resilience: the commercial extinction of Northern cod. In: Berkes F, Folke C, Colding J (eds.), Linking social and ecological systems: management practices and social mechanisms for building resilience, pp. 311-338. Cambridge: Cambridge University Press.

Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T, Rockström J

(2010). Resilience thinking: integrating resilience, adaptability and transformability. Ecol Soc 15(4): 20. [online] URL: http://www.ecologyandsociety.org/vol15/iss4/art20/ (accessed on 14 May 2014).
Gibson CC, Marks SA(1995). Transforming rural hunters into conservationists: an assessment of community-based wildlife management programs in Africa. World Dev. 23 (6):941-957. http://dx.doi.org/10.1016/0305-750X(95)00025-8
Giller KE, Leeuwis C, Andersson JA, Andriesse W, Brouwer A, Frost P, Hebinck P, Heitkönig I, van IttersumMK, Koning N, Ruben R, Slingerland M, Udo H,Veldkamp T, van de Vijver C, van Wijk MT, Windmeijer P(2008). Competing claims on natural resources: what role for science?. Ecol Soc 13(2): 34. [online] URL: http://www.ecologyandsociety.org/vol13/iss2/art34/(accessedon5June2014).
Grossman D, Holden P (2009). Towards transformation: contractual National Parks in South Africa. In: Suich H, Child B, Spenceley A (eds.), Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas, pp. 357-372. London: Earthscan.
Guerin K (2003). Property rights and environmental policy, a New Zealand perspective. Wellington. New Zealand.http://www.treasury.govt.nz/publications/research-policy/wp/2003/03-02/twp03-02.pdf (accessed on 20 May 2014).
Hagedon K (2008). Particular requirements for institutional analysis in nature-related sectors. Eur Rev Agric Econ 35(3):357-384. http://dx.doi.org/10.1093/erae/jbn019
Haller T, Chabwela HN (2009). Managing common pool resources in the Kafue flats, Zambia: from common property to open access and privatisation. Dev. Southern Africa 26:555-567. http://dx.doi.org/10.1080/03768350903181340
Haller T, Merten S (2008). "We are Zambians – don't tell us how to fish!" Institutional change, power relations and conflicts in the Kafue flats fisheries in Zambia. Hum Ecol 36(5):699-715. http://dx.doi.org/10.1007/s10745-008-9191-4
Hardin G(1968). The tragedy of the commons. Science 162:1243-1248. http://dx.doi.org/10.1126/science.162.3859.1243
Henry M, Maniatis D, Gitz V, Huberman D, Valentini R (2011). Implementation of REDD+ in sub-Saharan Africa: state of knowledge, challenges and opportunities. Environ. Dev.Econ. 16:381-404. http://dx.doi.org/10.1017/S1355770X11000155
Hill K (1994). Politicians, farmers and ecologists: commercial wildlife ranching and the politics of land in Zimbabwe. J.Asian Afr. Stud. 29:3-4. http://dx.doi.org/10.1177/002190969402900305
Hobley M (1996). Participatory forestry: the process of change in India and Nepal. Rural development forestry study guide.Rural development forestry network. London: Overseas Development Institute.
Hulme D, Murphree M (eds.)(2001). African wildlife and livelihoods: the promise and performance of community conservation. Oxford: James Currey.
ILUA (2010). Integrated land use assessment, 2005-2008. Lusaka: ILUA, MENR.
Imperial MT (2005). Using collaboration as a governance strategy: lessons from six watershed management programs. Admin. Soc. 37(3):281-320. http://dx.doi.org/10.1177/0095399705276111
Jones BTB (1999). Lights, revenues and resources: the problems and potential of conservancies as community wildlife institutions in Namibia. Evaluating Eden Project. London: IIED.
Jones BTB, Murphree MW (2004). Community-based natural resource management as a conservation mechanism: lessons and directions. In Child B (ed.), Parks in transition: biodiversity, rural development and the bottom line, pp. 63-104. London: Earthscan.
Klein DB, Robinson J (2011). Property: a bundle of rights? Prologue to the symposium.Econ.J. Watch8(3):193-204.
