

# **Biodiversity Conservation and Resilience of Socio-Cultural Institutions<sup>1</sup>**

## **Introduction**

‘Biodiversity conservation’ Berkes observes ‘is an activity for which a number of panaceas, blueprint approaches have been widely promoted.’ (Berkes 2007: 15188) There have been strong calls to conserve biodiversity in parks, else privately or by communities. Berkes argues that it is preferable to recognise that a plurality of approaches is required, to recognise that conservation objectives need to be pursued in different ways according to the nature of the land ownership and provenance of the threats to it.

Institutions according to Ostrom are ‘shared concepts used by humans in repetitive situations organized by rules, norms and strategies’ (Ostrom 1999). Following this definition, and Berkes’ observation about conservation, a paper with our brief should examine the full gamut of conservation strategies from parks, to controls on trade, to educational initiatives, to government edicts, to NGOs large and small, to community-based conservation to privately owned game farms. For all of these are strategies for biodiversity conservation that are shaped by socio-cultural institutions. But this was not the intention of the organisers and our space is limited. It is clear from the people identified to work on this paper that our focus should be local level resource management and in particular the resilience of institutions of common property management and indigenous stewardship of resources. We will therefore dwell on these alone. However, in doing so, we are emphatically not arguing that these institutions will necessarily be better at conserving biodiversity than others. They will in some cases, and not in others. The purpose of this paper is to examine how they perform, what sorts of pressures they can experience, and how they survive and adapt in response to such pressures.

The paper proceeds thus.

1. We examine the nature and role of resilience in socio-cultural institutions of resource management and briefly outline the state of play of research into the dynamics of these institutions.
2. We then look at the interaction between these institutions and biodiversity conservation examining literature on the effectiveness of parks, on devolution and specific case material where biodiversity conservation and local institutions have been observed to work together – and to conflict.
3. We then examine the dynamics at work in cases where local institutions have been enrolled into conservation strategies, and the contemporary pressures that these institutions experience

## **Resilience**

Crucial to understanding socio-cultural institutions is understanding how they cope with change, both change from within the system (changing user numbers, condition of the resource, values and preferences) and change without – such as the influence of markets, large-scale environmental change else government policy. Walker and colleagues define resilience as

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<sup>1</sup> Paper prepared for the Symposium on “Sustaining Cultural and Biological Diversity in a Rapidly Changing World: Lessons for Global Policy”, American Museum of Natural History, 2-5 April 2008. The paper was drafted by Dan Brockington (University of Manchester, UK) and Bhaskar Vira (University of Cambridge, UK), with inputs from Vasant Saberwal (Ford Foundation, India). The drafting team retain responsibility for any errors.

‘the capacity of a system to absorb disturbance and reorganise while undergoing change so as still to retain the same function, structure, identity and feedbacks’  
(Walker, Holling et al. 2004)

Resilience is an essential property of strong resource management institutions because they have to cope with changing environmental circumstances and with changing user needs and preferences. Resource management institutions are continually adapting to changing circumstances. Resilience refers to the persistence of rules, outcomes and properties despite stress, tension and pressure. As such it is the very stuff of healthy common property regimes (Berkes and Folke 1998).

Berkes insists that resource management institutions begin and evolve through an iterative process of learning and adaptation (Berkes 1999). They are often born of conflict, and maintained through conflict. Healthy regimes have rules of exclusion, which limit access to the resource, prescribe rules of use governing users’ behaviour, establish mechanisms for surveillance and enforcement of the rules and, often, implement graduated sanctions to cope with transgression. In short they are continually dealing with pressure to change and adapt from members of the system and from those that are excluded (Ostrom 1990). Their healthy functioning will necessarily cause problems and difficulties for those who are unable to command the resources or outcomes they desire. The literature on common property management regimes is replete with this sort of resilience.

Socio-cultural institutions can also be resilient in the sense that they reappear after many years of absence. Berkes has documented precisely this happening with the establishment of rules for caribou hunting among groups in Canada, which had not required them because caribou had not visited their hunting grounds for decades. Their reappearance was initially met with a chaotic and messy hunting season. But the former rules were still remembered, and revived in the subsequent season (Berkes 1999). Folke et al (2007) stress the importance of such ‘latent functionality’ for the resilience of institutions, but also point to the need for research that examines the role of cultural (collective and social) memory in sustaining such functionality in the context of ecosystem management.

Local resource management regimes often fail. They can be stretched beyond the limits of the resource, the rules or the abilities of members to cope with change. They can also persist for decades or more. Netting’s study of resource management in the Alps described institutions that had survived centuries (Netting 1981). Ostrom and colleagues have spent decades examining the factors which make for healthy systems (Ostrom 1990; Ostrom, Burger et al. 1999; Ostrom, Dietz et al. 2002). The state of research has been summarised by Arun Agrawal in two papers (2001; 2003). He examined work by Wade (1988), Ostrom (1990) and Baland and Platteau (1996) to draw up a list of factors facilitated effective and durable common property regimes, and supplemented it with his own suggestions (Table 1). He notes that the abundance of factors makes it difficult quantitatively to analyse the fortunes of common property management regimes because it is hard to undertake studies that control some variables and observe variation on others. However, he also observed that many of these variables are causally related. Group Interdependence for example, was likely to be a function of group size, and mobility, market pressure and resource size. He argued that analysis of the large collections of case studies to understand how causality works and to reduce the number of variables in the analysis.

There is, however, an important need to qualify this conceptual framework, which examines a range of factors that influence the nature of resource management institutions. The assumption of this research programme is that the strength of the common property management regime is the dependent variable, and that other aspects – community homogeneity, government support and the nature of the resource etc are the independent variables. In other words that the nature of the management regime is explained by these other factors. That is not always the case. It is quite possible for the birth and development of common property management regimes to affect the nature of other variables sometimes quite fundamentally. For example, Johnson's work on fisheries in Thailand has shown that quite diverse and heterogeneous communities have united and overlooked their differences in order to exclude outsiders. This involved setting up common property management regimes of fisheries that advantaged the wealthier members of the community. In other words, community homogeneity was a product of the success of the establishment of the regime, not a condition of success (Johnson 2001).

Work on the resilience of social institutions has also recognised that this property is not always desirable, since it could as easily sustain ecologically and socially undesirable situations over significant periods of time (Levin et al 1998). Socially regressive practices and institutions that discriminate because of caste, gender and ethnicity often serve to reinforce the exclusion of specific categories of people from access to resources (Sinha et al 1997). It is important not to allow romanticism about long-established traditions to obscure the ways in which these sometimes perpetuate elite control over increasingly valuable resources (Chhatre and Saberwal 2006). The resilience of such traditions may reinforce inequality, and may actually serve the narrow interests of powerful individuals and groups rather more than the broader goals of equitable resource management with which this paper is concerned.

### **Relations between social institutions and biodiversity**

What is the relationship between institutions of local natural resource management and biodiversity conservation? This is a surprisingly hard question to answer because natural resource management regimes are not always, or exclusively, concerned with biodiversity outcomes, and conservationists are only gradually coming to recognise the value of local resource management institutions for biodiversity conservation.

A good example of the dysfunctional discussion at work is the literature on the effectiveness of parks. It is surprisingly unhelpful because it has rarely adopted a comparative institutional perspective, focusing instead on the efficacy of parks in relation to their surrounding (often less well-protected) areas. What is not considered is whether the specific form of management (national parks) is superior to all other forms of protection, or is there likely to be an alternative management regime that is likely to produce similar, or even better, results?

With respect to tropical forests' protection, the importance of parks is strongly supported by a number of studies. Bruner and colleagues (2001) found, on the basis of questionnaire evidence of a sample of 93 tropical parks in populated areas, that 40% had experienced improvement of vegetation cover, and 43% had shown no further forest clearance since establishment. Naughton-Treves and colleagues (2005) compared 36 deforestation rates inside and outside protected areas. In 32 cases the deforestation rate was between 0.1 and 14% faster outside protected areas' boundaries. DeFries and colleagues (2005) examined the increasing isolation of 198 highly protected tropical forests using coarse resolution satellite

data and found that two thirds experienced significant deforestation within 50 km of their borders, but only a quarter had such within their boundaries.

Does this evidence mean that national parks are better than other management regimes? If we wish to protect a coastal forest in Madagascar, or a rainforest in New Zealand, is it necessary to impose state enforced regulations? Government conservation departments can be far removed from local realities, else simply absent and unable to enforce their rules. There are all sorts of situations where some form of local control may be better than distant state controls. However, none of the studies cited above address that question. They are only concerned with how parks do compared to their surroundings, not with how they perform compared with other institutional regimes. Echoing similar concerns, Ostrom and Nagendra's wide-ranging review of this literature concluded that the 'debate over the effectiveness of strictly protected areas needs to be extended to a much larger landscape of tenure regimes' (2006: 19225).

Surprisingly few rigorous studies have tackled this important issue. There are some relatively small-scale studies based on satellite data and aerial photographs. For instance, Nepstad and colleagues (2006) have compared the relative efficiency of large uninhabited parks and inhabited extractive and indigenous reserves in preventing fire and deforestation in the Brazilian Amazon using satellite data (data covered between 1997-2000 for deforestation, and 1998 alone for fires). They found that both forms were effective against preventing fire and deforestation, with no significant differences between either. They noted that the good performance of occupied reserves was achieved despite their being at the frontier of deforestation pressure, whereas parks benefited from their relative lack of proximate habitat change (Nepstad, Schwartzman et al. 2006). On the other hand, Ostrom and Nagendra report poor performance of selected parks in South Asia which excluded local management and better performance of community managed forests nearby (Ostrom and Nagendra 2006).

