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## Examining Co-management of National Parks through the Lens of Common-pool Resource Design Principles: A Comparative Case Study of Liwonde and Majete in Malawi

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### Abstract

Co-management which was founded on common-pool resource design principles has been popularized in solving sustainability challenges of national parks. Co-management was imposed on all national parks in Malawi under the 2000 Wildlife Policy. However, such a top-down approach might neglect the local contexts that influenced policy implementation. The objective of this study was to examine the implementation of co-management and determine the extent of conformity to Ostrom's eight design principles. The Institutional Analysis and Development (IAD) framework was engaged through a qualitative case study of Liwonde National Park and Majete Wildlife Reserve. Based on co-management documentations and key informant interviews, the research found varied extents of conformity in the two cases despite a unified national policy framework. Majete was more supportive to the design principles than Liwonde because of resource, user and institutional attributes. The study proposed fine tuning the implementation process towards contextualizing these attributes for long term delivery of perceivable biodiversity and livelihoods benefits.

**Keywords:** Biodiversity; Co-management; Common-pool resources; Community-based management; National parks; Wildlife conservation

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### Introduction

National parks are considered critical hot-spots for biodiversity conservation and livelihoods baskets on which the local communities depend despite the complex challenges facing

their sustainability [1]. Globally, the increase in human activities culminating into unsustainable off-take of natural resources and conversion of wild land for alternative uses is rapidly turning the national parks into volatile

“islands” of ecosystems on the verge of disappearance [2]. According to proponents of community-based resource governance, this is partly because of the negative ramifications imposed on local communities which heavily discount benefits of national parks below alternative land uses [3, 4]. Traditionally, both the establishment and the operation of national parks have been characterized by unsympathetic approaches ranging from evictions to relying on paramilitary guarding and penalties [5] without due regard to the constraints facing the local communities [1].

This approach was deeply rooted in exclusionary policies which were strengthened by Garret Hardin’s famous thesis, the “Tragedy of the Commons” until late 20<sup>th</sup> century. Upon examining the common property theory through the lens of rationalism, Hardin asserted that regulation would thrive in curtailing environmental degradation resulting from overexploitation by individuals motivated by self-interest rather than communal incentives [6]. Nonetheless, Hardin’s oversight on the possibility of local governance became central to the empirical criticism of his proposed theory [3, 4]. The expansion of this conceptual basis led to crystallization of the concept of co-management, building upon the popular common property theory [3]. Drawing upon early efforts by self-organized user groups, it was asserted that common pool resources (CPRs) can be utilized sustainably provided there is autonomy, recognition of the community as an institution for proprietorship, tenurial rights to make rules and enforce them, and ongoing incentives in the form of benefits that exceed costs [3, 7]. As such, the underlying assumption of co-management is that incentivized participation in resource management develops a sense of ownership and positive attitudes among the local community [8] which ultimately contributes to sustainability. Ostrom identified institutional isomorphism, as critical

building blocks contributing to the success of local governance regimes that had been sustained for longer periods, in sustainably managing common pool resources; this became the basis of her eight design principles [3].