Knox A (1996). Malawi Country Profile.In:Bruce JW (ed.),Country profiles of land tenure, Southern Africa,pp. 13-18. Madison: University of Wiscconsin.
Kreuter UP, SimmonsRT (1994). Economics, politics and controversy over African elephant conservation. In:Freeman MR, Kreuter UP (eds.), Elephants and whales: Resources for whom?, pp 39-57. New York: Gordon and Breach.
Lawrence R(2000). Property, rights and fairness. Cambridge: Cambridge Research for the Environment.
Lawry S, Samii C, Hall R, Leopold A, Hornby D, Mtero F (2014). The impact of land property rights interventions on investment and agricultural productivity in developing countries: a systematic review. Cambridge, MA: Ash Centre for Democratic Governance and Innovation.
Leach M, Mearns R, Scoones I(1999). Environmental entitlements: dynamics and institutions in community-based natural resources management. World Dev. 27(2):225-247. http://dx.doi.org/10.1016/S0305-750X(98)00141-7
Leach M, Mearns R (eds.) (1996). The lie of the land: challenging received wisdom on the African environment. Oxford: James Currey.
Leal DR (1998).Community-run fisheries: avoiding the tragedy of the commons.Popul. Environ. 19:225-246.
http://dx.doi.org/10.1023/A:1024691919628
Lee JA,Libecap GD, Schneider R (1996). The determinants and impact of property rights: land titles on the Brazilian frontier. J.Law Econ. Organ 12(1):25-61. http://dx.doi.org/10.1093/oxfordjournals.jleo.a023360
Leverington F, Costa KL, Courrau J, Pavese H, Nolte C, Marr M, Coad L, Burgess N, Bomhard B, Hockings M (2010). Management effectiveness evaluation in protected areas : a global study. Second edition. Brisbane: University of Queensland.
Libby LW(1994). Conflict on the commons: natural resource entitlements, the public interest, and agricultural economics. Am.J. Agr. Econ. 6:997-1009. http://dx.doi.org/10.2307/124338
Libecap GD (2009). The tragedy of the commons: property rights and markets as solutions to resource and environmental problems. Australian J. Agric. Res. Econ. 53:129-144. http://dx.doi.org/10.1111/j.1467-8489.2007.00425.x
Lindsey PA, NyirendaVR,BarnesJI, BeckerMS, McRobb R, Tambling C, Taylor A, Watson F, t'Sas-Rolfes M (2014). Underperformance of African Protected Area Networks and the Case for New Conservation Models: insights from Zambia. PLoS One 9(5):e94109. http://dx.doi.org/10.1371/journal.pone.0094109
Lindsey PA, Barnes J, Nyirenda V, Pumfrett B, Tambling CJ, Taylor WA, t'Sas-Rolfes (2013). The Zambian wildlife ranching industry: scale, associated benefits and limitations affecting its development. PLoS One 8(12):e81761.
http://dx.doi.org/10.1371/journal.pone.0081761
Lindsey PA, du Toit R, Pole A, Roma-ach S (2009). Savé Valley Conservancy: a large-scale African experiment in cooperative wildlife management. In: Suich H, Child B, Spenceley A (eds.), Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas, pp. 163-184. London: Earthscan.
Lindsey P, Taylor WA, Nyirenda V, Barnes J (In press). Bushmeat poaching costs African countries hundreds of millions of dollars per year. PLoS One.
Lueck DL(1998). First possession. In: Newman, P. (ed.), The new palgrave dictionary of economics and the law, New York: Stockton Press. 2: 132-144.
Lund JF, Treue T (2008).Are we getting there? Evidence of decentralized forest management from the Tanzanian miombo woodlands. World Dev 36:2780-2800. http://dx.doi.org/10.1016/j.worlddev.2008.01.014
Lyons A(1998). A profile of the community based monitoring systems of three Zambia rural development project. Lusaka USAID/ZAMBIA.
Magole IL (2009). Common pool resources management among the San communities in Ngamiland, Botswana. Dev Southern Africa 26:597-610. http://dx.doi.org/10.1080/03768350903181381
Magole L (2003). A tragedy of the commoners: the evolution of communal rangeland management in Kgalagadi, Botswana. PhD Thesis, University of East Anglia.
