Journal of East African Natural History **105**(1)**:** 1–19 (2016)

LOCAL RULES AND THEIR ENFORCEMENT IN THE ARABUKO-SOKOKE FOREST RESERVE CO-MANAGEMENT ARRANGEMENT IN KENYA

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ABSTRACT

The management of common-pool resources is a key problem in global environmental governance: forests, freshwater resources, pastures, and land are often managed by communities and organisations (bureaucracies, NGOs) at different organisational scales that are competing for the right to manage the resource in question, and often find ambiguous negotiated institutional solutions to co-management problems. Often these solutions are the result of complex bargaining processes rather than of institutional design. In the context of the ongoing debate over the kinds of rules that are appropriate for the sustainable management of common-pool resources (CPRs), this paper examines the local rules and their enforcement emerging from co-management between government agencies and local project communities in Arabuko-Sokoke Forest Reserve (ASFR), Kenya's largest remaining coastal forest. Arabuko-Sokoke has been a national forest reserve for many decades, but only during the past two decades have communities been involved in conservation and resource extraction under piloting participatory forest-management schemes. A state-owned and controlled resource is made into a co-managed common-pool resource—or so the theory of community-based natural resource management goes. Our contribution is informed by Ostrom's (1990, 2008) design principles, but we critically scrutinize the manifold problems involved in transfers of access and management rights from state to local community, and the planned (re-)emergence of common-pool resource management. We compare communities involved in a governmental programme fostering communal management and communities not involved in such programmes (The study addresses a number of critical questions related to the transfer of centralised governmental rights in the management of natural resources, and the co-management of forests between government agencies and local communities. The ASFR co-management programme was initiated nearly two decades ago with the aim of conserving the forest and at the same time improving the livelihoods of the communities dependent on it. The findings

show that despite a number of challenges, local rules and enforcement have started to emerge in co-managed parts of ASFR, though in an imperfect, volatile and ambiguous manner.

Keywords: Forest management, institutions, common pool resources, conservation

INTRODUCTION

Local rules (boundary-making, conflict resolution), their enforcement (monitoring, sanctioning) and governmental attempts at co-management and decentralisation are key themes in the current literature on common-pool resources (Dietz *et al.*, 2003; Gibson *et al.*, 2005; Ostrom & Nagendra, 2006 Nagendra & Gokhale, 2008; Singh *et al.*, 2011). Comparative evidence points to the fact that local rule-making and local enforcement, as opposed to external rule-making and enforcement by the government agencies (as had been proposed by Hardin in his treatise on the tragedy of the commons, 1968) is a key condition for success in the management of common-pool resources (Singh *et al.*, 2011; Gibson *et al.*, 2005). High levels of local rule enforcement and strong collective action have also been found to improve the quality of management of common pool resources.[1] The key indicators of the existence of local enforcement are rule compliance, effective monitoring, guarding against unauthorised use, and graded sanctions for dealing with offenders (Singh *et al.*, 2011). Without a proper monitoring system, it is difficult to enhance participatory engagement in rule-keeping where a large number (perhaps the majority) of stakeholders will take responsibility for monitoring the state of the resources and complex processes of resource extraction (Dietz *et al.*, 2003). While there is some agreement among scientists that such monitoring systems are essential but difficult to engineer: stakeholders are bound in heterogeneous communities and reaching consensus is difficult. At the same time resource extraction by a multitude of not organised users itself is a complex process difficult to monitor. Community sanctions, for example social pressure (*e.g.* open criticism, back-biting), is generally considered very important and can be useful in making the households or communities consider the costs of resource over-use and rule-breaking, and increase their compliance (Pomeroy *et al.*, 2001). The sharing of responsibility and a mutual acknowledgement of the legitimacy of the management claims of governmental agencies and communities in guarding a common resource is considered likely to lead to high levels of enforcement of the co-management rules (Singh *et al.*, 2011). When management is initiated and owned locally communities demonstrate their capacity for putting effective and adaptive forest management practices in place to address future forest governance (Pandey, 1993; Pandey, 2003; Ostrom & Nagendra, 2006; Singh *et al.*, 2011). Effective implementation of

[1] A common-pool resource is here defined as a resource for which property rights are connected to a social community. Such property rights are often defined vaguely. Generally common-pool resources are sufficiently large that it is challenging to define legitimate users and exclude other users. Each person's use of such resources subtracts benefits from the resource that others might enjoy, but one person's use does not subtract a definite quantity from another's use (Ostrom, 2008). Fisheries and forests are typical common-pool resources.

community-based forest management aims at significant improvements of livelihood outcomes (Singh *et al.*, 2011; Ming'ate *et al.,* 2014). Local institutions lower the probability of participants' free-riding on the efforts of others and increase the likelihood of positive benefits (Pagdee *et al.*, 2006). However, such institutions are costly to design. So explaining why some communities effectively organise themselves well while others do not is a very difficult task (Gibson *et al.*, 2005).

Since the 1990s the theoretical insights into common-pool resource management were used to decentralise natural-resource management and to devolve certain rights from the state to local communities (Bollig & Menestrey-Schwieger, 2014). Forests under participatory management have been of exemplary interest for researchers, and community-based forest management has become, in various forms, an established policy goal of rural development, especially in Africa (Blaikie, 2006). To what extent participatory forest management, as proposed and carried out by government agencies, is tantamount to common-pool resource management, or whether participation is only one ingredient of the successful co-management of common pool resources will be an issue discussed in this paper. We will argue here that participation is certainly an important and necessary step toward establishing effective common-pool resource management at the local level, but other steps that give local communities true entitlements to resources and the autonomy to find own modes of exploiting them are certainly worth taking.