The most ambitious attempt to test the relative impacts of protected areas is work by Tanya Hayes and Elinor Ostrom, in which they have considered the relative effectiveness of parks compared to community controls (Hayes and Ostrom 2005; Hayes 2006). They looked at data collected by the International Forestry Resources and Institutions (IFRI) network on 163 forests, of which 76 were 'parks' and 87 'non-parks', where park was defined as falling in one of the six IUCN categories (Table 2). All forests in the IFRI database provide relatively standardized data about institutions governing their use, ownership user communities and forest products used. To compare forest condition, Hayes and Ostrom used assessments of vegetation density made by independent professional foresters who compared the vegetation density of IFRI forests to other forests in the same ecological zone.

Hayes and Ostrom report no difference in the vegetation density of parks and non-parks.<sup>2</sup> But they found evidence that might make parks imposed and policed by government a less robust form of conservation than protection rooted in local institutions. For instance, they found that density of vegetation was higher where more forest products had rules governing use, and lower where there were no rules. They found vegetation density was more abundant where

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<sup>2</sup> It is perhaps unfortunate that Hayes and Ostrom tied their work so tightly to parks. The term is a shibboleth Redford, K., J. G. Robinson, et al. (2006). Parks as Shibboleths. *Conservation Biology*. **20**: 1-2. It is widely used, but in ways that reinforce prejudice, obscuring more than it reveals. One could argue that parks are in fact irrelevant to Hayes and Ostrom's argument. They are in fact concerned with the importance for conservation of locally derived rules of resource use control. There is a risk that the value of their findings will be lost by the confusion over the term 'park'.

more user groups could define the rules and sparser where fewer could. Thus what makes for more effective protection (denser vegetation relative to similar forests) is not the official designation, but rather the role of residents in defining rules for forest products.

Several problems remain with this analysis. There were no data about the size of these forests, so it is impossible to assess the relative significance of the contribution of parks and non-parks to protected area networks. There are also problems with how the term ‘park’ was defined. Few of the parks in the analysis were included in the World Database on Protected Areas (WDPA) (Table 2). This could reflect the WDPA’s incompleteness, but it could also mean that there is simply inadequate overlap between this sample of parks and those other authors have used. The WDPA lists nearly 4,700 other protected areas in the countries Hayes and Ostrom examined, including nearly 1,700 forest reserves, which are not part of their analyses. The WDPA is not, of course, the ultimate authority as to what constitutes a park. However, as it has formed the basis for other studies (Rodrigues, Andelman et al. 2004; DeFries, Hansen et al. 2005; Naughton-Treves, Buck Holland et al. 2005), it would be useful for comparative purposes to know how samples of parks within the IFRI database relate to the WDPA. Rigorous methodologies need not be exclusively based on the WDPA, but this example reflects the difficulty with comparing sets of case studies in the published literature (including those based on relatively large datasets), since different analysts often adopt different sampling criteria.

This work also illustrates that Hayes’ question, ‘are parks effective?’ is insufficient. Effective for whom, for what nature? While Bruner and his colleagues undoubtedly show that 40% of (large tropical forest) parks ‘have seen an improvement in vegetation cover, they also show that 17% were not ‘holding their borders’ against agricultural expansion and a further 43% merely had no further net clearing (cf. Roe, Hutton et al. 2003). The question to ask in these circumstances is not whether they are failing or succeeding, but rather under what circumstances were they strong, and when were they weak?

With respect to wildlife there is clear evidence that animal abundances are higher inside parks than outside, and that unprotected animals can suffer from over hunting unless they are protected (Wilkie and Carpenter 1999). But it is also clear that even in well protected parks the abundance of many species of larger wildlife are declining (Caro and Scholte 2007; Stoner, Caro et al. 2007). Parks are not sufficient to sustain many species who depend on ecosystems beyond park boundaries (Homewood and Rodgers 1991; Western 1994). Here new institutions are required that depend on local resource management strategies ((Nelson and Makko 2003; Nelson 2004). Indeed in some instances parks can prove less resilient in times of conflict than the local resource management that governs their hinterlands. Research by de Merode has shown that village chiefs have actively prevented the sale in local markets of slow breeding species taken with heavy weaponry in the DRC even during the civil war. Urban markets in contrast showed a massive increase in wild meat availability in that period as controls broke down and hunting and weapons proliferated (de Merode and Cowlshaw 2006).

It is thus clear that the relative merits of local resource management and state led conservation in different contexts are yet to be adequately tested for different goals of biodiversity conservation. Both have important roles, and both need to be marshalled effectively in pursuit of biodiversity conservation goals but rigorous comparative evaluations are at a nascent stage.

A second reason why it is difficult to examine the relationship between local resource management and biodiversity conservation is that attempts to empower local institutions are often stymied and fall short of real empowerment, and proper devolution of powers. Devolution is ‘the transfer of power to elected local authorities’ (Ribot 2004: 8). It is sometimes called ‘democratic decentralisation’. It should not be confused with ‘deconcentration’, or ‘administrative decentralisation’ which transfers powers to local government agencies who are not downwardly accountable to local electorates, but who remain upwardly accountable, to government officials in higher office (Crook and Manor 1998).

Effective devolved management of natural resources by rural communities is in many ways the Holy Grail of successful community-based conservation. In theory devolution has much to offer, and is potentially a useful alternative to the inefficiencies and inequities of central state control. Indeed devolution might not just enhance natural resource management, it may be a vehicle for promoting stronger democracies (Wily 2002). However, it is also important to note that devolution of decision making is often conflated with the types of deregulation associated with the promotion of free market development models. While both ostensibly involve the reduction of centralized state control, devolution also ideally entails the decentralization of decision making responsibility to local people. When actually given these responsibilities, local people may make decisions that are not necessarily in line with the spread of free market development models, or mainstream conservation interventions for that matter.

If done well, however, the benefits of decentralization to local communities, and healthy democracies, and the environment, are potentially very powerful, as Ribot (2004; 2006) states:

- it can promote equitable distributions of benefits from resource use, because allocation of benefits is determined by local democratic decision making.
- it is likely to be more efficient. It can bring more local knowledge to bear on management decisions, it can mean decision-makers more aware of the needs of local people, it can reduce the transaction costs of administering the resource, improve co-ordination and facilitate growing environmental consciousness in the local electorate whose decisions now help govern the resources (Agrawal 2005).

Ribot’s major review of the experience of devolution in forests internationally concluded that there were numerous incidences of local authorities and people increasing revenue from forests, sustaining strong management, protecting them from commercial depredation and improving their management capacity (2004; 2006). Unfortunately however, despite all the talk about devolution, there are few cases where it has really been tried. We lack sufficient material about what happens to global priorities when they are put in local hands. One of the main findings of Ribot’s work was that devolution has often been incomplete and has rarely actually been tried properly. Often the key obstacle is the state itself, or agencies within it, which are reluctant to relinquish the power, and revenues that they command (Vira 2005).

Local powers are captured by local elites, or by national elites working in particular localities, none of whom are properly accountable to electorates (Oyono 2004; Oyono 2004; Oyono 2004). Else power can be devolved to unaccountable local institutions such as customary authorities or NGOs (cf. Igoe and Kelsall 2005). The outcomes of these failures are often highly unsatisfactory. They can be detrimental to local livelihoods, for instance by facilitating

commercial exploitation by large-scale corporations who receive permission to enter from the new gatekeepers and increase exclusion, and disempowerment generally.

The lack of effective devolution makes it harder to examine the role of local resource management in biodiversity conservation. However, local resource management regimes need not wait for official empowerment programmes to take effect. There are many cases of local resource management growing stronger despite adverse circumstances (Conroy et al 1999). A World Bank sponsored review of community-based natural resource management has noted that while ideally the correct enabling policy and institutional environment needs to exist for local management to succeed, in many instances ‘local communities often forge ahead with activities even when such an enabling macro-level framework does not exist’ (The-World-Bank 1999: 13). Similarly Koch has argued with specific reference to natural resource management in Southern Africa that community cohesion is unusual unless people are fighting to defend or acquire rights (Koch 2004). Viewed thus, these problems of government performance would not necessarily foreclose effective village based natural resource management. They may even be a necessary ingredient, the incentive which drives local success.

One of the most spectacular examples of this in Tanzania comes from a scheme in the eastern Serengeti where villagers in Oloolosokwan have set aside land for wildlife in return for a proportion of tourist revenues. The case is remarkable for two reasons. The amount of money received is incredible: \$50,000 went to the village in one year. This compares favourably to the tax revenues of entire districts. Also the injection of money provided the motivation to introduce unique levels of transparency in village accounts. Concerns about how that money was being spent resulted in an independent audit of expenditure of this money (Alcorn (Alcorn, Kajuni et al. 2002; Nelson and Makko 2003). Similarly Child and Dalal-Clayton’s report of the Luangwa Integrated Resource Development Project in Zambia suggests that success there has hinged upon effective and transparent accounting. This was not introduced instantly, but came about as increasing funds were moved out of the control of chiefs into elected village committees. The procedures reported include bank accounts for each Village Action Group (responsible for wildlife revenues), regular audits of their accounts, and an obligation for the committee to present quarterly financial and progress reports to the community (Child and Dalal-Clayton 2004).