Magole L, Turner S, Büscher B(2010). Towards an effective commons governance system in Southern Africa? Int. J. Commons 4(2):602-620.
Makagon JE, Jonas H, Roe D (2014). Upholding human rights in conservation: who is responsible? London: IIED.
Marks SA (2009). Rural people and wildlife in Zambia's central Luangwa Valley: precautionary advice from a long-term study. In: Baldus RD (ed.), A practical summary of experiences after three decades of

community-based wildlife conservation in Africa: what are the lessons learnt?, pp. 52-71. CIC Technical Series Publication No. 5. Budapest: FAO and CIC.
Mbaiwa JE (2007). Local community attitudes towards wildlife conservation and community based natural resources management in Ngamiland District, Botswana. In: Schuster B, Thakadu OT(eds.), Natural resources management and people, pp. 19-26. Gaborone: IUCN CBNRM Support Programme.
Mbaiwa JE(2004). The success and sustainability of community-based natural resource management in the Okavango delta, Botswana. S. Afr.Geogr. J. 86 (1):44-53. http://dx.doi.org/10.1080/03736245.2004.9713807
Mbote KP(2005). Land tenure, land use and sustainability in Kenya: towards innovative use of wildlife property rights in wildlife management. Nairobi: International Environmental Law Research Center.
McEvoy AF (1988). Toward an interactive theory of nature and culture: ecology, production, and cognition in the California fishing industry. The Ends of the Earth: perspective on modern environmental history. Cambridge:Cambridge University Press.
Mesterton-Gibbons M, Milner-Gulland EJ(1998). On the strategic stability of monitoring: implications for cooperative wildlife management programmes in Africa. Proc R Soc Lond B 265:1237-1244. http://dx.doi.org/10.1098/rspb.1998.0425
Mhlanga L (2009). Fragmentation of resource governance along the shoreline of Lake Kariba, Zimbabwe. Dev. Southern Africa 26:585-596. http://dx.doi.org/10.1080/03768350903181365
Millennium Ecosystem Assessment (2005). Ecosystems and human well-being: biodiversity synthesis.Washington D.C: World Resources Institute.
Moyo S(2000). Land reform under structural adjustment in Zimbabwe:land-use change in the Mashonaland Province. Uppsala: Nordic Africa Institute.
Mphale M, Makoae M, Rwambali EG (1999).Stakeholder opinion analysis in Mokhotlong District for Drakensberg Mountains Conservation Programme. Maseru: German for National Environment Secretariat.
Murphree MW (1993). Communities as resource management institutions.Gatekeeper Series No. 36. London: IIED
Mwima HK (2001). A brief history of Kafue National Park, Zambia. Koedoe 44(1):57-72. http://dx.doi.org/10.4102/koedoe.v44i1.186
NACSO (2008). Namibia's communal conservancies: a review of progress and challenges in 2007. Windhoek: Namibian Association of CBNRM Support Organizations.
Nkhata BA, Mosimane A, Downborough L, Breen C, Roux DJ (2012). A topology of benefit sharing arrangements for governance of social-ecological systems in developing countries. Ecol Soc 17(1): 17. http://dx.doi.org/10.5751/ES-04662-170117
Ostrom E (2008). Tragedy of the commons: the new palgrave dictionary of economics. In: Durlauf SN, Blume LE (eds.), The new palgrave dictionary of economics. Second edition. Online. Palgrave Macmillan. http://www.dictionaryofeconomics.com/article?id=pde2008_T000193. http://dx.doi.org/10.1057/9780230226203.1729
Ostrom E(2003). How types of goods and property rights jointly affect collective action. J. Theoretical Polit. 15:239-270.
http://dx.doi.org/10.1177/0951692803015003002
Ostrom E(1999). Coping with tragedies of the commons. Ann. Rev. Polit. Sci. 2:493-535. http://dx.doi.org/10.1146/annurev.polisci.2.1.493
Rankin DJ, Bargum K, Kokko H (2007). The tragedy of the commons in evolutionary biology. Trends Ecol.Evol. 22(12):643-651.
http://dx.doi.org/10.1016/j.tree.2007.07.009
Reid H, Turner S (2004). The Richtersveld and Makuleke contractual parks in South Africa: win-win for communities and conservation? In: Fabricius C, Koch E, Magome H, Turner S (eds.), Rights, resources and development: community-based natural resource management in Southern Africa, pp. 223-234. London: Earthscan.