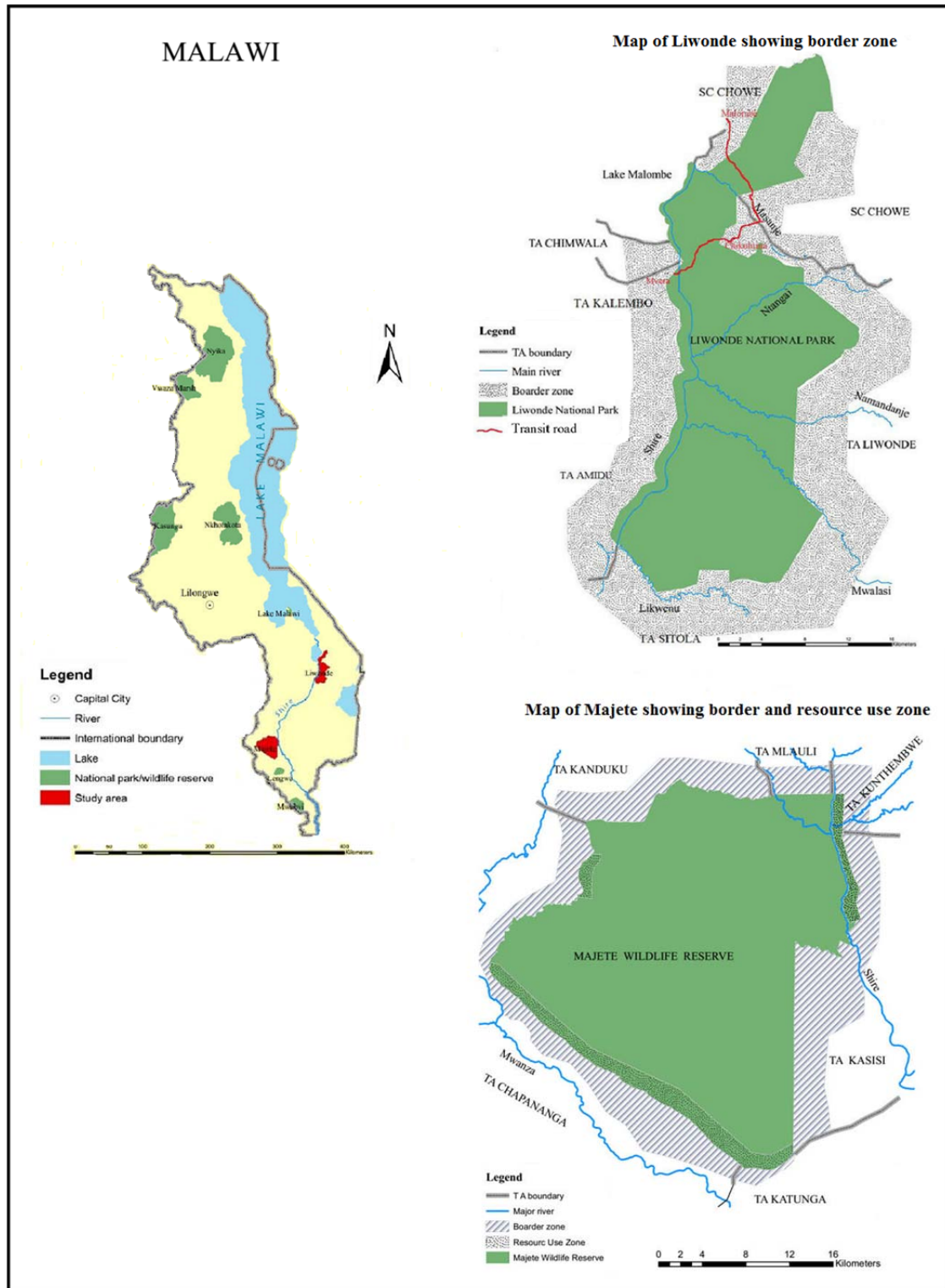
Co-management gained popularity in recent decades as an appealing solution because in contrast to the “Tragedy of the Commons”, it embraced the multiple objectives of sustainable livelihoods and biodiversity conservation through local participation [9-11]. However, despite the high expectations it raised, co-management has not been a panacea for all environmental problems [4] and according to Levine and Richmond [12] its outcomes remain mixed. Stark divisions exist regarding the feasibility of delivering on promises through the concept [5, 13] given the different contexts in which it is applied [12]. In this regard, understanding the elements that contribute towards successful co-management is critical for sustainable livelihoods of dependent community [3] and management of the national parks. As such, this research adopted a case study design involving co-management of Liwonde National Park and Majete Wildlife Reserve (Figure 1), whose choice purposively aimed at maximizing the contrast of the biophysical, user and institutional contexts which shaped the programmes.

### **An overview of co-management in Malawi**

Although conservation awareness began in 1980s [14], the legal and policy frameworks for active participation were embraced as part of decentralization between 1990s and 2004 [15]. The co-management of national parks was first piloted under a German Technical Cooperation Agency (GTZ) project around Nyika and Vwaza National Parks, which was followed by adoption of a new Wildlife Policy in 2000. The new policy promoted community participation in natural resources management within and outside protected areas, equitable access, sustain-

able utilization and fair sharing of the benefits for both present and future generations [16]. Since then, the Department of National Parks (DNPW) rolled out co-management to all national parks in the country which necessitated

establishment of community-based organizations (CBOs) surrounding each park for local participation, sharing of benefits and responsibilities and conflict resolution.



**Figure 1** Map of Malawi showing the study areas

Colin-Castillo and Woodward [17] underpinned that determining *ex-ante* the likelihood that a co-management would succeed can ensure efficiency in resource allocation. This proposition was acknowledged by the wildlife policy in section 9.1 which articulates that co-management as a new concept should be applied with appropriate feedback mechanisms including management oriented research that informs decisions and refinement of the methods [15]. However, the expansion of co-management program into most national parks left contextual feasibilities uninvestigated behind the veil of lessons and experiences obtained from the few remote pilot programmes. Hitherto, a majority of studies about Malawi's national parks have been bio-centric while the few that have evaluated co-management have done so at broader scales, focusing on outcomes [14, 18, 19], effective institutional arrangements [20] and community attitudes and perceptions [21]. Consequently, little is known about how the programme fits within the different socio-ecological contexts across Malawi's national parks. Therefore, this research aimed to fill this gap towards understanding the implementation process by addressing the question: to what extent did co-management of national parks follow the common pool design principles?