Despite the obstacles to effective devolution and the difficulties associated with empowering local institutions, there are numerous examples of local mechanisms of resource management that have proven successful and compatible with conservation objectives (Folke et al 2007). For example:

- Surveys of the critically endangered Ethiopian Wolf have recorded small but healthy populations living outside protected areas on communally managed grasslands (Ashenafi, Coulson et al. 2005)
- The critically endangered Bengal florican bustard (*Houbaropsis bengalensis*) is thriving on grasslands in Cambodia which are subject to periodic and patchy burning by local groups (Gray, Chamnan et al. 2007).<sup>3</sup>

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<sup>3</sup> It is not clear whether these grasslands are subject to a common property management regime. The authors describe them as ‘open access’ and ‘community-managed’. They describe practices of management and burning but do not describe the decision-making processes that result in this management being carried out.

- Mutton birds are sustainably harvested in protected land in New Zealand by Maori groups as part of more general systems of *kaitiakitanga* (generally meaning guardianship) (Taiepa, Lyver et al. 1997; Kitson 2002)
- East Africa pastoralists manage dry season grazing areas to ensure the long term survival of their herds, setting aside fodder trees and pasture into which only small stock and calves are allowed at certain times of the year (Potkanski 1997; Igoe and Brockington 1999)

Note however that in some cases the compatibility of these management regimes with biodiversity conservation goals is an accidental consequence of the resource management. It is not always an intended outcome. It is the consequence of fauna and flora fitting in with the spaces and habitats that people create and manage, rather than people setting out to explicitly make room for nature. Smith and Wishnie in their review of these resource management practices noted that in most cases conservation was not one of the deliberately designed outcomes of these institutions (Smith and Wishnie 2000) The compatibility with conservation goals was therefore serendipitous, not planned. The obvious exceptions to this are the arrangements for sustained harvest of wildlife by hunters and fishers (Berkes 1999; Kitson 2002).

More generally, there is growing evidence that disturbance, both ‘natural’ and ‘human-induced’, is not necessarily incompatible with the long term resilience and integrity of ecological systems that are characterised by nonlinear dynamics (Folke et al 2007). Disturbance regimes might actually serve to enhance levels of diversity, as demonstrated in the case of the Keoladeo Ghana National Park in Bharatpur, where the exclusion of cattle grazing resulted in an infestation of weeds and a decline in valuable elements of the avian habitat (Lewis 2003). Similarly, the suppression of forest fires under conventional management practices increases the vulnerability of the system to a major conflagration, with potentially devastating consequences for both floral and faunal diversity (Bond and Keeley 2005). Paradoxically, in areas historically characterised by relatively low-intensity understory fire regimes, the more the system is protected from disturbance, the more vulnerable it becomes to a high-intensity event because of the progressive build-up of combustible material (Turner et al 2003).

While it is likely that the specific impacts of disturbance regimes will vary with respect to local social and ecological dynamics, there is clearly a need to examine the potential synergies between conservation and local resource uses further. This is particularly important in the context of relatively densely populated landscapes (such as in India), where the luxury of inviolate natural habitats and landscapes free from human interference is becoming increasingly difficult to maintain. According to the report of India’s high level Tiger Task Force, there are almost 20,000 families resident in 273 villages within the core areas of the 28 Project Tiger reserves in the country (GOI 2005). Millions of very poor households live in and around the entire network of over 500 protected areas, covering a little in excess of 5% of the total land area. It is vitally important to find ways in which conservation planning can be made sensitive to the needs of these communities to secure their basic livelihoods, and for resource managers to be willing to challenge the received wisdom that attempts to eliminate all disturbance from conservation areas.

The potential value of local institutions in advancing conservation goals is clear. One estimate suggests that unofficial community conservation conserves about 3.7 million km<sup>2</sup> of forests and forested landscapes (how well is not clear) in Asia, Africa and Latin and North

America, as much as set aside in formal protected areas (Molnar, Scherr et al. 2004; Molnar, Scherr et al. 2004). There are ever increasing opportunities for local management of natural resources to facilitate the evolution and strengthening of new institutions. Changes in the management of forests in Tanzania empower village governments to set up village forest management committees and establish local rules governing the use of the same (Wily and Dewees 2001; Brockington 2007). Co-management of protected areas is being attempted in Australia and South Africa (Reid, Fig et al. 2004). There are numerous examples (albeit often problematic) of schemes to allow local land owners to sell the rights to hunt wildlife to rich overseas hunters (Hulme and Murphree 2001; MacDonald 2005; Swatuk 2005; Igoe and Croucher 2007). There is also a burgeoning literature in new conservation prioritising techniques which incorporate costs. These emphasize the importance of comparing the consequences and effectiveness of different types of conservation strategy, and not relying on mechanisms like parks alone (Meir, Andelman et al. 2004; Murdoch, Polasky et al. 2007).

We will discuss below diverse cases where local, and state-fostered institutions are instrumental in pursuing biodiversity conservation goals but note one important caveat. Some cases of successful (and profitable) local resource management that also promote biodiversity conservation are called ‘win-win’ situations, where people’s needs and conservation needs can both be advanced. However, it is generally better, for the purposes of analysis, to consider how these arrangements distribute fortune and misfortune. The ‘communities’ served by and practicing resource management are rarely united and often some groups, frequently minorities, can be disadvantaged. Mutually preferable arrangements certainly exist, but labels like win-win conceal much of the important politics at work.

### **Change Pressure and Resilience**

We have established that resilience is an essential component of institutions of resource management and that these institutions can be an important part of biodiversity conservation strategies. We consider below cases that outline the types of institutional arrangements that have successfully promoted biodiversity conservation in combination with local resource management. In considering these case studies, we hope to show that institutions of resource management, and conservation practices are fundamentally shaped by the capitalist systems of which they are part. Resilience in such circumstances can come to mean the ability of schemes to sustain profit, or the ability of groups to represent themselves in ways that are legible to the state and entrepreneurs, and persist with those representations. We make no judgement as to whether this is a ‘good’ or ‘bad’ thing. We are simply seeking adequately to understand the broader context within which these arrangements operate.

#### ***Enrolling local management to create new tourist markets***

One the most famous example of effective devolution over wildlife to advance conservation goals is the CAMPFIRE scheme in Zimbabwe. CAMPFIRE (which stands for Communal Area Management Programme for Indigenous Resources) arose out of wildlife legislation that allowed district councils to sell the right to hunt wildlife on their lands. Given that safari hunters will pay between \$10 and \$20,000 (in 2000, see Hurt and Ravan 2000) to hunt elephants, as well as thousands of dollars to shoot lions and leopards, not to mention a string of other animals as part of a three week package, the returns are lucrative.

In principal the scheme is simple. Currently wild animals are a cost to rural people; they raid crops, kill livestock and are dangerous. Rural people do not benefit from the revenues derived from hunting them. But by allowing the moneys from hunting wildlife to be available locally

the theory is that wildlife will be seen to be a benefit. Rural people will become more tolerant of wildlife on their land and the effective area of wildlife habitat will increase. As Child put it:

‘ if wildlife is permitted to contribute meaningfully to their welfare, people will not be able to afford to lose it in their battle for survival. If wildlife does not contribute significantly to their well-being, people will not be able to afford to preserve it except as a tourist curiosity on a few protected areas’

Child, 1995: 235, quoted in (Murphree 1996: 177)

The problem was the distribution of the resulting revenue. Spread out over a whole district the benefits were hard to see, because they were shared among too many people, including those who did not have to live with wildlife on their lands. However if returns were spent locally, at the ward level, and if village populations were small, then the value of wildlife could be remarkable and make a significant difference to peoples’ lives. In two villages in particular, Mahenye and Masoka, Murphree has documented substantial improvements (Murphree 2001; Murphree 2005).

But there are many discontent voices. In some places, these derive from the failure of district councils to pass on revenues to the wards where the wildlife lives. In other cases, it is because rural Zimbabweans simply do not want to live with the animals. They see the rural backwaters in which buffalo and elephant thrive as out of the way places, with few services and not enjoying the development provisions which they fought so hard to win (Alexander and McGregor 2000). Elsewhere, benefits are being distributed, but there are local politics of exclusion and dispossession at work and traditional uses of wildlife are being displaced (Dzingirai 2003). Sometimes, it can simply be awkward and unpleasant dealing with safari hunting operators who are steeped in racist values that define some white cultures in Southern Africa. These are not people with whom many African villagers want to chose to do business (Murombedzi 2001; Murombedzi 2003).

These schemes have many advocates. Child and Jones’ advocacy of using safari hunting revenues to fuel community based conservation initiatives in Zambia and Namibia hinges on the valuable revenues they generate to rural villagers (Child 2000; Child 2000; Child and Dalal-Clayton 2004; Jones and Murphree 2001). Child also notes that the revenues facilitated the introduction of more transparent village government and better accountability over the use of village revenues (Child and Dalal-Clayton 2004). The revenues of elite photographic safari hunting in Tanzania have similarly fuelled local development in the village of Ololosokwan, close to the Serengeti, and strengthened village institutions, including an independent quarterly audit of village accounts (Nelson and Makko 2003; Nelson 2004).