In contrast to an earlier contribution (Ming'ate *et al.,* 2014) this paper focusses rather on institutional dynamics in co-managed areas and does not deal extensively with the consequences of PFM for local livelihoods. Two other recent publications have dealt with PFM outcomes in ASFR. Matiku, Mireri and Ogol (2012) show that in the PFM zones community benefits arising from PFM have translated into higher levels of education, food security and improved housing. Jackson and Naughton-Treves (2012) deal with the effects of the Arabuko-Sokoke Schools and Ecotourism Scheme in which school fees are paid in return for active engagement with community based conservation. It is not surprising that they find that these incentives condition pro-conservation attitudes. This contribution has a very different focus: its main interest is to what extend PFM can contribute to the emergence of effective common pool resource management. In our contribution we ask how local rules for community-based forest management can develop in a situation in which the transfer of rights and obligations from governmental agencies to communities is imperfect and ambiguous.

THE REGIONAL FRAMEWORK OF ASFR

ASFR (see figure 1) is located in the hot and humid coastal climate of East Africa, with an average temperature of around 29°C. There are two rainfall seasons of over 1,000 mm in the wet part of the year, declining to 600 mm in the dry part of the year. ASFR covers 41 600 ha and is the largest single block of coastal forest remaining in East Africa. The hunter-gatherer community Sanya (also Sanye or Dahalo) were the original users of this coastal forest and members of this community are still present on the margins of the forest. Further, the forest has provided the dominant local Giriama population with essential resources: various food resources (honey, berries, fruits, timber, fire wood, grass for thatching, medicines) (Ming'ate *et al.*, 2014). The forested area was already declared Crown Land in 1932 and was gazetted as a forest reserve in 1943 due to administrative fears of extensive logging and firewood extraction (Arabuko-Sokoke Forest Management Team, 2002). The forest has been

protected ever since then.

The ASFR is surrounded by about 50 villages that depend on the forest for their subsistence, with a total population exceeding 100 000 (Arabuko-Sokoke Forest Management Team, 2002; Ming'ate *et al.*, 2014). The main food crops grown in the area are maize, cassava, and beans, while the locally grown cash crops include coconuts, mangoes, cashew nuts, and sesame. Farmers are increasingly taking up dairy farming. The environment has also provided tree species producing valuable timber for both the furniture and construction industry (Muriithi & Kenyon, 2002).

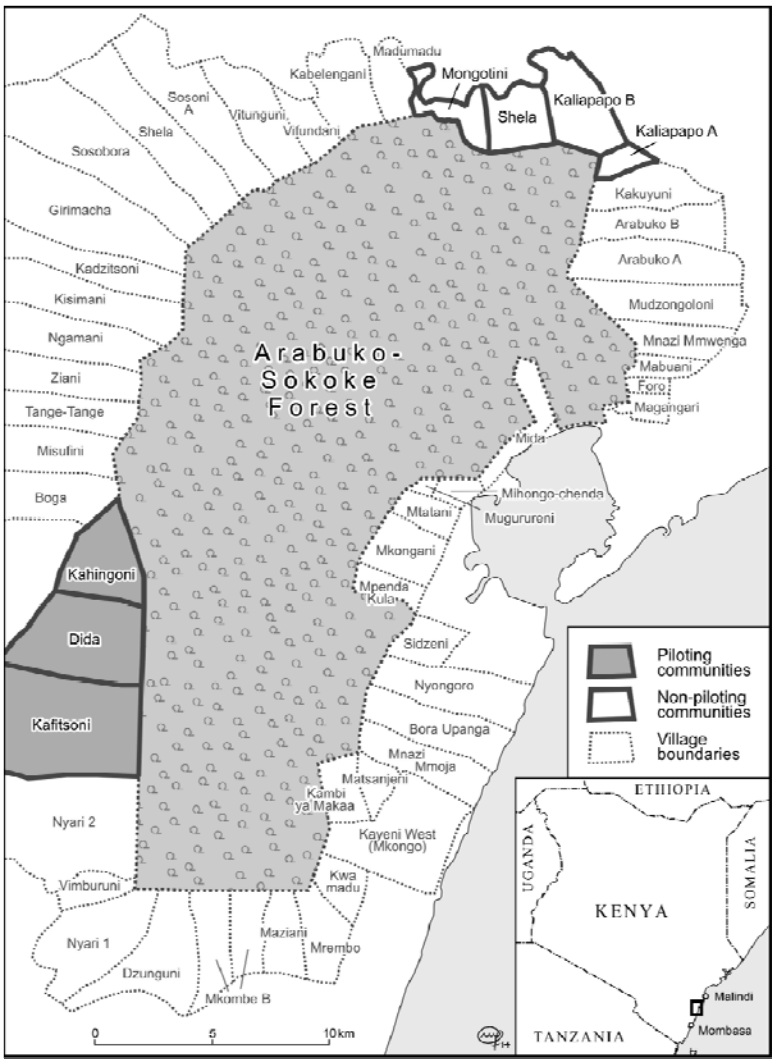

Figure.1: Arabuko-Sokoke Forest and Adjoining Villages.