### Materials and methods

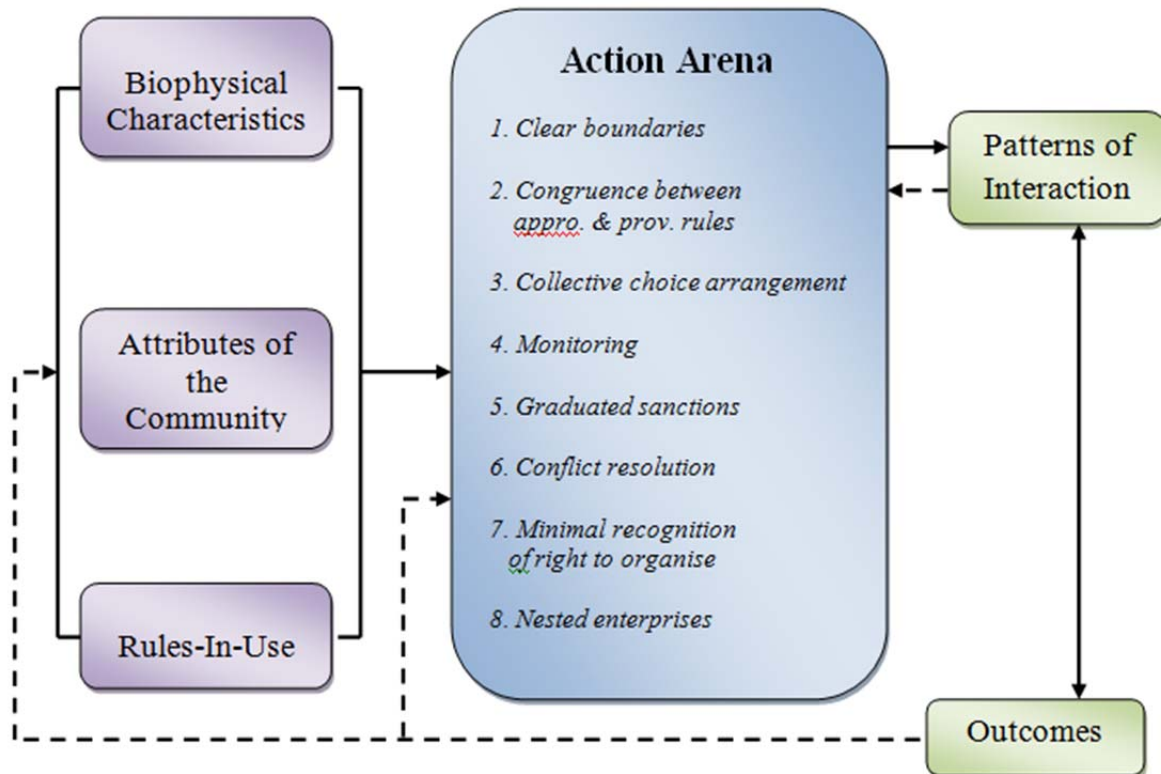
This research examined implementation of co-management of Liwonde under the DNPW and Majete managed under African Parks (AP), an international non-governmental organization (INGO) operating through a public private partnership (PPP), focusing the period between 2004 and 2014. Ostrom's design principles and the Institutional Analysis and Development (IAD) framework (Figure 2) were engaged to explore the confluence between co-management and the contextual dynamics in order to discern patterns of interaction. The choice of this frame-

work was based on its wide acceptance and relevance to co-management as an organic concept. For example, Hess and Ostrom [22] recommended the IAD framework as a fluid and dynamic methodology that can serve as both a checklist to explain individual and group behaviours and can also be used to determine the causal schema links. Furthermore, a meta-analysis by Cox et al. [23] found that Ostrom's design principles were empirically supported through 91 studies involving community-based resource governance.

Secondary data sources including annual progress reports, co-management guidelines, agreements and minutes for meetings were explored in complementation with key informants' interviews from the implementing agencies, CBOs/ Associations, NGOs/partners and traditional leaders. Specifically, the research targeted individuals with a key previous or ongoing role who were knowledgeable, reflective and conversant with the programmes. An interview guideline was sent in advance to allow for preparation and individual interviews followed using semi-structured questionnaires which covered the implementation arrangements in respect of various co-management interventions such as resource management, benefit sharing and governance. A total of nine participants with an average experience of 10 years were interviewed. The proceedings were recorded and transcribed to ensure that all important information was captured. Follow up interviews were conducted in order to facilitate further unlocking of thoughts.

Adopting Cox et al., [23], data analysis engaged criteria-based strategy using the framework summarized in Table 1. This was a qualitative analytical strategy in which first; each design principle was assessed using indicators which were qualitatively coded as either "+" to represent that the indicator had positive evidence to the principle; "-" to denote negative evidence and "n" for neutral evidence.

The overall code for a principle was based on the balance between the “+” and “-”. Secondly; the dependent variable “pattern of interaction” was assigned qualitative levels ranging from “1” to “5” to indicate highly unsupportive and highly supportive evidence respectively.



**Figure 2** The Institutional Analysis and Development (IAD) framework  
 Source: Modified from [24]

**Table 1** Criteria-based analysis framework

Pattern	Description	Code	Level
Highly supportive	More “+” evidence and no “-” evidence or overwhelmingly more “+” evidence exists with little “-”	+	5
Moderately support	Moderate “+” outweighing some “-” evidence or slight “+” without “-” evidence	+	4
Neutral	Equal mix of “+” and “-” evidence	n	3
Moderately unsupportive	Moderate “-” outweighing some “+” evidence or slight “-” without “+” evidence	-	2
Highly unsupportive	More “-” evidence and no “+” evidence or overwhelmingly more “-” evidence exists with little “+”	-	1

Source: Adopted from [23]

## Results and discussion

Co-management was examined by engaging the design principles within the action arena of the conceptual framework. The main focus was on processes that involved resource appropriation, provisioning, monitoring, regulation, governance and benefit interventions in general. The research observed that in both cases co-management was a product of adopting the new wildlife policy in 2000. The new policy necessitated establishment of community institutions namely; Upper Shire Association for Conservation of Liwonde (USACOL) and Majete Wildlife Reserve Association (MWRA). These served as conduits for delivery of various interventions supposedly to incentivize local participation in park management. The practices in relation to institutional setups were similar despite different nomenclatures. The research found that the interventions followed rural appraisal in Liwonde and baseline studies in Majete and included a similar mix of resource use programme (RUP), revenue sharing, nature-based livelihoods enterprises and social amenities. However, different patterns

of interactions emerged in each case because of the different local contexts. In general, Majete was moderately supportive while Liwonde was neutral to the design principles (Figure 3). The rest of this section presents the conformity analysis based on the evidence observed for each of the eight design principles [3].