More money is a good thing in these places but note the consequences here. In Zambia selling the right to hunt wildlife means prohibiting local hunters from doing so, many of whose prestige and identity arose from their position in village society as hunters. Ken MacDonald has observed a similar process in Pakistan where tourist hunting of ibex (*Capra sibirica*) removes control over their meat and value from one group of villagers and gives a different sort of reward (money) to another. This project took place in the absence of any decent data documenting trends in ibex populations (MacDonald 2004; MacDonald 2005). Sullivan has shown in Namibia that conservancy operations value hunting and wildlife over other natural resources and can reinforce and perpetuate discrimination against women’s

resources and participation in resource management (Sullivan 2000). She also notes that these schemes are based on commodifying and selling, or distributing previously hunted meat. All the joy and complexity, the experience of the hunt with its smells, sights and memories are lost to local experience as a result (Sullivan 2006). There is a curious echoing of deep ecology here – reducing our interactions with nature to dismal dollars is a poor way to cultivate lasting conservationist sentiment.<sup>4</sup> Child’s statement above, recognises the constraint of poverty on conservation but is itself constrained by considering poverty alone.

Another paradox appears to be emerging with the initiation of value addition activities linked with the sustainable harvesting of non-timber forest products (NTFP) from protected forest areas in various parts of India. As NTFP values increase, there is an increasing tendency to ‘farm’ the products on privately-accessed lands rather than relying on (often-uncertain) supplies from what are perceived to be state-controlled forest resources. This results in a declining interest in the management of the commons, especially amongst the more economically powerful groups within the community. Thus, Rai (2007) documents much poorer ecological conditions in what he calls ‘open access’ (!) Reserved Forests compared with privately-controlled forest-fringe areas in the Western Ghats, due to greater tenure security associated with NTFP harvesting on private lands. Similarly, Dasgupta (2005) reports that growing profitability from fruit-based processing activities has led wealthier households in the Kangra district of Himachal Pradesh to plant trees on their own lands, in order to reduce the time spent in collecting fruits from more distant and less-easily accessible common forests. This has led a loss of interest in the management of these common lands, as households shift their attention to cultivation and harvesting of fruits from private lands.

What these examples demonstrate is that economic incentives for conservation activities are necessarily subject to changing relationships between local communities and the resources from which they derive their livelihoods. Conservation efforts that focus on financial returns to households might lose momentum if they fail to adapt to the dynamics of the market, or to changing socio-economic conditions. In parts of India where economic prosperity is increasing, higher standards of living and increasing out-migration from remote rural areas are resulting in a decline in interest in time-consuming subsistence-based activities associated with natural resource management. If there are alternative, more lucrative livelihood options, wealthier households are turning away from forest-based activities, and this might have negative impacts on the overall viability of local resource management regimes. On the other hand, poorer households and those in regions that are experiencing less rapid economic growth continue to depend on forests as vital sources of livelihood security. Here, locally valuable livelihood options that are linked with the natural resource base will continue to provide opportunities for people-centred conservation strategies.

### ***Co-management of Protected Areas***

The label ‘co-management’ is problematic. It implies equality between the participants. It also conceals a considerable diversity of practice, and a variety of specific historical and political circumstances that have given rise to the arrangements. Many cases of *de facto* co-management are often not recognised as such either because the resident people have historically been seen as a special kind of endangered species (as is the case in Brazil), a

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<sup>4</sup> Curious because it is normally associated with exclusive conservation thinking Guha, R. (1997). *Radical American Environmentalism and Wilderness Preservation: a Third World Critique. Varieties of environmentalism. Essays north and south.* J. Martinez-Alier. London, Earthscan.

perennial problem (as is the case in Tanzania); or no legal category for co-management exists and so such arrangements must be made on a case-by-case basis and so will not officially be called co-management (as is the case in the continental United States).

This occurs in cases where protected areas already exist. The Xingu National Park in Brazil was in fact created in part to protect the Kayapo people living there as another type of endangered species (Villa Boas and Villa Boas 1968). In a move that could only be construed as collaborative from the most ironic perspective, they even kidnapped the director of Xingu National Park, demanding that the Brazilian Government continue to protect the boundaries of the park, and therefore their traditional homeland, as sacrosanct.

Tanzania's Ngorongoro Conservation Area is also a variation on this arrangement. It occurred, however, as a compromise between European conservationists who wanted the Maasai and other resident ethnic groups to be evicted from a greater Serengeti Park that included the Ngorongoro. As a result of the compromise the Maasai left the Serengeti Plain, but were allowed to remain in the Ngorongoro with some restrictions. This has resulted in long standing Maasai residence, increased numbers of wildlife, and multitudes of tourist (Homewood and Rodgers 1991; McCabe, Perkin et al. 1992; McCabe 2002). However, it has also entailed significant restrictions on Maasai livelihoods and perennial threats that resident Maasai may still be removed.

More typically co-management arrangements occur in wealthier developed countries like Australia, New Zealand, South Africa and the U.S., where the state is trying to redress historical grievances. In the U.S. a variety of arrangements exist between the National Parks Service and indigenous communities (for a full discussion see Burnham 2000). The Badlands National Park, for instance, overlaps with the Pine Ridge Reservation of the Oglala Sioux in South Dakota. Through a memorandum of agreement between the Oglala and the Park Service this part of the park is jointly managed with benefits (gate receipts) going directly to the tribal government (Igoe 2004).

In South Africa, as part of the post-Apartheid land restitution process substantial parts of the country's protected area estate are now 'under claim' from evicted communities. This includes large portion of the Kruger National Park and 80% of the protected areas of Mpumalanga Province in the north-centre of the country. Some conservationists in the country are alarmed at the extent and implications of these claims. However the history of claims thus far shows that the loss of conservation estate which was feared has not been realised (Fabricius and de Wet 2002). In almost all cases thus far, people moved from protected areas, who have won back their land, have chosen not to return to the protected areas. Reasons for this are diverse. In part it is because these are now urban orientated people. Often many years have passed since they were moved, and the current more numerous generation calls their new place home. The remote unserved rural locations which they win back are not their favourite place to live. Else they have become part of broader societies, often composed of people displaced from diverse areas, in which identity and place are not well connected. Surveys of people living around the Kruger National Parks show that few look to it as a home. Many are indifferent about its proximity excepting when they suffer crop damage or livestock loss (Antony 2006).

The other reason for the persistence of protected area estates are the innovative and beneficial co-management arrangements which the South African government has initiated in order to maintain the integrity of its protected areas (Reid, Fig et al. 2004; Reid 2006). The most

famous incident is the 20,000 ha Makuleke claim at Pafuri in the northern end of the Kruger National Park. This community was moved off their land in 1969 and, to claim it back formed a Common Property Association of about 15,000 people. They negotiated the return of their land, but agreed instantly to lease it back to the government for 50 years (cancellable after 25). A joint management board of three community representatives and three South Africa National Parks representatives manages the land. This portion of the Kruger National Park has been reclassified as a 'contractual park'. Contractual parks are a South African speciality – the Richtersveld National Park in the north-east of the country was created in its entirety as a contractual park.

It is important to note that the Makuleke community receive no rent from their lease. The agreement instead gives them control over tourist income, including hunting. They have built a lodge aimed at the luxury market, and most community members are in a much better position now than they once were with respect to their land. But as always what matters is the distribution of cost and benefit. Many of the older generation did not want to sign away their rights to the land, but return to it (Reid 2001). The current arrangement still results in their exclusion, and in the strange commoditisation of their knowledge and interaction with the landscape into something tourists will pay to watch. The lodge has the potential to generate significant revenues for other families.

It is all very well setting up a joint management board, but what matters is how well it functions. These can be mixes of unequal capacity, with experienced national parks officials, for whom management boards are their natural habitat, and long marginalised rural communities who lack the capacity and experience to flourish in these institutional environments. According to Reid the South African experience of these sorts of imbalances is mixed. In Makuleke, the community representatives have grown rapidly to fit their roles, and they are increasingly dominant in Joint-Management Board meetings, while in the Richtersveld the experience is much less satisfactory (Reid and Turner 2004). Other arrangements have resulted in sustained conflict. The hand back of the Dwesa-Cwebe forest reserve in the former Transkei has also resulted in the land continuing as a protected area leased back from its new owners by the South African government. But there is a continued conflict within the affected communities that has left many aggrieved (C. Fabricius pers. comm. 2005).

Similar experiences have been reported from India's widely-cited Joint Forest Management (JFM) programmes, which have been in existence since the early 1990s. The sheer scale of the JFM effort makes generalisation very problematic – the programme is now operational in all 28 States of the country, with an estimated 106,482 village-level committees engaged in the regeneration and development of approximately 21.44 million hectares of forests (or 28.17% of the recorded forest area of the country). However, it is increasingly clear that JFM has not really been able to transform the inequalities that characterise relationships between the Indian Forest Department and local communities, or within highly differentiated rural communities themselves (Sundar et al 2001, Vira 2005). Communities have not really benefited beyond access to the forest for fodder, fuelwood and some NTFPs, and there has been no bounty from timber harvests, which shaped some of the early optimism about the programme. Elites have usually disproportionately captured the limited returns that have emerged from the programme (Kumar 2002), and there is growing disillusionment with what is perceived to be no more than a limited exercise in 'bureaucratic participation' (Vira 2005).