Repetto R(1988). Economic policy reform for natural resource conservation. Washington, DC: World Bank.
Ribot JC, Lund JF, Treue T (2010). Democratic decentralization in sub-Saharan Africa: its contribution to forest management, livelihoods, and enfranchisement. Environ.Conserv. 37(1):35-44. http://dx.doi.org/10.1017/S0376892910000329
Rohde RF, Moleele NM, Mphale M, Allsopp N, Chanda R, Hoffman MT, Magole L, YoungE(2006). Dynamics of grazing policy and practice: environmental and social impacts in three communal areas of Southern Africa. J. Environ. Sci. Policy 9:302-316.
http://dx.doi.org/10.1016/j.envsci.2005.11.009
Rihoy E, Steiner A (1995). The commons without tragedy?: strategies for community-based natural resources management in Southern Africa. In: Proceedings of the regional natural resources management annual conference. Kasane: SADC Wildlife Technical Co-ordinating Unit.
Schlager E(1994). Fishers' institutional responses to common-pool resource dilemmas. In: Ostrom E, Gardner R, Walker J (eds.), Rules, games, and common-pool resources, Ann. Arbor, Michigan: University of Michigan Press. pp. 247-266.
Schlager E, Ostrom E(1992). Property-rights regimes and natural resources: a conceptual analysis. Land Econ. 68 (3):249-262. http://dx.doi.org/10.2307/3146375
Scoones I, Cousins B (1991). Key resources for agriculture and grazing: the struggle for control over dambo resources in Zimbabwe. In: Scoones I (ed.), Wetlands in drylands: the agroecology of savanna systems in Africa. London: IIED Drylands Programme.
Sinclair ARE, Fryxell JM, Caughley G(2006). Wildlife ecology, conservation and management. Second edition. Malden, MA: Blackwell Publishing.
SubmanianJ (1996). Zambia country profile.In: Bruce JW(ed.),Country profiles of land tenure, Southern Africa, pp.65-68. Madison: University of Wiscconsin, Land Tenure Centre.
Swanson TM, Barbier EB (1992). Economics for the wilds.Britain: Guernsey Press Co. Ltd.
Swatuk LA (2005). From project to context: community-based natural resources management in Botswana. Glob Environ. Polit. 5(3):95-124. http://dx.doi.org/10.1162/1526380054794925
Todd SW,Hoffman MT (1999). A fence-line contrast reveals effects of heavy grazing on plant diversity and community composition in Namaqualand, South Africa. Plant Ecol 142:169-178. http://dx.doi.org/10.1023/A:1009810008982
Quan J (2000): Land tenure, economic growth and property in sub-Saharan Africa. In: Toulmin C, Quan J. (eds.), Evolving land rights, policy and tenure in Africa, pp. 151-179. London: DFID, IIED and NRI.
Twyman C(2000). Participatory conservation? Community-based natural resource management in Botswana. Geogr. J. 166 (4):323-335. http://dx.doi.org/10.1111/j.1475-4959.2000.tb00034.x
Van der Waal C, Dekker B (2000). Game ranching in the Northern province of South Africa. S. Afr. J. Wildl. Res. 30:151-156.
Wentworth DR,Ratté K (2002). Fish tales: classroom lessons about economics and the environment. Montana: The Centre for Free Market Environmentalism.
Wilson DC, Raakjaer-Nielsen J, Degnbol P (2006). Local ecological knowledge and practical fisheries management in the tropics: a policy brief. Mar Policy 30:794-801. http://dx.doi.org/10.1016/j.marpol.2006.02.004
Wily LA (2011). The tragedy of public lands: the fate of the commons under global commercial pressure.Rome: International Land Coalition.
Wittemyer G, ElsenP, BeanWT, Burton ACO, Brashares JS (2008) Accelerated human population growth at protected area edges. Science 321:123-126. http://dx.doi.org/10.1126/science.1158900