### 1) Clearly defined resource boundary and membership rights

Clearly specified resource boundaries and user rights are considered critical towards sustainable management [3]. According to the principle, both the resource and user boundaries should be identified, understood and acceptable to all stakeholders especially the local community who hold a stake in the resource system. As such, conformity analysis to the first principle used four indicators according to Ostrom [3]: (1) the physical description of resource boundaries; (2) identification of the communities who held access and user rights; (3) whether the boundaries were acceptable by all stakeholders; and (4) the excludability of intrusions by outsiders.

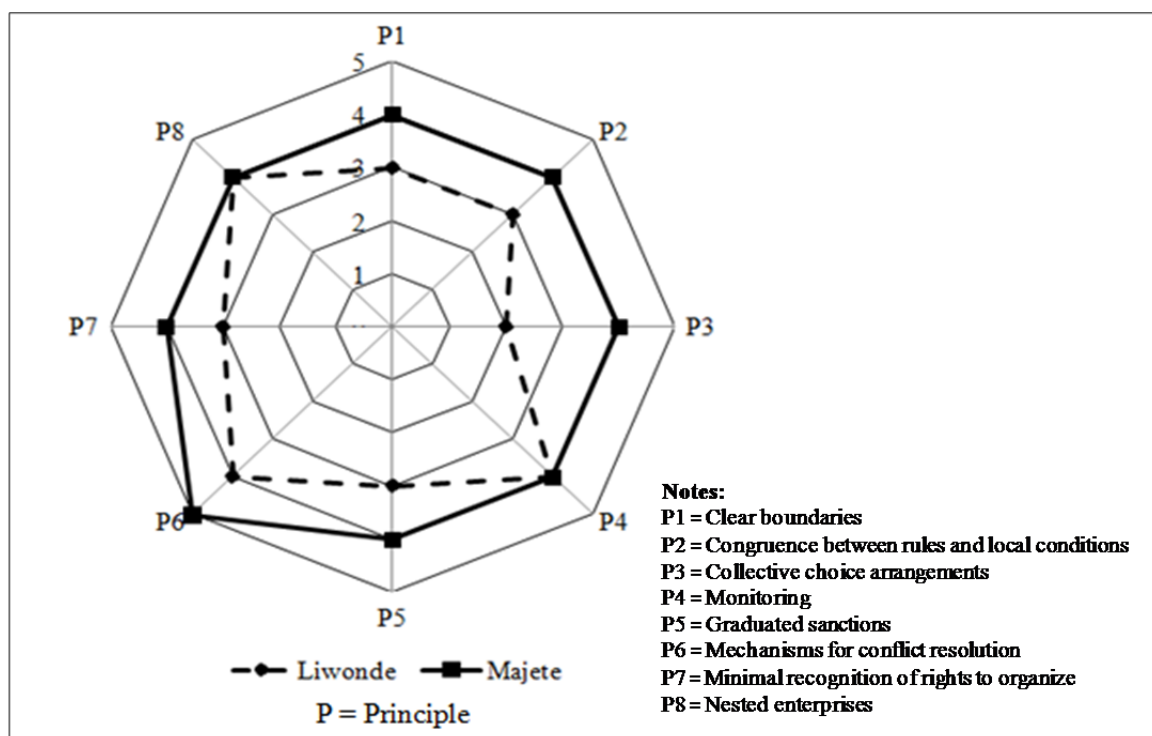


Figure 3 Conformity of co-management to the design principles

The analysis showed varied conformity extents between the two cases. For Majete, evidence in support of principle 1 included that the entire perimeter boundary was fenced, clear definition of the targeted communities and impact area represented by grey area around Majete (Figure 1) and use of village registers in identifying legitimate users as attested by Senior Chief Chapananga [25]. However, dependence on staff in identification of the permissible resource use zones was a source of uncertainty among participants. Therefore, Majete was moderately conformed to the first principle. For Liwonde, supportive evidence towards principle 1 included that it had partially fenced boundary sections, the use of readily perceivable natural features to mark boundaries, and the definition of eligible communities marked by the grey area around Liwonde in Figure 1 according to [26]. However, the excludability of outsiders in Liwonde was negated by the existence of unmonitored transit routes in the upper part of the park from Mvera to Chikuluma and from Chikuluma to Malombe (Figure 1). This together with the uncertainty of the Malombe boundary and undemarcated resource use zone rendered Liwonde of neutral conformity to this principle.

## 2) Congruence between rules and local conditions

The second principle specifies that provisioning and appropriation rules be in tandem with the local contexts in order to ensure proportional and equitable distribution of costs and benefits [3, 7]. The principle further emphasizes that decentralized governance is critical for attainment of long enduring resource system because of its ability to adequately take into account the local contexts [3]. Therefore, analysis in respect of this principle applied five indicators according to Ostrom [3]: (1) clearly defined rules of appropriation; (2) jointly agreed locations where resources harvesting

was permissible; (3) mutually agreed times and schedule for resource harvesting; (4) existence of quotas regulating harvesting; and (5) advance knowledge about resource harvesting.