These examples demonstrate that co-management will be hard. It makes possible all sorts of local and small scale conflicts which simple exclusion obviated. However, it could also increase the local legitimacy of conservation activities, and a more just distribution of resources (Reid and Turner 2004). It also makes possible one great potential dividend. Throughout the African continent national parks and game reserves have been set up on lands in which people used to live. Tourists will walk through and drive past former homesteads or ancient burial grounds in complete ignorance of the social history of the landscape, and of the violence necessary to render it empty for them to enjoy. But awareness of the role of eviction in creating protected areas is growing. Discerning tourists tend not to enjoy holidays that depend on these processes. South Africa is unique in the continent in addressing the violence in the history of conservation. Tourists can not only go there with a clean conscience, they can be more certain that their fees are being put to good local use.

Australia too has sought to address the troubled relationship between the state and aboriginal peoples through more inclusive conservation policies. Few, if any, protected areas in Australia were established by removing indigenous inhabitants (Poirier and Ostergren 2002). This was because in many regions the damage had already been done, with entire groups killed off and others split up and forcefully assimilated into white society. Rather the impetus for co-management here has come from the enormous social dislocation which Aboriginal communities face following decades of marginalisation and discrimination. Following an enquiry into the high rates of Aboriginal death in custody the central government, and federal states, recognized that more efforts must be made to strengthen Aboriginal communities and their associations with country (the land) which colonization had so brutally severed. Co-management of state protected areas is one means by which this can be achieved.

As a federal country the fortunes and practice of co-management vary according to the state in which it occurs. The northern territory was the first to act establishing co-management arrangements over the Gurig National Park in 1981 (Smyth 2001). The Commonwealth government (central state) co-manages three protected areas – Uluru-Kata Tjuta (often known as Ayer's Rock), Kakadu and Booderee National Parks. In all cases the land was managed for conservation by the Australian government before co-management began. Title to the land was then granted inalienably to land trusts who hold it on behalf of traditional owners, and, as in South Africa at the moment title was granted the Commonwealth simultaneously began to lease the lands back from the aboriginal owners. The leases each last for 99 years, and each involve substantial payments which vary between AUS \$235,000 plus park management contracts (Booderee); \$150,000 and 25% of tourism income (Uluru), and lease money and 39% tourism revenues, worth AUSS\$ 1.3 million in 2000 (Kakadu).

Aboriginal representatives constitute the majority on the board. But the key question here is not numbers, but, as in South Africa, the capacity to make the boards work for the community. The establishment and development of co-management arrangements are scenes of perpetual conflict. This is inherent to such arrangements. In Kakadu they are further complicated by the presence of a large uranium mine, and the diversity of traditional groups who reside in different parts of the park (Lawrence 2000). In all parks various forms of traditional use of natural resources by Aboriginal groups continue, specifically hunting and fishing. But, as Smyth observes, these arrangements hinge on their ability to promote the development and community aspirations of the groups whose opportunities can be argued to have been curtailed by conservation restrictions (Smyth 2001). The story is mixed here. In Kakadu tourism enterprises employ considerable numbers of residents, but jointly owned tourism companies are still only beginning. For many traditional owners tourism remains an

alien activity, and catering to the needs of tourists is not a straight forward operation (Lawrence pers. comm. 2006). At Uluru despite the majority the traditional owners enjoy on the board they have not been able to restrict the practice of climbing on the rock (which they dislike because every year people die and are injured on it) and are only able to advise tourists against it. The economy of the local area is highly dependent on the income the park and its lease provides, but as yet the income has done little to address the chronic pathologies of alcohol and drug abuse and community dislocation that plague the local Aboriginal settlement. Nevertheless Reid and colleagues felt that, in general, compared to South Africa, the Australian parks service were investing much more in promoting local employment and training (Reid, Fig et al. 2004).

Australian co-management is characterised by greater openness to local cultural uses of natural resources and interpretations of the landscape. South African national parks are subject to a much more stringent interpretation of the legislation even in co-managed areas. However in Australia this can generate a further set of interesting ecological questions. Aboriginal groups interpret value in biodiversity differently from western scientists (Reid, Fig et al. 2004). Some feral introduced species (buffalo, rabbits) are ‘good tucker’ (food), so why try to exterminate them?

Fortunes in the different states of Australia vary. In New South Wales legislation allows a schedule of state parks to be returned to Aboriginal ownership. The benefits of this process are numerous. The state pays a substantial lease (often over one hundred thousand Australian dollars) to the owners, who comprise a majority on the management board. The cultural heritage in the landscape is managed by those whose heritage it is and people are re-connected to country in new powerful ways. For example the hand back of Biamanga and Gulaga National Park followed years of wrangling and disputes in which local aboriginal groups had fought the logging and desecration of sacred sites on Mumballa Mountain and Mt Dromedary respectively (Egloff 1979; Egloff 2004). Staff managing the parks and local traditional leaders enjoy productive and close relationships.

But note these problems with co-management. In order to be considered an owner, claimants have to subject themselves to a rigorous invasive inspection of their past and social links in order to establish their significant cultural associations with the place. This can be disturbing and generates conflict, as people who feel they have strong associations are omitted. Waters’ study of co-management and well being noted that:

‘it could also be argued that the processes of co-management have been detrimental to wellbeing as a result of the social conflict produced by the processes determining the issues of the identification of who can ‘speak for country’.’

(Waters 2006: 10)

Furthermore the NSW legislation stipulates that the lease be compulsorily renewed and that funds must be spent on the upkeep of the park. The committees are still exploring the latitude allowed in determining what can be included in park expenditure.

Still the situation is better than that operating in Queensland, where there is a more recent and active history of exclusion and dispossession. The worst case was that of the former residents of the Archer River Pastoral Station who raised the funds necessary to buy the pastoral lease from its owners and thus win back land taken by European settlers. The government of

Queensland however, which normally rubber stamps all such sales, decreed that they were not allowed to own it because it was not their government's policy to allow Aboriginal ownership of ranches. The Aborigines successfully contested the government's decision saying that it was racist discrimination. When they lost the case the government promptly compulsorily purchased the land and turned it into the Ben Archer National Park (now Mungkan National Park). But then the story gets worse. Upon the introduction of legislation allowing joint management of national parks by Aborigines and the government, the same group applied to have that park leased back to them and then jointly manage it with the government. They went through the same invasive and exhausting process of establishing significant historical and cultural ties to the land. And having been identified as the rightful owners were told by the Queensland government that their terms for leasing the park were that it would be given back to the government for free, and in perpetuity. The traditional owners have declined to pursue the issue.

In the face of this sort of hostility from the state there are still concrete ways however that conservation can become more meaningful to Aboriginal groups, and can value their connections to the land. This depends on the informal associations and friendships between park staff and local groups on which also hinge the success of the formal co-management arrangements (Smyth pers. comm. 2006). Renaming of sites within the park using local vernacular terms and the informal granting of collecting activities can be more valuable given the general desire of the state to deny and restrict such associations (Smyth pers comm.). Similarly, in New South Wales even if the legal process can be obstructive and impeding, it cannot block peoples' claims on and belonging to country.

Co-management therefore is a complicated tool. It can be a means by which states empower marginalised and disadvantaged groups. But it is also a means by which state control is extended and confirmed in different ways. It can restore relations to country, to land indigenous people value, but rarely on terms they determine. In New Zealand Coombes and Hill have shown that moves to 'co-manage' the Te Urewera National Park in the north west of the country are being met with hostility because residents fear that it will weaken the unresolved land claims that the Maori residents of the area have already made against the Crown (Coombes and Hill 2005). Similarly Tofa has examined co-management arrangements at Taranaki National Park in the north east of New Zealand (2007). This region experienced some of the worst injustices of suppression and land alienation prior to the park's establishment (Waitangi Tribunal 1996). The settlements, which have followed the Crown's recognition of its mistake, involve giving Maori iwi control over some conservation land and eventually some say in the management of Taranaki National Park itself.<sup>5</sup> Tofa argues that these arrangements are themselves further impositions as they have required the construction of governance entities which have reshaped iwi into forms which the government can negotiate with, and in the act of giving control over sites to particular iwi the settlements are at the same time closing off other areas. Nevertheless she observed that Maori were willing to co-operate with these arrangements because they offered a stepping stone to more satisfactory relations. Purists (and some Department of Conservation staff in New Zealand) insist however that co-management should only be applied to the country's national parks if the land is being handed back to Maori ownership. This is not occurring.

As a conservation tool, co-management has to be seen as one that works under very specific social and ecological conditions, and not as a universal panacea. In the Indian case, where

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<sup>5</sup> An iwi is approximately equivalent to a tribe in English. It is a named, distinct sub-group of the Maori people.

there are often up to 100 hamlets and settlements surrounding a national park, inhabited by half a million people, the complexity of co-management is likely to be on a different scale to that in less densely populated parts of the world. Furthermore, the potential for tourism related revenues to create positive incentives for conservation is much more limited, especially when these have to be shared out amongst such a large population. These considerations are serious enough to rule out co-management strategies in certain situations, and certainly merit a much more careful approach which recognises the constraints associated with transplanting such models from one empirical context to another.

## **Conclusion**

This paper has focused on local level resource management, indigenous stewardship of resources and institutions of common property management in the context of debates about biodiversity conservation. The paper suggests that while resilience is an essential property of robust resource management institutions, it is also important to recognise the dynamic nature of these institutions themselves, and the need for adaptation and iterative learning to enhance long-term sustainability. The paper argues that policy-oriented generalisations remain difficult, both because of the lack of comparability across diverse case studies, and the lack of an explicitly comparative institutional approach within the literature. Despite these difficulties, the paper suggests that it is important to isolate the ingredients of local success, and to use these to identify broader patterns that characterise resilient socio-ecological systems.