The forest is currently managed between four government agencies: the Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Kenya Forestry Research Institute (KEFRI),

and National Museums of Kenya (NMK). Part of the forest is co-managed in a formalised participatory way by local inhabitants living adjacent to the forest in a few selected villages. Informally, however, of course villagers from other places adjacent to the forest also make use of its resources, even if illegally, and thereby informally co-manage the park's resources as well. Hence, only Kahingoni, Dida, and Kafitsoni villages are actively involved in piloting the co-management agreement and were therefore selected for study. It is noteworthy that the transitory piloting phase is now almost 20 years old. Despite positive outcomes the government has neither expanded the piloting scheme nor formalised agreements with those local communities participating in the piloting scheme to change preliminary agendas into permanent contracts. The management of the ASFR is currently overseen by the Arabuko-Sokoke Forest Management Team (ASFMT) that comprises a small team of central government bureaucrats (namely: KWS, NMK, KEFRI and KFS, donors (NGOs) and community representatives governed by a Memorandum of Understanding (MOU) (Ming'ate *et al*. 2014)

Communities involved in a governmental programme fostering communal management (hereafter *piloting communities*) were compared with the second set of cases comprising four communities not involved in the governmental PFM programme (hereafter *non-piloting communities*): Kaliapapo A, Kaliapapo B, Shela, and Mongotini (Arabuko-Sokoke Forest Management Team, 2002; Ming'ate *et al.*, 2014). The three villages constitute the Dida sub-location in Kilifi district, and the four villages constitute the Mongotini sub-location in Malindi District. The two sets of cases (piloting and non-piloting) were selected on account of their similar poverty and population characteristics. These similarities were established in a number of qualitative interviews and are not directly supported by quantitative data. The selected communities are ethnically homogenous and rely on agriculture for their subsistence.

MATERIAL AND METHODS

The study mainly employed qualitative approaches. Purposive sampling was used in choosing all the participants of this study (Bernard, 1994). This way of sampling is meaningful in case random sampling cannot be applied because *e.g.* the structure and number of people in the originally researched community is not clear and reliable demographic data is hard to come by. Purposeful sampling is considered advantageous when studying subjects who have specific experiences or subjects with special expertise (Marshall, 1996). We took six months to collect data, seeking both people with experience in co-management and those with no experience, and we also sought information from those with special knowledge and roles in the co-management of the ASFR.

In total some 109 interviews were conducted with members of selected households as well as with organisational informants. In the text hints to original interviews appear in an abbreviated form (*e.g.* HC100). In addition, we conducted detailed household surveys in piloting and non-piloting communities. Participant observation was also used in data collection. 38 respondents from PFM-piloting villages and 41 respondents from non-PFM-piloting villages; 9 detailed household case studies in piloting communities, and 6 detailed case studies in non-piloting communities; 8 household key informants and 7 key informants from the organisations operating in the co-management arrangement were interviewed. All interviews conducted were semi-structured; *i.e.* a list of set questions was put forward but interviewed persons were given enough leeway to develop their ideas independently from the interviewers' questions. For example, we asked a number of informants about their ideas on

the acceptance and practices of boundaries around resources emerging when rules of co-management were laid out and about differential resource use within and around ASFR. To understand the rules for appropriation and provision and the local conditions, interviewees were asked to explain whether the operational rules they use in harvesting the forest resources restrict them in terms of time, place, technology, and/or the quantity (units) or quality of the products that they harvest from the forest. Household members were also asked whether local conditions were appropriately considered when resource-use plans were drafted. As the research project was keenly interested in the rules and practices of sanctioning, extended case histories of conflict over resource were documented, and interviews were specifically focussed on monitoring and sanctioning.

All audio-recorded interviews were checked for audibility prior to transcribing and then transcripts were quality-checked by comparing them with the original interview recordings. They were then coded manually. After coding, we identified the data that were directly relevant to the objectives of the study and put them together manually according to similar themes and meanings while considering the research objectives and questions, and used them to assist in answering the research objectives (Bernard, 1994).

RESULTS AND DISCUSSION

The following paragraphs present results from the comparative study of social institutions for communal forest management in piloting and non-piloting communities surrounding the ASFR. We go along with the design principles specified by Ostrom (1990).

ASFR forest and resource users' boundaries

Ostrom (1990) specifies clearly defined social boundaries 'around' user groups and spatial boundaries 'around' resources for which user rights are specified as the first principle of successful CPR management. Consequently, the following analysis of forest resources and resource users' boundaries is presented in two parts: (1) the definition of boundaries for the forest resources, and (2) the resources users' boundaries.

The boundaries of forest resources

Already during colonial times, the area of today's ASFR was put under protection. In 1932 39 105 ha of forest were set aside as Crown Forest. In 1943 this area was gazetted as Forest Reserve to be management by the Forestry Department. Later another 2676 ha were gazetted and a strict nature reserve of 2700 ha was mapped and further extended with 1635 ha in 1979. After independence the Kenyan government kept the protection status of the forest and in many ways continued the colonial practice of forest management. However, illegal use of forest resources was a constant problem and there was a lot of conflict between the government and local communities (Maundu, 1993; Mbuvi & Ayiemba, 2005). In the 1990s the government looked for options to co-manage the protected forest area together with local communities. These efforts were supported by a number of governmental organisations (including KWS and KEFRI) and international non-governmental organisations (particularly BirdLife International under an EU grant) that directly co-funded participatory forest management (PFM) projects (Maundu, 1993). Such co-funding of projects ended some years ago, and currently no donor-money is going into the piloting schemes.