Liwonde presented a mix of both supportive and unsupportive evidence for this principle. The three supportive elements included: the presence of some defined rules of appropriation which specified permissible resources and methods including tools; availability of mechanisms for sharing benefits which were set by elected members of USACOL; and the presence of resource provisioning activities which included conservation awareness creation, boundary clearing, fence maintenance, reporting illegal activities and animals exiting the park. In contrast, unsupportive evidence included the observation that during request-based appropriation, communities had no prior knowledge about harvesting times and quotas, nor did they know about times when projects would be implemented and funds allocated. Furthermore, determination of quantities for the case by case RUP was sole discretion of DNPW. Neutral evidence was observed regarding resource use zoning probably influenced by the fact that resource use was not considered a focal component in Liwonde. For instance, Mr. Kawaye had this to say during the interviews; *“You can just imagine that the park is quite small and narrow shaped... one can easily walk across it within an hour... and you know... park which is... too small for the big animals such as elephants... it was unfeasible to designate resource use without compromising wild zones ”*...[26]. Additionally, the research observed that high rates of property damage caused by elephants discounted co-management benefits among villages surrounding the park. Based on these observations, the research found that co-management of Liwonde was neutral to the second principle.

Co-management of Majete presented moderately supportive evidence to the second principle as observed through the interview with Mr. Kamoto who stated: *“resources were selected on the basis of their renewability in order to ensure... the integrity of the park. The resource use zone was identified by a distance of 1km from the boundary into the reserve... the poor...were... benefiting including communities considered as desperate ...due to degradation of their areas ... The RUP opened, between June – August... eligible village was allocated days announced through...CBOs...when the members could go into the park with... extension assistants...The ...impact area ... was... a band of 5 km from the park boundary outwards... there were no quotas such that communities were allowed to harvest ... until the harvesting period... After realizing that we needed... quotas a Master student was identified who conducted a study...with the aim of helping to set up quotas”* [27]. Basing on this interview, out of the five indicators used in the conformity analysis, four presented positive evidence as follows: (1) there were clearly defined rules of appropriation in respect of permissible resource types and technologies; (2) AP –Majete and MWRA jointly agreed types, locations and permissible tools for resources harvesting; (3) the two sides also mutually agreed on a schedule for resource harvesting whereby villages took turns and were jointly monitored by AP – staff and CBO members; (4) participants of the programme also knew in advance dates for harvesting through village announcements and were more certain about the flow of other co-management proceeds; (5) however, the absence of quantitative quotas weakened conformity of the programme to the second principle.

### 3) Collective choice arrangements

The third principle is about participation in rule setting and modification. The principle stipulates that regimes which involve directly affected individuals in rule making or modification process have higher likelihood of devising rules that fit with local contexts and considered acceptable [3]. This is because such involvement allows experiences and current knowledge from actual interactions to inform the process in contrast to dependence on agency officials or elites. Therefore, analysis under this principle focused on three indicators: (1) the extent of participation by local communities in rule setting; (2) the perceived importance of shared norms; and (3) whether or not individuals were allowed to enter or exit the programme voluntarily.

The Liwonde programme presented moderately unsupportive evidence to principle 3 as follows; according to the USACOL Chairperson, Mr. Donzani [28], the rule setting process mainly involved Zone Natural Resources Committees (ZNRC) and the USACOL executive through an Annual General Meeting (AGM) consensus that required endorsement of DNPW. Although the community structures were duly elected and therefore legitimately representing local interests, the research observed that inadequate consultations and debriefing to electorate prior and after AGMs was a limitation that restricted participation of the most affected people. This was evidenced by the few and irregularly held meetings based on the reports accessed by the research and was also attested by Chief Chowe who remarked: *“...as USACOL together with our DNPW counterparts try our best to share information with grassroots people...but...we are resource constrained...”* [29]. Consequently, little information trickled down to the grassroots and when done, such meetings served as platforms for information rather than active involvement in the rule setting. This



finding mirrors Manda [21] who concluded that the typology of community participation in Malawi's co-management was stagnated on the passive end of the continuum whereby the communities were merely consulted rather than actively participating.

Furthermore, the research observed a mix of both favorable and unfavorable shared norms in Liwonde. While favorable shared norms were evidenced by incidences when village members arrested poachers [28], unfavorable cases were also recorded, such as: villagers assaulted DNPW staff on account of a disputed park boundary – Mpwapwata in 2011; villagers attacked rangers during anti-poaching raids to resist the arrest of suspected poachers – Chikuluma on several occasions, Molipa and Nafiulu in 2012 and 2014 respectively [30-32]. However, the co-management of Liwonde presented supportive evidence regarding voluntary membership and participation into the programme by villages and individuals. Despite that no villages within the impact area opted to be non-member, some individuals willfully exercised this freedom by not attending co-management activities [26].

The Majete co-management depicted moderately supportive evidence to the third principle based on the following reasons: Firstly, rule setting involved CBOs at grassroots level closer to the most affected participants and the programme also engaged communities in AGM as a forum for rule setting [27]. Frequent meetings involving the grassroots CBOs increased participation in contrast to the intermediary ZNRCs at district level as in Liwonde. The research further observed indications of supportive shared norms through voluntary surrender of poaching equipment and about villagers apprehending poachers [27]. This was attested by Senior Chief Chapananga who stated: *“At the moment the villagers are benefiting a lot...scholarships...improve access to health services...So how can people be ne-*

*gative about conservation of the reserve when they can see for themselves the different forms of assistance coming from the reserve?”* [25]. In contrast to Liwonde, there were no recorded incidences of confrontation between AP officials and local communities in Majete. Furthermore, membership recruitment was on a voluntary basis and neither individuals nor villages within the impact area had renounced membership to the Majete programme. This was evidenced by the establishment of CBOs in all villages and the wide patronization of co-management activities [27].