The evidence inevitably suggests that no single regime is uniquely associated with success, and that much more localised political ecologies are required for any prescriptive diagnosis. National Parks do seem to work in some contexts, but are not necessarily superior to alternative regimes. This is particularly true when considering the impacts of parks on overall conservation strategies, especially those that rely on associated protection activities outside park boundaries. While conservationists have started to recognise the value of local resource management institutions for biodiversity conservation, examples of effective devolution and democratic decentralisation remain rare. In some cases, local groups have initiated protection and conservation activities spontaneously, despite the lack of official or external support, and have grown in strength. Although the goals that these groups pursue do not necessarily explicitly prioritise the needs of biodiversity conservation, there are often serendipitous synergies between local livelihood strategies and conservation outcomes. While these examples suggest the possible compatibility of local priorities and broader conservation goals, the paper has stressed that these initiatives are usually located in highly complex social contexts. In particular, communities are often heterogeneous and marked by differences, so it is important to recognise that the potential for conflict remains significant, and that there are unlikely to be all that many easy 'win-win' outcomes.

The paper proceeds to reflect on a growing tendency to use economic incentives to generate revenues for local conservation activities, especially through tourism and wildlife harvesting. The harnessing of economic values, while an invaluable tool for conservation, can have differentiated impacts on local groups, especially in terms of gender and social class. If returns are significant, wealthier, male-dominated, politically powerful households might seek to capture these economic benefits disproportionately, at the expense of the poor and those less powerful. On the other hand, the paper also points out that in regions of the world where economic prosperity is creating alternative income-earning possibilities, the rich may now be losing interest in the relatively low returns that flow from conservation-related

livelihood activities. The potential for the use of economic incentives for conservation, thus, is shown to be highly variable, and must be placed within wider local and global socio-economic trends that shape the availability of alternative livelihood and income-generation possibilities.

The paper concludes with a review of co-management experiences from around the world. Again, while there is considerable potential for such an approach in some parts of the world, and substantial successes in the literature, the paper cautions against any universal generalisations from this experience. Co-management strategies require the careful nurturing of relationships between partners in a management regime, and the documented experiences suggest considerable variations in the extent to which these have actually emerged and survived in the field. At its best, co-management can be a true partnership of trusting equals, but at its worst it can serve to simply replicate exploitation and manipulation of local agendas by powerful external interests.

What this review serves to highlight, then, is the importance of local dynamics in shaping biodiversity conservation and socio-cultural outcomes. This might seem to be self-evident, but it is a point worth emphasising in order to avoid the temptation of recommending universal institutional panaceas to the challenges of promoting conservation in a social context. The lessons for global policy are to take the local seriously, but also to learn from the diversity of solutions that have worked in specific ecological and institutional settings, and to allow these to inform a more varied menu of options for decision makers. Truly resilient socio-ecological systems thrive on such diversity, and this is perhaps the most robust conclusion that can emerge from such a review exercise.

**Table 1: Conditions facilitating common property management regimes. From Agrawal 2001 page 1659 (Table 2)**

**1. The characteristic of the resource**

- small size
- well-defined boundaries
- low levels of mobility
- possibility of storing benefits from the resource
- predictability

**2. The nature of the user group**

- small size
- clearly defined boundaries
- shared norms
- past successful experiences
- appropriate leadership
- the group is internally interdependent
- heterogeneity of endowment; homogeneity of identities and interests
- low levels of poverty

**3. Relationship between characteristics of the resource and the group.**

- Overlap between the group's residence and the location of the resource
- High levels of dependence by the group on the resource
- Equitable allocation of benefits from common resources
- low levels of user demand
- gradual change in levels of demand

**4. Institutional Arrangements**

- Rules are simple and easy to understand
- Access and management rules are locally devised
- Rules are easily enforced
- Graduated sanctions
- Adjudication cheap
- Monitors and other officials accountable to users

**5. Relationship between resources system and institutional arrangements**

- Match restrictions on harvests to resource regeneration

**6. The Wider Social and Political Environment**

- Exclusion technology is low cost
- Adaptation time of technology suited to resource's dynamics
- Low levels of articulation with external markets
- Gradual change in articulation with external markets
- The State:
  - Central government does not undermine local authority
  - External sanctions supportive
  - Aid supports conservation activities
  - Nested appropriation, provision, enforcement and governance

Table 2: A comparison of the distribution of parks in Hayes' sample and others.

Country	Hayes 2006; Hayes and Ostrom 2005			Naughton- Treves et al, 2005	De Fries et al, 2005	Bruner et al, 2001
	Non Parks	Parks not in WDPA	Parks in WDPA			
Argentina	-	-	-	-	5	-
Bolivia	3	6	-	-	2	-
Brazil	2	1	-	-	32	7
Columbia	-	-	-	-	9	8
Ecuador	1	-	-	4	2	7
Paraguay	-	-	-	3	3	1
Peru	-	-	-	5	4	6
Venezuela	-	-	-	-	11	-
Belize	-	-	-	-	2	1
Costa Rica	-	-	-	12	2	-
Guatemala	6	1	-	2	4	-
Honduras	1	-	-	1	2	4
Mexico	2	4	-	2	-	1
Nicaragua	-	-	-	-	1	-
Panama	-	-	-	-	2	-
USA	7	-	-	-	1	-
Jamaica	-	-	-	1	-	-
Cambodia	-	-	-	-	4	1
China	-	-	-	1	3	-
India	28	11	1	-	10	-
Indonesia	-	-	-	3	29	8
Japan	-	-	-	-	1	-
Laos	-	-	-	-	-	10
Malaysia	-	-	-	-	3	-
Myanmar	-	-	-	-	1	-
Nepal	22	23	2	-	1	-
Philippines	-	-	-	-	1	7
Sri Lanka	-	-	-	-	4	-
Taiwan	-	-	-	-	4	-
Thailand	-	-	-	-	29	3
Vietnam	-	-	-	1	2	3
Brunei D'm	-	-	-	-	1	-
CAR	-	-	-	-	1	-
Congo	-	-	-	-	2	-
Cote d'Ivoire	-	-	-	-	2	4
DRC	-	-	-	-	4	-
Ghana	-	-	-	-	-	10
Kenya	-	1	4	1	1	-
Liberia	-	-	-	-	1	1
Madagascar	4	4	-	-	5	5
Malawi	-	-	-	-	1	-
Senegal	-	-	-	-	-	2
Tanzania	1	1	1	-	-	6
Togo	-	-	-	-	-	2
Uganda	10	3	13	8	-	6
Australia	-	-	-	-	2	-
<b>Total</b>	<b>87</b>	<b>55</b>	<b>21</b>	<b>44</b>	<b>198</b>	<b>93</b>

## References

- Agrawal, A. 2001. Common Property Institutions and Sustainable Governance of Resources. *World Development* 29:1648-1672.
- . 2003. Sustainable governance of common-pool resources: Context, methods, and politics. *Annual Review of Anthropology* 32:243-262.
- . 2005. Environmentalism, Community, Intimate Government, and the Making of Environmental Subjects in Kumaon, India. *Current Anthropology* 46:161-190.
- Alcorn, J., A. Kajuni, and B. Winterbottom. 2002. *Assessment of CBNRM Best Practices in Tanzania*. Presented to USAID / Tanzania.
- Alexander, J., and J. McGregor. 2000. Wildlife and Politics: CAMPFIRE in Zimbabwe. *Development and Change* 31:605-627.
- Antony, B. 2006. A view from the other side of the fence. PhD., Central European University.
- Ashenafi, Z. T., T. Coulson, C. Sillero-Zubiri, and N. Leader-Williams. 2005. Behaviour and ecology of the Ethiopian wolf (*Canis simensis*) in a human-dominated landscape outside protected areas. *Animal Conservation* 8.
- Baland, J. M., and J. P. Platteau. 1996. *Halting degradation of natural resources: is there a role for local communities?* Oxford: Clarendon Press.
- Berkes, F. 1999. *Sacred Ecology. Traditional Ecological Knowledge and Resource Management*. London: Taylor and Francis.
- . 2007. Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences of the United States of America* 104:15188-15193.
- Berkes, F. and C. Folke eds. 1998. *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge: Cambridge University Press.
- Bond, W. J. and J. E. Keeley. 2005. Fire as a global 'herbivore': the ecology and evolution of flammable ecosystems. *Trends in Ecology and Evolution*. 20(7): 387-394.
- Brockington, D. 2007. Devolution, Community Conservation and Forests. On local government performance and Village Forest Reserves in Tanzania. *Society and Natural Resources* 20:835-848.
- Bruner, A. G., R. E. Gullison, R. E. Rice, and G. A. B. da Fonseca. 2001. Effectiveness of parks in protecting tropical biodiversity. *Science* 291:125-128.
- Burnham, P. 2000. *Indian Country God's Country: Native Americans and National Parks*. Washington D.C.: Island Press.
- Caro, T., and P. Scholte. 2007. When protection falters. *African Journal of Ecology* 45:233-5.
- Chhatre, A. and V. Saberwal. 2006. *Democratizing Nature: Politics, Conservation and Development in India*. New Delhi: Oxford University Press.
- Child, B. 2000a. "Application of the Southern African Experience to wildlife utilisation," in *Wildlife Conservation by Sustainable Use*. Edited by H. H. T. Prins, J. G. Grootenuis, and T. T. Dolan, pp. 218-245. Boston: Kluwer Academic Publishers.
- . 2000b. "Making Wildlife Pay: converting wildlife's comparative advantage onto real incentives for having wildlife in African savannas, case studies from Zimbabwe and Zambia," in *Wildlife Conservation by Sustainable Use*. Edited by H. H. T. Prins, J. G. Grootenuis, and T. T. Dolan, pp. 218-245. Boston: Kluwer Academic Publishers.
- Child, B., and B. Dalal-Clayton. 2004. Transforming approaches to CBNRM: learning from the Luangwa experience in Zambia. in *Getting biodiversity projects to work: towards better conservation and development*. Edited by T. O. McShane and M. P. Wells. pp 256-289. New York: Columbia University Press.