Since colonial times the boundaries of ASFR have been clearly defined on maps but, it is only recently that a large electric fence was put up to reduce human-wildlife conflicts and

marked the boundary in a much more material way. Resources within the ASFR were not clearly marked and had to be specified in a dialogue between resource users and government agencies after the decision on co-management had been made. From the interviews and project papers it became clear that five resource-use zones had been established to which pilot communities had access: (1) a pole-cutting zone, which ran one kilometre inwards from the forest boundary; (2) a fuel wood zone, which extended one to two kilometres inwards from the forest boundary (3) the biodiversity conservation zone, which began two kilometres inside the forest boundary and extended a further kilometre inwards, and (4) a household zone, which was an area entirely outside the forest boundaries, consisting of private land (the household farms) and generally thought of as a buffer between the conservation zone and agriculturally used zone (in reality though agriculture is practised right up to the forest edge). Piloting communities' households use this zone and carry out various activities that give them livelihood benefits (*e.g.* planting of *Casuarina equisetifolia* L. trees and beekeeping). The fifth zone, the core conservation area in the centre of the forest, does not allow for any human resource use activities. Plans to use this zone for scientific research and/or tourists have not been put into practise yet. These use zones have been specified only in and for the piloting communities and have not been fully formalised by the central government yet – more than a decade after the piloting scheme started. This indicates the difficulties governmental agencies face when formally devolving rights to local communities. After the termination of donor-funding, perhaps there was also a lack of motivation on the part of government agencies to expand and formalise the process of co-management—and probably also lack of funds to do so. In expert interviews with government staff it was argued that these zones were only set aside for trials for the co-management arrangement by KEFRI (HC103) and that no formal transfer of management rights was intended; hence none of the maps in use showed these use-zones for piloting schemes. Zones for taking other forest resources did not exist, and no particular areas were identified by interviewees as being of special significance for other activities, such as medicinal herb-collecting (HC125 and HC214). These demarcations of resources have only been discussed with piloting communities. This however does not imply that members of other communities are completely excluded from resource use within ASFR. Any person within five kilometres of the boundary of ASFR has a legal right to collect firewood from the forest (DHC104), be they inhabitants of piloting or of non-piloting communities, upon receiving a permit from KFS.

Boundaries of resources users

While there were efforts to define spatial boundaries of resource use within the ASFR, the definition of social boundaries of a resource user group was more difficult. Only the use of firewood was allowed for all communities adjoining the forest. All other legal uses were formally a prerogative of the piloting communities, which had set up separate management plans with the authorities. Villagers from piloting communities had to be registered in a resource user group: *e.g.* beekeeping, tree farming, or medicinal herb collection. Resource users were allowed only to register in one user group. This rule was difficult to maintain as the same households *e.g.* farmed butterflies and also kept bees. Hence, while individual users perhaps engaged only in one activity, households often engaged in a number of them. In order to be eligible for a permit, a household must be a registered member of a particular user group and also must make a small payment of Kshs 100 (*ca.* 1 US$) (DHC105 and DHC110). The permit specifies the name of the resource user and the payment made. At the time of data procurement, anybody who wished to join a particular user group in the piloting

communities could do so, irrespective of whether they were poor or rich, resident or non-resident. Especially the latter point provided some room for irritation, as outsiders could register themselves as members of resource user groups without inhibition. The regulations on group membership do not clearly stipulate who should be a member and who should be excluded from resource use. It is also not specified how to exclude non-members from participating in the co-management decision-making. The situation is further complicated as even non-forest-adjacent communities can obtain the right to access forest resources by virtue of payment of a permit fee to the Kenya Forest Service. This implies that it is not only PFM pilot communities that profit from co-management, as people from other places can also benefit, as long as they can obtain a permit. Neither the households nor the forest guards have the powers to stop intruders if they have a permit for collecting particular resources. However, such outsiders with KFS permits are clearly not bound by any regulations and rules set up by pilot communities. So, the entitlements of households to forest resources were found to be embedded in the permits issued to them to collect particular forest resources (HC128 and HC223); that is, these entitlements were more connected with individual permits given out by KFS than with membership in a social group. A substantial number of household respondents reported that it is an individual decision as to which forest resource user group to join. This situation implies a lack of congruence between social boundaries around legal resources (these boundaries are defined by the permit system) and social boundaries of communities meant to co-manage the forest with government agencies (these are the boundaries of the piloting communities). However, the interviews with households and the organisational informants found that the major constraint facing the establishment of both resource use and community boundaries is that the government has not signed an agreement with the communities to acknowledge the latter's' full rights over the resources (HC112) pointing out to an imperfect transfer of rights from governmental agencies to local communities.

Rules for appropriation and provision, and local conditions

Ostrom (1990) argues that rules of appropriation and provision must be adapted to local ecological and socio-economic conditions (see also Ambika & Ganesh, 2005). The responses from informants suggested that they perceive local resources as abundant and not as threatened; they particularly highlighted the local economic value of such resources. In fact, the community was almost entirely focused on what was good for their (short-term) needs rather than on the sustainability of the resources on which their livelihoods depend. This held true both for piloting and non-piloting communities. For instance, the illegal removal of forest products was found to take place in both the piloting and non-piloting communities (KH107, KOI01, KOI04 and HC232) and was not commented upon negatively, but rather accepted as a necessary evil. Hence, while socio-economic challenges and options were highlighted, ecological constraints did feature prominently in local reasoning.

The study found that the only area in which rules for appropriation and provision have been significantly developed is that related to fuel wood. Rules were in existence both in piloting and non-piloting communities and they were certainly active and alive long before PFM was introduced to the region. For instance, the rule for fuel wood collection restricts the households in terms of the equipment they may use for harvesting fuel wood (*e.g.* only an axe or machete may be carried) and specifies that only dead wood or fallen trees may be taken. Further, only one headload of firewood is allowed to be taken out of the forest per day per household in order to restrict firewood gathering to subsistence needs and to inhibit the commoditisation of firewood exploitation. Thus, these rules are generally congruent with the

local conditions, even though they lack the capacity to prevent multiple trips for households in a day—as there is nobody who would register (or better: who would be interested to register) whether a second or a third headload of firewood is taken out of the forest.