#### **4) Resource monitoring**

According to principle 4, sustainability of a CPR regime also depends on the extent of trust and reciprocity in order to maintain minimal levels of rule violations [3]. The principle suggests that monitors who are themselves authorized users and who are accountable to the other users are more likely to be efficient. According to Ostrom [3], this eliminates uncertainties about free riding thereby increasing the level of trust, reciprocity and cooperation. Therefore, conformity analysis engaged three indicators namely: (1) availability of local structures for monitoring; (2) actual community participation in resource monitoring and enforcing rules; (3) and accountability mechanisms for monitors to other resource users .

Both USACOL and MWRA provided the opportunity for participation in monitoring resources and the behavior of other members . Routine and special monitoring and enforcement activities were conducted through the Village Natural Resources Committees (VNRCs) and CBOs in Liwonde and Majete respectively which included boundary patrols and surveillance for poaching outside the parks. This was attested by the reported cases of arrests by communities as earlier explained [26, 27]. Furthermore, the co-management of Liwonde had a systematic monitoring pro-

gramme called Management Oriented Monitoring System (MOMS). This involved detailed recording of conservation matters including animal movements, co-management activities and poaching incidences and the monitors were elected by communities [26].

While the monitoring by communities focused outside the parks, technical resource monitoring was done by park authorities through specifically dedicated research sections. Findings of the monitoring activities were disseminated through periodic stakeholder meetings [27] which according to this research were more forthcoming in Majete than Liwonde. As already highlighted the MOMS of Liwonde involved recording of all conservation matters. Consequently, the data tools were specially designed for technical consumers and as such the monitors were accountable to park management more than to local communities. Therefore, there was inadequate information passed down in respect of resource conditions and appropriation issues, particularly from the monitors. This element slightly weakened the programmes' support for the fourth principle in Liwonde. Despite lacking detailed monitoring tools, the research found clear linkage mechanisms and readily available fora for information exchange in Majete according to [26]. Therefore, basing on the above evidence, the analysis revealed that both Liwonde and Majete were in moderate conformity to principle 4.

### **5) Graduated Sanctions**

This principle stresses the importance of sanctions that aggravate the value of rule violation above obtainable benefits regardless of relatively minimal chances of being caught. According to Ostrom [3], this is achievable through sanctions that take into account the gravity and contexts of offences. Therefore, programmes were examined using three indicators namely: (1) availability of local struc-

tures for sanctioning rule violators; (2) arbitration of offenses in connection with illegal off-take of resources; and (3) types of sanctions imposed on the violators.

The findings indicated similar practices in Liwonde and Majete. In both cases the community structures were linked to traditional leadership who commanded high respect and therefore served as patrons [26, 27]. As such, the traditional leaders served as first arenas where sanctions were imposed particularly for minor offenses such as violations of RUP regulations. Offences concerning animal poaching, encroachment and fence vandalism were regarded as serious and therefore arbitrated by formal courts. While traditional leaders were readily accessible by virtue of living among communities, access to formal courts required lengthy bureaucratic procedures since such arenas were located at district headquarters contrasting the remotely situated parks. In both cases, graduated sanctions were well reflected at lower end. At the local level, first offenders were simply warned in the presence of other members. Repeated violations attracted a fine, usually payable in the form of domestic produce such as chickens [25, 29]. Repeat violators were handed over to park management where they were either suspended from obtaining certain co-management benefits or prosecuted by formal courts, depending on the gravity and context. The formal courts also considered mitigating or aggravating factors when sentencing violators. Sanctions included suspended sentences, community service, fines or jail terms for first and subsequent offences, progressively.

However, there were two contrasting observations between the two case studies: first, in terms of the proportion of offences arbitrated locally and those decided by the formal courts, and secondly, distribution of sanctions towards the higher end of the scale. Liwonde had a higher proportion of arbitration by for-

mal courts, implying a lower proportion of local arbitration while Majete presented the reverse [26, 27]. The explanation to this could be two folds; this could either mean that Liwonde experienced more of serious offences that warranted use of formal courts, or that there were more repeated violations which necessitated engagement of the formal courts in contrast to local sanctioning arenas. Nonetheless, dependence on formal courts which were highly bureaucratic negated the principle in respect of accessibility of arenas in Liwonde. Furthermore, despite the fact that both case studies applied graduated sanctions, particularly at the lower end, the analysis showed that Liwonde experienced stagnation of the sanctions towards the higher end, as Mr. Donzani lamented during the interview: *“The penalties are too low and we are not satisfied... and if this trend continues then the park cannot be protected. We are surprised sometimes that the offenders are just detained for a few days and then we see them back again into the village and they continue with what they were doing”* [28]. This was also hinted at by the chiefs [25, 29]. Pulling together this evidence, the research found that co-management of Liwonde was neutral, while Majete was moderately supportive to the fifth principle.

## 6) Mechanisms for conflict resolution

Self-organized groups are susceptible to conflicts due to different interpretation of rules and the use of discretion in applying even rules that were jointly made [3]. These have detrimental effects on trust and cooperation among participants. Therefore, principle 6 stipulates that readily available conflict resolution mechanisms which are low cost and within the local arena are essential in ensuring timely and transparent resolution before they can negatively impact on trust and cooperation among the participants [3]. Conformity assessment under this principle

involved use of three indicators namely; (1) existence of local low cost problem solving arenas; (2) conflict preventive mechanisms such as frequency of information sharing meetings by local institutions and (3) the proportion of conflicts resolved by the local institutions.