- Conroy, C., A. Mishra and A. Rai. 1999. *Self-Initiated Community Forest Management in Orissa: Practices, Prospects and Policy Implications*. Chatham, UK: Natural Resources Institute.
- Coombes, B. L., and S. Hill. 2005. "Na whenua, naTuhoe. ko D.o.C. to partner" - Prospects for comanagement of Te Urewera National Park. *Society & Natural Resources* 18:135-152.
- Crook, R. and J. Manor. 1998. *Democracy and Decentralisation in South Asia and West Africa*, Cambridge: Cambridge University Press
- Dasgupta, P. 2005. Common Pool Resources as development drivers? A case study of NTFPs in Himachal Pradesh, India. New Delhi: Institute of Economic Growth. Available online [http://www.landcoalition.org/cd\\_ILC/cd\\_commons/doc\\_case/CPR07\\_Case21\\_India\\_Dasgupta.pdf](http://www.landcoalition.org/cd_ILC/cd_commons/doc_case/CPR07_Case21_India_Dasgupta.pdf)
- de Merode, E., and G. Cowlshaw. 2006. Species protection, the changing informal economy, and the politics of access to the bushmeat trade in the Democratic Republic of Congo. *Conservation Biology* 20:1262-1271.
- DeFries, R., A. Hansen, A. C. Newton, and M. C. Hansen. 2005. Increasing Isolation of Protected Areas in Tropical Forests Over the Past Twenty Years. *Ecological Applications* 15:19-26.
- Dzingirai, V. 2003. The new scramble for the African countryside. *Development and Change* 34:243-263.
- Egloff, B. J. 1979. *Mumballa Mountain. An Anthropological and Archaeological Investigation*. Aboriginal and Historical Resources, National Parks and Wildlife Services.
- . 2004. *Biamanga and Gulaga. Aboriginal Cultural Association with Biamanga and Gulaga National Parks*. Canberra: Cultural Heritage Research Centre, University of Canberra, Australia.
- Fabricius, C., and C. de Wet. 2002. "The influence of forced removals and land restitution on conservation in South Africa," in *Conservation and Mobile Indigenous Peoples. Displacement, forced settlement, and sustainable development*. Edited by D. Chatty and M. Colchester. New York: Berghahn Books.
- Folke, C., L. Pritchard, F. Berkes, J. Colding, and U. Svedin. 2007. The problem of fit between ecosystems and institutions: ten years later. *Ecology and Society* 12(1): 30. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art30/>
- GOI (2005) *Joining the Dots: The Report of the Tiger Task Force*; Project Tiger, Ministry of Environment and Forests, Government of India, New Delhi. Available online at <http://projecttiger.nic.in/TTF2005/index.html>
- Gray, T. N. E., H. Chamnan, R. Borey, N. J. Collar, and P. M. Dolman. 2007. Habitat preferences of a globally threatened bustard provide support for community-based conservation in Cambodia. *Biological Conservation* 138.
- Guha, R. 1997. "Radical American Environmentalism and Wilderness Preservation: a Third World Critique.," in *Varieties of environmentalism. Essays north and south*. Edited by R. Guha and J. Martinez-Alier. London: Earthscan.
- Hayes, T. M. 2006. Parks, People, and Forest Protection: An Institutional Assessment of the effectiveness of Protected Areas. *World Development* 34:2064-75.
- Hayes, T. M., and E. Ostrom. 2005. Conserving the World's Forests. Are Protected Areas the Only Way? *Indiana Law Review* 38:595-617.
- Homewood, K. M., and W. A. Rodgers. 1991. *Maasailand Ecology. Pastoralist development and wildlife conservation in Ngorongoro, Tanzania*. Cambridge: Cambridge University Press.

- Hulme, D., and M. Murphree. 2001. *African Wildlife and Livelihoods. The promise and performance of community conservation*. Portsmouth: Heinemann.
- Hurt, R., and P. Ravan. 2000. "Hunting and its benefits: an overview of hunting in Africa with special reference to Tanzania," in *Wildlife Conservation by Sustainable Use*. Edited by H. H. T. Prins, J. G. Grootenuis, and T. T. Dolan. Boston: Kluwer Academic Publishers.
- Igoe, J. 2004. *Conservation and Globalisation: a study of national parks and indigenous communities from East Africa to South Dakota. Case studies in contemporary social issues*. Belmont, CA: Wadsworth/Thomson Learning.
- Igoe, J., and D. Brockington. 1999. Pastoral Land Tenure and Community Conservation: a case study from North-East Tanzania. *IIED. Pastoral Land Tenure Series* 11.
- Igoe, J., and B. Croucher. 2007. Poverty alleviation meets the spectacle of nature: Does Reality Matter? *Conservation and Society*. 5.
- Igoe, J., and T. Kelsall. 2005. *African NGOs, Donors, and the State: Between a Rock and a Hard Place*. Durham, NC.: Carolina Academic Press.
- Johnson, C. 2001. Community Formation and Fisheries Conservation in Southern Thailand. *Development and Change* 32:951-974.
- Jones, B., and M. Murphree. 2001. "The Evolution of Policy on Community Conservation in Namibia and Zimbabwe," in *African Wildlife and Livelihoods*. Edited by D. Hulme and M. Murphree. Portsmouth: Heinemann.
- Kitson, J. C. 2002. What limits the number of TiTi (Puffinus griseus) Harvested by Rakiura Maori. *Human Ecology* 30:503-521.
- Koch, E. 2004. "Putting out fires: Does the 'C' in CBNRM stand for community or centrifuge," in *Rights, Resources and Rural Development. Community-based Natural Resource Management in Southern Africa*. Edited by C. Fabricius, E. Koch, H. Magome, and S. Turner, pp. 93-111. London: Earthscan.
- Lawrence, D. 2000. *Kakadu: the Making of a National Park*. Melbourne: Melbourne University Press.
- Levin, S. A., S. Barrett, W. Baumol, C. Bliss, B. Bolin, N. Chichinsky, P. Dasgupta, P. Ehrlich, C. Folke, I. M. Gren, C. S. Holling, A. M. Jansson, B.-O. Jansson, K.-G. Mäler, and C. Perrings. 1998. Resilience in natural and socioeconomic systems. *Environment and Development Economics* 3: 222-235.
- Lewis, M. 2003. Cattle and conservation at Bharatpur: a case study in science and advocacy. *Conservation and Society*, 1(1), 1-21.
- MacDonald, K. 2004. "Developing 'Nature': global ecology and the politics of conservation in Northern Pakistan.," in *Confronting Environments: Local Environmental Understanding In A Globalising World*. Edited by J. Carrier. Lanham: AltaMira Press.
- . 2005. Global Hunting Grounds: power, scale and ecology in the negotiation of conservation. *Cultural Geographies* 12:259-91.
- McCabe, J. T. 2002. "Giving Conservation a Human Face? Lessons from Forty Years of Combining Conservation and Development in the Ngorongoro Conservation Area, Tanzania," in *Conservation and Mobile Indigenous Peoples. Displacement, forced settlement and sustainable development*. Edited by D. Chatty and M. Colchester, pp. 61-76. New York: Berghen Books.
- McCabe, J. T., S. Perkin, and C. Sholfield. 1992. Can conservation and development be coupled among pastoral people? An examination of the Maasai of the Ngorongoro Conservation Area, Tanzania. *Human Organisation* 51:353-66.
- Meir, E., S. Andelman, and H. P. Possingham. 2004. Does conservation planning matter in a dynamic and uncertain world? *Ecology Letters* 7:615-22.