It is worth noting that despite the fact that the households' responses showed a lack of consideration of ecological conditions, the discussion indicated that the restrictions on cutting poles or harvesting timber in the ASFR, though being a governmentally endorsed rule, did change local practices somewhat (HC107, HC117 and HC223). The introduction of on-farm trees to the households in the piloting communities, to provide timber for building their houses instead of going to the forest to collect timber, is a strategy to conserve the communities' ecological conditions as well as to ease the pressure on the forest.

Ostrom hypothesises that one condition for successful CPR management is the capacity of individuals to modify operational rules of resource governance that directly affect them. In other words: if political conditions allow local actors to change operational rules when they consider it rational to do so, CPR management may be successful; if operational rules are enforced by outside forces that do not take into account local ecological and social conditions, however, there is a higher likelihood of non-compliance. Operational rules regulate daily activities of resource extraction (*e.g.* the intensity of harvesting or methods of cultivating) (Quinn *et al.*, 2007). Pomeroy (1994, pp. 37–38) argues that the CPR institutions that make use of this principle are able to tailor rules to better suit local circumstances, since individuals who directly interact with one another and with the physical world can modify the rules so as to better fit them to the specific characteristics of their settings. Table 1 gives a summary of operational rules applied locally.

One household interviewed from the non-piloting communities described a significant change in operational rules and noted that KFS, as the authority responsible for the management of the ASFR, decided to indicate the time for collecting forest resources on the households' permits to stop those households who might otherwise collect more resources than was desirable; *i.e.* not only resource type but also a time of harvesting was to be fixed in a detailed manner. One informant explained this change:

> *"They stopped that behaviour because they (KFS) realised that somebody can enter into the forest even six times per day, but they finally resolved that they indicate in your permit the time when you are supposed to collect the forest products; if you indicate that you will be going to the forest in the morning and then you go to the forest in the afternoon, it will be wrong" (HC223).*

Respondents were asked whether they were able to change the operational rules used in the ASFR co-management regime. We found that in both piloting and non-piloting communities local people regarded their capacity to shape and/or change operational rules as limited. While an official informant (KOI02) affirmed that some rules could be changed by communities if they so wished (*e.g.* those controlling butterfly harvesting), the majority of the households in the piloting communities reported that it was not possible for them to modify co-management rules (HC108, HC232 and KHI03). The informants adamantly stated that the rules were made by 'the government'—and not by them! Maundu (1993) collected similar quotes with his informants and one may wonder to what extend PFM has actually changed the process by which operational rules are established. Some local interviewees and organisational informants confirmed that the communities are only able to change the rules of

co-management if the respective community and the government agency sign a formal agreement with respect to the use of forest resources (KHI06). Such agreements would become the basis for co-management for five years. The requirement to formalise rules in agreements may add to the transparency of rule-making, but it also makes the production of operational rules slow and cumbersome. The few households in the piloting communities that reported that they had the right to participate in changing the rules pointed out that the forest does not belong to an individual or to the government alone—but this was clearly a minority opinion, which was more informed by aspirations how rules should be made than by the history of how they have been made in the recent past (HC102).

Guarding against unauthorised use of forest resources

The quality of monitoring of resource extraction is crucial for any CPR management system. Due to the co-management initiative, a complex system of guards evolved. KWS and KFS forest guards who have been around for a number of decades are formally employed. These are poorly paid (*ca.* 200 US$ per month) formalised jobs that are advertised countrywide. A major objective of the BirdLife project (1997–2002) was to set up joint patrolling involving both KWS and KFS guards. Hence, KFS forest guards usually have different origins and do not have kinship ties to the local community. While originally only KWS guards were well armed later also KFS got military equipment and were armed with semi-automatic guns (AK47). In contrast to KFS guards, community forest guards who were installed in the context of PFM were nominated by the piloting communities, selected from the local youth. Each village community appointed four community forest guards to monitor resource extraction. Community forest guards work on a voluntary basis in the hope that one day they will gain paid employment once a final agreement between the communities and the government has been signed. It is obvious that unless this hope is realised, community monitoring will not be sustainable. Currently KFS forest guards patrol together with community guards regularly while KWS guards run separate patrols being more interested in cases of poaching than in cases of illegal extraction of non-living natural resources from the forest.

Households were asked whether they were able to monitor the behaviour of users of the forest resources in the villages in order to safeguard resources against unauthorised use. In community-based natural resource management (CBNRM) approaches, monitoring is meant to make those who do not comply with the operational rules visible to the community (Bollig & Menestrey-Schwieger, 2014). Good monitoring facilitates the effectiveness of local enforcement and informs strategic and contingent behaviour for those who are tempted not to comply with the rules (Dietz *et al.*, 2003; Cox *et al.*, 2010). It was only in piloting communities that community guards were nominated. It was anticipated that because of their closer relationship with the authorities the piloting communities would be better able to monitor the behaviour of forest users (*e.g.* noticing the behaviours of households that would possibility steal the forest resources) than those in the non-piloting communities. Community guards are meant to monitor various kinds of resource extraction, and they are authorised to look at resource dynamics and human-wildlife conflicts and to report their insights to the village advisory committee. Indeed, the study found that monitoring skills and techniques have developed in the piloting communities. In the case of the non-piloting communities, a majority of the respondents pointed out that they do not monitor the behaviour of those violating the rules of forest use (HC239 and HC222), with the majority of the respondents reporting that it is not their responsibility to monitor such rule-breakers because KFS forest guards are there to guard the forest (HC203; HC204; HC215 and HC201). In piloting communities, the community guards took on this task, though they did so with varying degrees of effectiveness and success, and usually patrolled in joint tours with KFS guards.