It was observed in both cases that traditional leadership constituted the focal structure for conflict resolution, especially for conflict among community members. According to [25, 29], the parties in conflict would report to the village head with information to or through the USACOL/ MWRA structures or extension staff. The village head then summoned the parties to a hearing, usually under a tree near the chief's home or within nearest school premises. Sometimes conflict resolution took advantage of already existing gatherings such as after village developmental activities or religious gatherings. Conflicts between community members and officials were jointly addressed by park management and the respective village heads either at the premises of the concerned village or park office depending on the nature of the conflict, but these were relatively rare [26, 27].

In spite of these commonalities at lower level, Liwonde and Majete presented diverging practices regarding higher level conflicts between park management and communities as observed in the boundary disputes. The absence of a streamlined conflict resolution structure at the higher level left Liwonde dependent upon district officials [26] who were to some extent unacquainted with specific co-management issues. On the other hand, the JLC in Majete was considered as a representative, trustworthy and acceptable arena as evidenced by its success in resolving the boundary conflict [25]. Venues for meetings were selected based on the vicinity of the concerned people and resources in both cases. Furthermore, co-management of Majete had

more regular meetings, increasing the opportunity to share information and reduce the likelihood of conflict as compared with Liwonde. Conclusively, the higher proportion of locally adjudicated offences, readily available arenas and the existence of functional conflict preventive and resolution mechanisms were stronger for Majete than its counterpart, thereby strengthening its conformity to this principle. Therefore, the analysis showed that the practices in Majete strongly supported, while those in Liwonde were moderately supportive, to the sixth principle.

### 7) Minimal rights to organize

The seventh design principle emphasizes that locally devised rules can be effective if external agencies do not assume exclusive decision making authority [3]. Central to this principle is that external government has to be willing to acknowledge legality of the local regime to exercise some powers. Therefore, conformity of the programmes to this principle was assessed based on three indicators: (1) existence of legal community empowerment frameworks; (2) existence and enforcement of by-laws by local communities; (3) community developed and implemented resource management and appropriation guidelines.

The research found that both USACOL and MWRA were registered associations under the Trustees Incorporation Act, and were thus considered as legitimately constituted bodies [27, 28]. As such, the associations were mandated to enter into co-management agreements which specified rights and obligations of its members, and formed the basis for the sharing of benefits and responsibilities with park authorities [26, 27]. Therefore, practices by the two case studies in respect of this indicator were similar except that in Liwonde, the initial agreement was not renewed for many years after expiry [26]. Furthermore,

although the programmes also promoted resource management by-laws, these were not evident in both cases. Additionally, the procedures for the benefit-sharing intervention were similar in the two cases. For instance, the criteria for selecting types of interventions and target areas were decided by the communities, as evidenced by the Participatory Rural Appraisal (PRA) process and baseline study in Liwonde and Majete, respectively.

However, analysis on community developed and implemented resource management guidelines revealed differences between the two case studies. Most decision making rights were retained by DNPW with minimal consultation or just information to community in the Liwonde. This was enforced by the exclusion of RUP and revenue-sharing percentages, which were meted out as directives, without community participation. For example, Chief Chowe said during the interviews: *“There are...some unclear areas regarding implementation of revenue sharing. Some decisions are...made by government alone... At first, government committed... 50% ... later revised... to 25% without the active participation of communities... information does not trickle down...thereby affecting... the projects... it is difficult for us to ask...from government... we appreciate government too has financial problems”* [29]. The existence of a Joint Liaison Committee (JLC) in Majete served as a back-stopping mechanism because the inclusion of various stakeholders provided checks and balances in the decision-making processes. Basing on the foregoing evidence, this analysis showed that co-management of Liwonde was neutral, while Majete moderately supported principle 7.

### 8) The extent of nestedness of the programme

Hitherto, the focal components of the co-management systems were resource appropriation, provisioning, monitoring, rule enforce-

ment, conflict resolution and governance activities [3]. While these represent specific components at various levels, they all contribute towards sustainability of the programme. Therefore, this principle focuses upon the existence of linkages among the components at different levels, for synchrony as a single system through complementation and interdependencies. According to the principle, such functionality is feasible if appropriate rules exist and are enforced at each level. Therefore, the nestedness of co-management programmes was evaluated basing on; (1) different layers of programme organizational hierarchy and (2) the existing mechanisms for linking the structures.

Nestedness of the Liwonde programme was demonstrated by existence of VNRC at the grass root level, ZNRC at intermediary level, executive committee and board of trustees at top most multi-district level (Figure 4), each devising and operating under specific rules. For instance, resource rights and obligations enshrined in the co-management agreements were negotiated between the USACOL and DNPW at higher level, coordinated by the ZNRCs at district level and actual operationalization through activities of VNRCs. Such roles were guided by specific rules and arrangements at that particular level [26].