- Molnar, A., S. J. Scherr, and A. Khare. 2004a. *Who conserves the world's forests? A new assessment of conservation and investment trends*. Washington DC: Forest Trends; Ecoagriculture partners.
- . 2004b. *Who conserve's the world's forests? Community-driven strategies to protect forests and respect rights*. Washington DC: Forest Trends.
- Murdoch, W., S. Polasky, K. A. Wilson, H. P. Possingham, P. Kareiva, and R. Shaw. 2007. Maximizing return on investment in conservation. *Biological Conservation* 139.
- Murombedzi, J. 2001. "Committees, Rights, Costs & Benefits. Natural Resource Stewardship & Community Benefits in Zimbabwe's CAMPFIRE Programme," in *African Wildlife and Livelihoods. The promise and performance of community conservation*. Edited by D.Hulme and M.Murphree. Oxford: James Currey.
- . 2003. "Devolving the expropriation of nature: the 'devolution of wildlife management in southern Africa.," in *Decolonizing Nature. Strategies for conservation in a post-colonial era*. Edited by W. M. Adams and M. Mulligan. London: Earthscan.
- Murphree, M. 2001. "Community, Council and Client. A case study in ecotourism development from Mahenye, Zimbabwe.," in *African Wildlife and Livelihoods*. Edited by D. Hulme and M. Murphree. Portsmouth: Heinemann.
- . 2005. "Congruent Objectives, Competing Interests, and Strategic Compromise: Concept and Process in the Evolution of Zimbabwe's CAMPFIRE, 1984-1996.," in *Communities and Conservation. Histories and Politics of Community-Based Natural Resource Management*. Edited by J. P. Brosius, A. L. Tsing, and C. Zerner, pp. 105-147. Walnut Creek, CA: Altamira.
- Murphree, M. W. 1996. "Approaches to Community Participation," in *African Wildlife Policy Consultation, Final Report*. Edited by ODA. London: Jay Printers.
- Naughton-Treves, L., M. Buck Holland, and K. Brandon. 2005. The Role of Protected Areas in Conserving Biodiversity and Sustaining Local Livelihoods. *Annual Review of Environment and Resources* 30:219-252.
- Nelson, F. 2004. The evolution and impacts of community-based ecotourism in northern Tanzania. *IIED Drylands Programme Issue Paper* 131.
- Nelson, F., and S. O. Makko. 2003. "Communities, Conservation and Conflicts in the Tanzanian Serengeti." *Third Annual Community-based conservation network seminar: turning natural resources into assets, Savannah Georgia, 2003*.
- Nepstad, D., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, A. Alencar, E. Prinz, G. Fiske, and A. Rolla. 2006. Inhibition of Amazon Deforestation and Fire by Parks and Indigenous Lands. *Conservation Biology* 20:65-73.
- Netting, D. 1981. *Balancing on an Alp: Ecological Change and Continuity in a Swiss Mountain Community*. Cambridge: Cambridge University Press.
- Ostrom, E. 1990. *Governing the Commons. The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Ostrom, E., J. Burger, C. B. Field, R. B. Norgaard, and D. Policansky. 1999. Revisiting the Commons: local lessons, global challenges. *Science* 284:278-282.
- Ostrom, E., T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, and E. U. Weber. 2002. *The Drama of the Commons*. Washington DC: National Academy Press.
- Ostrom, E., and H. Nagendra. 2006. Insights on linking forests, trees and people from the air, on the ground, and in the laboratory. *Proceedings of the National Academy of Sciences of the United States of America* 103:19224-19231.
- Oyono, P. R. 2004a. *Institutional deficit, representation, and decentralized forest management in Cameroon*. World Resources Institute. Washington DC.

- . 2004b. One step forward, two steps backward? Paradoxes of natural resources management decentralisation in Cameroon. *Journal of Modern African Studies* 42:91-111.
- . 2004c. The social and organisation roots of ecological uncertainties in Cameroon's forest management decentralisation model. *European Journal of Development Research* 16:174-191.
- Poirier, R., and D. Ostergren. 2002. Evicting People from Nature: Indigenous Land Rights and National Parks in Australia, Russia and the United States. *Natural Resources Journal* 42:331-351.
- Potkanski, T. 1997. Pastoral Economy, property rights and traditional mutual assistance mechanisms among the Ngorongoro and Salei Maasai of Tanzania. *IIED Pastoral Land Tenure Series Monograph* 2.
- Rai, N. D. 2007. The Ecology of Income: can we have both fruit and forest? in *Making Conservation Work: securing biodiversity in this new century*, Edited by Ghazala Shahabuddin and Mahesh Rangarajan, pp. 147-164. New Delhi: Permanent Black.
- Redford, K., J. G. Robinson, and W. M. Adams. 2006. Parks as Shibboleths. *Conservation Biology* 20:1-2.
- Reid, H. 2001. Contractual National Parks and the Makuleke Community. *Human Ecology* 29:135-155.
- . 2006. Culture, conservation and co-management: lessons from Australia and South Africa. *Policy Matters* 14:255-268.
- Reid, H., D. Fig, H. Magome, and N. Leader-Williams. 2004. Co-management of Contractual National Parks in South Africa: Lessons from Australia. *Conservation and Society* 2:377-409.
- Reid, H., and S. Turner. 2004. "The Richtersveld and Makuleke contractual parks in South Africa: win-win for communities and conservation?," in *Rights, Resources and Rural Development. Community-based Natural Resource Management in Southern Africa*. Edited by C. Fabricius, E. Koch, H. Magome, and S. Turner, pp. 93-111. London: Earthscan.
- Ribot, J. C. 2004. *Waiting for democracy. The politics of choice in Natural Resource Decentralisation*. Washington DC: World Resources Institute.
- . 2006. Choose democracy: Environmentalists' socio-political responsibility. *Global Environmental Change-Human and Policy Dimensions* 16:115-119.
- Rodrigues, A. S. L., S. J. Andelman, M. I. Bakarr, L. Boitani, T. M. Brooks, R. M. Cowling, L. D. C. Fishpool, G. A. B. da Fonseca, K. J. Gaston, M. Hoffmann, J. S. Long, P. A. Marquet, J. D. Pilgrim, R. L. Pressey, J. Schipper, W. Sechrest, S. N. Stuart, L. G. Underhill, R. W. Waller, M. E. J. Watts, and X. Yan. 2004. Effectiveness of the global protected area network in representing species diversity. *Nature* 428:640-643.
- Roe, D., J. Hutton, J. Elliot, M. Saruchera, and K. Chitepo. 2003. In pursuit of pro-poor conservation - changing narratives . . . or more? *Policy Matters* 12:87-91.
- Sinha, S, S. Gururani and B. Greenberg. 1997. The 'new traditionalist' discourse of Indian environmentalism, *Journal of Peasant Studies*, 24 (3): 65-99.
- Smith, E. A., and M. Wishnie. 2000. Conservation and Subsistence in small-scale societies. *Annual Review of Anthropology* 29:493-524.
- Smyth, D. M. 2001. "Joint Management of National Parks," in *Working on Country. Contemporary Indigenous Management of Australia's Lands and Coastal Regions*. Edited by R. Baker, J. Davies, and D. Young. Oxford: OUP.
- Stoner, C., T. Caro, S. Mduma, C. Mlingwa, G. Sabuni, M. Borner, and C. Schelten. 2007. Changes in large herbivore populations across large areas of Tanzania. *African Journal of Ecology* 45:202-215.

- Sullivan, S. 2000. "Gender, ethnographic myths and community-based conservation in a former Namibian 'homeland'." in *Rethinking pastoralism in Africa: gender, culture and the myth of the patriarchal pastoralist*. Edited by D. Hodgson, pp. 142-164. Oxford.: James Currey.
- . 2006. The Elephant in the Room? Problematizing 'New' (Neoliberal) Biodiversity Conservation. *NUPI Forum for Development Studies* 2006:105-135.
- Sundar, N., R. Jeffery and N. Thin (2001) *Branching Out: Joint Forest Management in India*, Delhi: Oxford University Press.
- Swatuk, L. A. 2005. From 'project' to 'context': community-based natural resource management in Botswana. *Global Environmental Politics* 5:95-124.
- Taiepa, T., P. Lyver, P. Horsley, J. Davis, M. Bragg, and H. Moller. 1997. Co-management of New-Zealand's conservation estate by Maori and Pakeha: a review. *Environmental Conservation* 24:236-250.
- The-World-Bank. 1999. *Report from the International CBNRM Workshop*. Washington DC.
- Tofa, M. 2007. Justice in Collaboration? Indigenous Peoples and Postcolonial Conservation Management. Master of Arts, University of Auckland.
- Turner, M. G., W. H. Romme and D. B. Tinker. 2003. Surprises and lessons from the 1988 Yellowstone fires. *Frontiers in Ecology and the Environment* 1(7): 351-358.
- Villa Boas, O., and C. Villa Boas. 1968. Saving Brazil's Stone Age Tribes From Extinction. *National Geographic* 134:424-444.
- Vira, B. 2005. Deconstructing the Harda experience: the limits of bureaucratic participation, *Economic and Political Weekly*, 40(48): 5068-75.
- Wade, R. 1988. *Village Republics: Economic conditions for collective action in South India*. Oakland: ICS Press.
- Waitangi Tribunal, T. 1996. *The Taranaki Report: Kaupapa Tuatahi*. Wellington.
- Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, Adaptability and Transformability in socio-ecological systems. *Ecology and Society* 9:5 <http://www.ecologyandsociety.org/vol9/iss2/art5>.
- Waters, K. 2006. *Discussion Paper on Wellbeing and Co-management*. Waters Consultancy. Earlwood.
- Western, D. 1994. "Ecosystem conservation and rural development: the case of Amboseli," in *Natural Connections. Perspectives in Community-based Conservation*. Edited by D. Western and R. M. Wright. Washington DC.: Island Press.
- Wilkie, D. S., and J. F. Carpenter. 1999. Bushmeat hunting in the Congo Basin: an assessment of impacts and options for mitigation. *Biodiversity and Conservation* 8:927-955.
- Wily, L. A. 2002. The political economy of community forestry in Africa - getting the power relations right. *Forest Trees and People Newsletter* 46:4-12.
- Wily, L. A., and P. A. Dewees. 2001. From users to custodians: changing relations between people and the state in forest management in Tanzania. *World Bank Policy Research Paper* 2569.