Table 1: Some operational rules applied in communities bordering ASFR.

Type of resource	Time	Technology	Quantity	Quality	Place
Wood fuel (the rule applies in both piloting and non- piloting communities)	Restricted to one trip/day; proposed to tighten to selected times of the day	Restricted to nothing more than an axe or machete when harvesting	One headload, but no other weight limit	Restricted to fallen or dead wood	No restriction on place, but intended to limit households to collecting within a 1km-deep zone inside the protected area boundary in the co-management area
Butterflies (the rule applies in piloting communities only)	None	None, but practice limited to nets	None	None	None
Bee harvesting (the rule applies in the piloting communities only)	None	None, but depend on community people with bee harvesting skills	None	None	No, restrictions on place for harvesting bees (Farmers collect bees from the forest and put them in their hives in the village forests for the production of honey)
Herb gathering (the rule applies in both piloting and non-piloting communities)	None	None	None	None	Anywhere in the forest where they can find them
Leaves for butterflies (the rule applies in the piloting communities only)	None	Restricted to the picking of leaves	None	Restricted to lower leaves on tree branches, and not the buds, to avoid killing the trees	None from the forest, but some households have planted the trees the butterflies feed on at their homes
Grass (the rule applies in non-piloting communities only)	None	None	No restriction except a headload, which is sold to households by KFS for fifty Kenyan shillings	None	None

However, our data show that the institutionalisation of monitoring via local guards is effective, and contributes to the emergence of local institutions of resource protection.

In the case of the piloting communities, the majority of the households (82%) reported that the rules allow them to monitor the behaviour of those destroying the forest resources in a better way. A great number of these 28 respondents testified that once they see a person destroying the forest resources they report the incident to the respective government agency through the government forest guards—not, interestingly, through the community guards (HC133). The reason why they do not go through the community guards became evident in further interviews: Reports of illegal resource extraction are given carefully and often clandestinely so that the violators do not know who gave the report to the forest guards. Clearly those accusing do not want to become visible. This shows how difficult it is for the households to deal with rule-breakers, as if they were to accuse somebody publicly they would lack any protection against the violators (HC111). Some households reported that they might not report a violator even though they might witness somebody destroying, stealing or poaching from the forest, because the thief would be earning a living. Bringing their behaviour to the notice of the government may put the reporting person in a position of social isolation. In fact, he or she may be accused of worse behaviour than the person violating the management rules (HC129). One respondent from a non-piloting community pointed out that some locals also occasionally steal a few of the forest products such as trees, so they avoid reporting others as they fear counter-accusations (HC214). Yet other households explained that they cannot report the behaviour of those who destroy the forest resources to government officials because community forest guards were formally assigned to do this job (HC111 and KHI02). The interviewed people perhaps felt it was not in their interest to report the illegal actions of the community members, especially when there was no formal, legal backing for doing so (HC107). Obviously there is an imperfect fit between 'official' and formally employed KFS forest guards and the volunteering community guards. At this stage the high costs of monitoring are still mainly borne by the formal monitoring system. This pertains not only to the technical costs (employment, educating guards and fitting) but also to the high social costs. Nevertheless, local monitoring skills are increasingly seen as contributing importantly to the overall set up. Even if community guards do not contribute much in terms of the detection of wrong doers, their activities convey a sense of empowerment and participation and—as one informant put it—function as an important control of KFS forest guards.

The government forest management bodies argued that they can and do check on the activities of those using the forest and that they do receive reports of illegal activities through community forest guards (KOI01). However, the village forest guards do not have the power to arrest anybody and rarely make patrols alone, as they have nobody to protect them in case violators confront them. But once the KFS and community forest guards conduct a forest patrol together, it is the KFS forest guards who report the situation to their management station, while the village forest guards report to the village advisory committee (HC137). The old forest management system mentality ('us versus them'), as opposed to a more open sharing of information in a monitoring approach, was still present, as one organisational informant reported: 'I don't think we do monitoring of the people who are poaching the forest, but what we do is, we hunt each other; it is like hunting each other' (KOI02).

Cox *et al.* (2010) argue that, in other cases, monitors constitute a separate position that is compensated. Further, Agrawal & Yadama (1997), studied the strength of local forest institutions in the Himalayas, India, and found that the number of months a guard has been employed has a very strong and statistically highly significant direct effect on the condition of a forest. ASFR community forest guards work on a voluntary basis for the co-management, in the hope that one day it may be registered, and they will gain paid employment (HC107). Our study supports these findings: only the formalisation of co-managed monitoring

(entailing education, formal employment, support) really increases the success of monitoring practices. If village guards were to enjoy this kind of formalisation and recognition they could potentially act as a more meaningful support for KFS guards, and in the long run perhaps even replace them. The lack of formalisation of the local guards does however contribute to their disempowerment.