Similarly, the nestedness of Majete co-management was manifested through the multiple layers of the MWRA structures. According to [25, 27] the communities engaged local rules and criteria to identify their needs for potential intervention such as institutional capacity building in specified area. This was translated into proposal by the CBOs submitted to MWRA. The proposal evaluation for funding was based on prescribed criteria by a special task force. AP – Majete then linked up with relevant organizations with the expertise and facilitated the intervention in line with the prevailing national legal and

policy frameworks. However, as highlighted under principle 6, the existence of weaker conflict resolution mechanisms evidenced by the persistent boundary controversy in Liwonde did not only demonstrate weak coordination for that purpose but equally reflected weak nestedness at the higher level. Therefore, the analysis revealed moderately supportive evidence inherent within both the Liwonde and Majete co-management.

## Conclusions

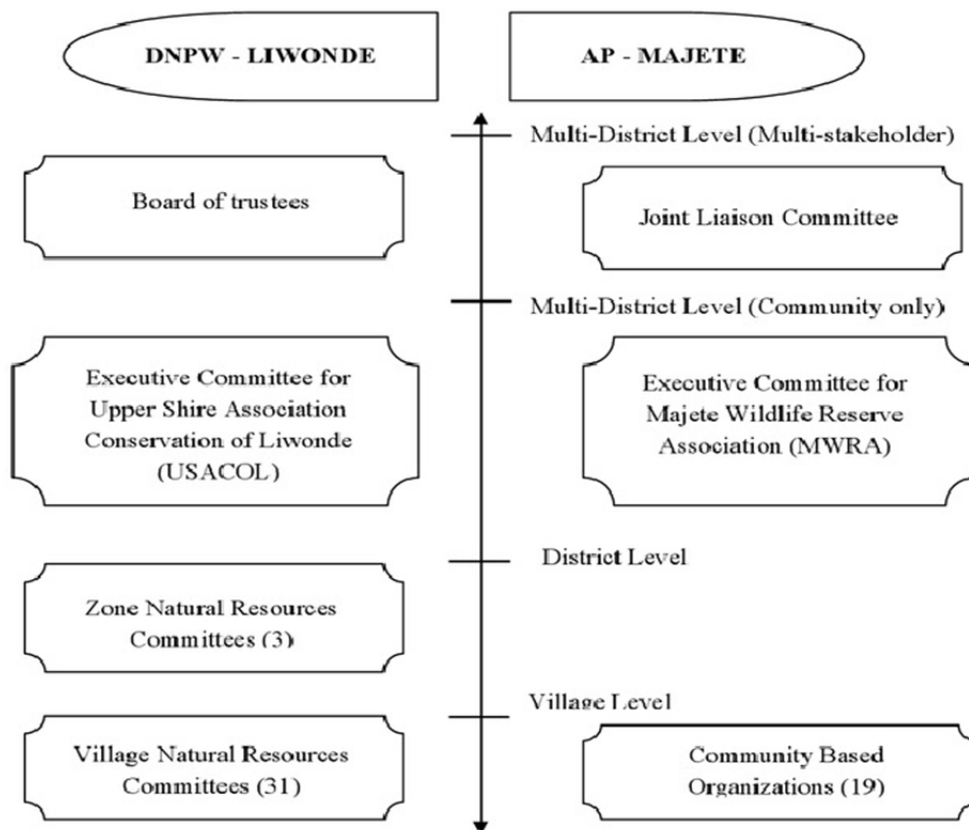
The co-management programmes began following adoption of the new Wildlife Policy [15]. Both Liwonde and Majete embraced the concept as part of the expansion from the piloted sites and were initiated by donor funded projects implemented by DNPW and further developed by AP in the case Majete. Community structures were instituted as forums for local participation, sharing of benefits and responsibilities and conflict resolution. Both case studies engaged in participatory processes to identify community needs which became the basis for designing various interventions that included resource use, revenue sharing, conservation based enterprises and provision of social amenities.

Although the case studies applied similar legal and policy frameworks, divergent co-management practices that in turn shaped different patterns of interaction were evident. By invoking Ostrom's design principles and the IAD framework, the study provided insights in determining the potential for producing long enduring co-management programmes. The practices presented different extents of conformity to the principles framed by the local contexts. Majete generally emerged to be relatively more supportive to the principles because of its receptive biophysical characteristics such as conducive shape and size, resource distribution and capacity; supportive community attributes that included shared

norms, and rule compliance among the communities; and the use of widely acceptable and enforceable rules. These contexts enabled Majete to lend itself better to the course of the design principles, leading to successful implementation of the programme. Liwonde presented patterns of relatively low conformity to the principles because of biophysical limitations in terms of its small size and narrow geographical shape, existence of unsupportive community attributes such as antagonistic norms and challenges associated with rule devising, enforcement and compliance mechanisms; all of these collectively constrained the trajectory of the design principles.

Therefore, basing on the empirical presumptions that successful implementation can lead to successful delivery of intended objectives [33], co-management of Majete had a higher likelihood of sustainability while Liwonde was rated as having relatively low

likelihood to deliver intended goals. This confirms earlier attestation which lead government of Malawi to enter into another PPP with African Parks for the management of Liwonde by August, 2015. Underlying to this decision was that a PPP would improve effectiveness in the implementation of co-management for the attainment of the socioeconomic and biodiversity objectives. This research concludes that the local contexts within which the co-management of national parks is implemented are influential to the trajectory of the common-pool resource design principles which potentially has implications on sustainability of the programmes. Therefore, it is recommended that implementation be adjusted, especially in Liwonde, in order to adequately account for the specific local context such as community and governance attributes.



**Figure 4** Nestedness of co-management institutions

Source: developed by authors

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