Reports on those violating the rules for co-management are taken to the village advisory committee, who then report to the forest management authority in the piloting communities (HC131). This village advisory committee comprises two village elders per village from the three communities participating in co-management, thus forming a committee of six village elders who are meant to receive reports on the violators of the rules. The village advisory committee does the job voluntarily, for the most part, but may occasionally get a little pay when they participate in stakeholder meetings (KHI107). The committees were installed as co-management bodies with the intention to establish an institution to which villagers would voluntarily turn to report on overuse or misuse issues. Given that the relations between villagers and KFS forest officials are often strained, the village committee was thought to be more accessible and perhaps to wield more authority locally. The advisory committee was also meant to handle minor cases independently from formal courts. One informant in the piloting communities explained the process for sanctioning the violators of the rules in the piloting communities, as follows:

> *"…we warn the person; we take the person to the DIFAAFA [village advisory committee]; he is warned; the person is warned three times that what he is doing is not wanted. 'This is what you are supposed to do'. Then the person is left to go and warned not to repeat the same mistake. If the person is caught again he is reminded: 'What did we tell you on the other day?' So then if it is found that this person doesn't hear what he is being told, then the village elders may beat up the person just a little, and then the person is told to go back home and told, 'don't repeat the same mistake'. If the person repeats the same mistake the third time then it means that it is very hard for this person to hear. So this will force the village/DIFAAFA to send this person to jail to serve a sentence such that once the sentence is over, the person can say whether he has changed or not" (HC130).*

The study found that the village advisory committee also acts as a control mechanism for the KFS guards. KFS can, on the advice of the village advisory committee and after investigation, sack corrupt government forest guards:

> *"We can sack somebody. There was one person who was sacked from employment here this January. The person has been removed from here. He had worked here for six, eight or ten years. He had friends in this place and he would tell them that at this time, 'go and cut the trees, then I will bring a vehicle'. Some people have been sacked, others have been arrested, others have been transferred … The committee [village advisory committee] members investigate until they are sure. Then they write a letter; they take it to the forest management station, then they come here*

> *to investigate and within a minute you see somebody arrested" (KHI107).*

However, it was clear that there was some confusion over who the illegal activities should be reported to: the co-management government agencies (KFS, KWS, KEFRI, or NMK) or the village advisory committee (KHI04 and HKI07).

Sanctioning

Graded sanctions are a key condition in Ostrom's design principles. This means that violators of operational and collective choice rules are assessed on the severity of their violations by other resource users or officials acting on their behalf, and are punished accordingly (Quinn *et al.*, 2007). Furthermore, graduated sanctioning deters the participants from excessive violation rules (Cox *et al.*, 2010). Cox *et al.* (2010) argue that for graduated sanctions to succeed there must be a strictly implemented, graduated penalty structure. Ghate & Nagendra (2005) also argue that when sanctions are strictly enforced, they prevent the spread of 'free-riding' behaviour, thereby instilling a sense of trust in institutions in the community. It is essential to provide conditions that facilitate a sense of justice and fair play in the participants by ensuring that all individuals who break the rules will be sanctioned irrespective of their position in the community.

We were interested to what extent community members were able to punish violators of rules, and how they did so. All the interviewees from both piloting and non-piloting communities emphasised that communities were not allowed to punish violators independently, but that households can, and do, report incidents to government courts, which then punish violators according to their rules. The study found that in the piloting communities, the regulations do not allow a member to be sent to court unless they have received three warnings from the village advisory committee. Despite the recognition by the communities that they are not supposed to punish, the accused may suffer a beating as part of that community-level process if reported to the village advisory committee. Only if a transgressor still persists in offending is she/he referred to the authorities (HC130). Another informant also reported that the community did have powers to punish shortly after co-management was started. The communities had the powers to hear small cases and to sanction the offenders, but currently, the responsibility and powers to punish the offenders is entirely with the KFS, because the communities do not have *locus standi* that gives them the powers to take the violators to court or prosecute them (KH102). This argument, of course, will be applicable to most rural communities, and if local authority to sanction is desired, a government will have to accept extra-legal sanctioning with all its complex pros and cons.

Conflict resolution mechanisms

Ostrom points out that low-cost conflict resolution mechanisms at the local level are important for efficient CPR management (Ostrom, 1990). Conflict over an exhaustible resource is inevitable in CPR management, necessitating the presence of legitimate mechanisms for conflict resolution to maintain collective action (Cox *et al.*, 2010). We were interested in understanding if the ASFR co-management arrangements provided participating households with an accessible process for the resolution of conflicts among the forest resource users or between forest resource users and the government officials.

In regard to conflict resolution mechanism, out of the 28 respondents, 25 (89%) pointed out that there is a village advisory committee that is responsible for conflict resolution between the various resource users and the officials (*e.g.* forest guards). However, when

issues prove too difficult to be handled by the village advisory committees they are taken forward to the KFS (HC121, HC118 and HC112). This acceptance of an initial role for village advisory councils in resolving conflicts was also recognised by organisational informants (KOI06). However, apparently, the village advisory committee is only the primary address for conflict resolution if both parties are members of a users' association (KHI01). As soon as one party of the conflict is a government agency, such a case can no longer be handled by the local advisory council but must go to a formal court.

In non-piloting communities things look rather different. There are no village advisory committees, and respondents reported that if there are conflicts over forest resources, they are either solved by the local chief or by relevant forest station foresters (HC220 and HC221). In a good number of cases in non-piloting communities conflicts are also handled by formal courts (HC222).

Recognition of the rights of households to devise their own rules

To what extent do government agencies acknowledge the right of local resource users to create their own institutions? Devolution of power requires at least some recognition on the part of state authorities that communities can organise the management of resources autonomously. We found that the rule of official recognition has been partly realised in the piloting communities but not in the non-piloting communities. Out of 26 respondents, 18 (69%) felt that the government would recognise their right to devise the rules for the co-management arrangement if they would actively campaign for it. They felt that if the households were to hold a meeting and write down what rules they wanted to devise, and then forward them to the government then the government would accept those rules (HC101). They based their hopes on their experience of the fact that government officials engaged local communities initially when devising co-management rules (HC103). However, this statement actually underlines a problem, in that from the very beginning communities did not have the autonomy to devise their own rules. Even in the starting phase government officials were very much involved in the concrete process of devising rules.

There is some confusion as to why the government has not yet signed the overall agreement, especially as, according to the informants' own opinions, the community takes good care of the forest resources. A respondent concluded that if the government signs an agreement with the community, then the community would be sure that the government recognises them in devising the rules for co-management (HC112). In contrast, some households in the piloting communities were categorical that the government cannot recognise their right to co-management. They noted that the piloting communities had requested the Director of Forestry some 17 years ago to sign an agreement to allow them to do the co-management trials, but the communities had not received any feedback (HC125). They took this as indicative of how hesitant the government is in devolving power to the communities.

Organisational informants felt that the communities did not really devise their own rules, but were to be guided by the forest management. Whether the communities make the rules under the guidance of the forest management, or whether they have any specific requests, it is the forest management that has to deal with them. However, there was some disagreement among the officials. Some held that the government acknowledges local capacities to devise institutions, as community members are always asked for their opinion in joint meetings; *i.e.* they maintained that the current specific way in which such interactions are conducted provides sufficient space for community involvement. They alleged that all the communities' proposals are taken into account and their suggestions are included in the forest management

agreement. However, once the communities sign an agreement with the forest management, these rules will become law and cannot be easily changed again (KOI04).

All the non-piloting communities pointed out that the authorities do not recognise their right to devise their own rules. The households felt that forest management is 'above' them and that the forest managers would not accept rules devised by their communities. Furthermore, the households identified that they neither own nor protect the forest, and consequently the central government cannot recognise the rules devised by them (HC204, HC201). This throws up the question whether PFM or any form of natural resource co-management is feasible at all without true ownership of resources.

Ostrom further hypothesised that in successful CPR management systems, governance activities are organised in nested hierarchies. Nesting may occur either between user groups and the larger governmental jurisdiction, or within user groups (Cox *et al.*, 2010). In the piloting communities, nesting has started to develop; each community participating in co-management has its own structure and nested hierarchical relationships. However, one may critically ask to what extent this is a case of nested hierarchies, or rather of parallel structures. Let us take the guard system as an example: the KFS guards and community guards do not act in direct correspondence, and the responsibilities of neither group are particularly well described. This would nourish the suspicion that this is not a nesting of hierarchies but rather an inefficient and somewhat confusing doubling of institutional structures. In non-piloting communities the nested structures have not yet been established, as the communities depend on the government's structures alone. No subordinate institutional structures have been developed at the local level.

CONCLUSION

The study shows that despite 20 years of input, community-based forest management has not yet been fully accomplished in the piloting communities. Apparently it is difficult to engineer institutions of common-pool resource management. The fact that Elinor Ostrom set out the ingredients of successful CPR management does not yet enable governments or NGOs or communities to design and implement such institutions along such principles. In fact, Ostrom herself never promised that her design principles could be simply taken as a blueprint to engineer social institutions.

Several issues clearly stick out from this study. We would like to emphasise that especially the problem of adequate sanctioning is non-trivial. Ostrom describes a number of different ways in which local actors can sanction other actors' non-compliance. These sanctions range from fines to physical punishment and from ostracism to back-biting. However, a number of questions arise: Can a government easily condone that local courts sanction would-be wrongdoers? Do the accused have sufficient chance to defend themselves? Are lay judges not likely to be amenable to corruption? Acknowledging that there is no existing set of principles that can be easily framed as 'local law', on what account do local judges decide? It goes without saying that anthropology has provided a number of case studies that document the effectiveness of local courts. But can a government openly give away juridical power, and if so, to what extent? It certainly cannot allow local courts to enact severe physical punishments—but can it really allow them to impose major monetary fines? A second problem comes in with monitoring. No doubt, local guards can monitor resource extraction at the local level very well. But usually governments have a set of monitoring mechanisms in place already, and have employed staff to run the monitoring. In our instance KWS and KFS forest guards have worked

for a long time in the region. How can professional guards and community guards work together meaningfully? Should professional staff be replaced to make room for non-qualified staff in the long run? Should the government pay such auxiliary local staff? If not, what other incentives can be provided to local guards to invest their time and energy in monitoring?

Local people made the government's reluctance to sign a comprehensive contract a major point. They had been promised that such a signature was pending. However, informants suggested that problems of poaching and other illegal resource extraction are more serious in non-piloting communities than in piloting-communities. Here, resource users and government officials regularly clash. There is the general feeling on the part of resource users that they are dominated by government authorities. This is not the case in piloting communities. Resource extraction is more transparent and plannable there. Important steps in the direction of common pool resource management have been made and institutional designs of co-management have been tested. The data supplied by Matiku, Mireri and Ogol (2012) suggests that these gradual institutional developments are coupled with significant improvements in livelihoods. It is certainly worthwhile to explore this nexus (improved well-being-institutional development) further. Our data suggests that a more comprehensive transfer of ownership rights to local communities, a formalisation of co-management structures (e.g. contractually laid down rights) and an expansion of PFM to neighbouring communities may be a necessary further step.

ACKNOWLEDGMENTS

The authors acknowledge with gratitude the financial support from the World Academy of Sciences (TWAS) and German Research Foundation (DFG). We also thank Kenyatta University, Nairobi, Kenya, and the University of Cologne, Germany for signing an exchange programme agreement that made it possible for the researchers to meet and write the article. The researchers profited from the stimulating environment at the Global South Studies Centre at the University of Cologne. We also thank two anonymous reviewers for excellent comments and valuable hints to literature we had not consulted beforehand.

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