

Inadequate community engagement hampers sustainable wildlife resource management in Zambia

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Abstract

We propose improvements for addressing the inadequate sustainable use of wildlife resources in the community-based natural resource management (CBNRM) programme in Game Management Areas (GMAs) using case study data from Mumbwa and Lupande GMAs in Zambia. Firstly, we assess the sustainability of wildlife resources in these GMAs using design principles for enduring common pool institutions. Secondly, we propose the steps required to address the lack of sustainability of wildlife resources in the CBNRM programme in the two GMAs by building on indicators suggested by Ostrom's principles. The resource use patterns in the two GMAs were assessed according to their socioeconomic and institutional factors. Comparisons were made between the two GMAs in relation to Ostrom's design principles. Accordingly the combination of socioeconomic and institutional factors restrains the sustainable use of wildlife resources in the two GMAs. Unless the Zambian government provides local communities with meaningful decision-making powers and benefits for the utilisation and management of wildlife, this resource is likely to disappear outside national parks.

Key words: community - based natural resource management, game management area, Ostrom design principles, Sustainable use, Zambia.

1. Introduction

One of the major natural resource problems today is loss of biodiversity caused by a lack of sustainable use of natural resources (Ostrom, 2009). For example, the lack of sustainable harvesting of wildlife resources, which includes poaching, human encroachment, deforestation and illegal fishing (Mwima, 2001; Mwima, 2007; Simasiku et al., 2008) is a major risk to biodiversity globally and to many people who depend on wildlife for income and food (Karen et al., 2013). These threats led to the creation of protected areas such as national parks and game management areas (GMAs), which are seen as central to the conservation of biological diversity. A GMA in Zambia is a declared zone around a national park, intended for sustainable use of wildlife and to serve as buffer zone around the park where settlements, cultivation, and licensed trophy and resident hunting are permitted. GMAs promote both community livelihoods as well as wildlife conservation (ZAWA, 2007). Protected areas, most of which occur in tropical forests and savannahs are one of the bases of biodiversity conservation (DeFries et al., 2005) because they are home to 70% of the world's plants and animals (Font & Tribe, 2000). Given the pressing need to conserve wildlife and ensure the food security of rural peoples around the world, improved sustainability criteria, including contingent valuation to evaluate and improve the management and sustainability of wildlife resources and food security were devised by Siachoono (1995). A study by Ostrom (2009) on institutions in common pool resources (CPRs) has been significant in the field of sustainability of natural resources. A CPR is a natural resource system that is large enough to make it expensive, but not impossible to exclude potential beneficiaries from obtaining benefits from its use. The design principles (Table 1) for enduring common property regimes to evaluate CPR institutions have increasingly been used in the sustainable use of natural resources (Tucker, 1999; Armitage, 2005; Quinn, 2007; Huntjens et al., 2012; Dell'Angelo, 2016). Common property regimes are a system of rules, rights and responsibilities that govern the ways in which group members relate to one another and to the commons.

Table 1. Ostrom's eight design principles for common pool resources

Principles	Descriptions
1a. Clear boundaries	Individuals or households who have the right to use the common pool resource are clearly defined
1b. Clearly defined membership rights	Multidimensional rights systems may include the right to physical access to the area, the right to withdraw resources, to manage or decide on use, to exclude others and to alienate others through sales or leasing
2. Congruence with local conditions	Rules restricting time, place, technology and quantity of resource use are well adapted to local conditions
3. Collective-choice arrangements	Most individuals affected by the rules can participate in modifying them
4. Monitoring	CPR conditions and use are monitored by the users themselves or by people accountable to the users
5. Graduated sanctions	Users who violate resource-related rules are likely to be subject to penalties that correspond to the seriousness and context of the offence
6. Conflict resolution mechanisms	Users and officials have rapid access to low-cost local arenas for resolving conflicts among users and conflicts between users and officials
7. Recognition of the right to organisation	The rights of users to devise their own organisations are not challenged by external government authorities
8. Nested governance	Appropriation, provision, monitoring, enforcement, conflict resolution and governance are organised in multiple, nested layers

Source: Adapted from Ostrom, 1990.

The wildlife policy of 1998 and the 2007 national policy on environment in Zambia recognises the important role of the wildlife sector in the economic development of the country and also the valuable input of local communities in managing wildlife and other natural resources in GMAs and open areas. This was in line with the Wildlife Policy of 1998, which has since been repealed and replaced by the National Wildlife Policy 2015 which has been launched but is not yet published. The legislation provided for the establishment of CRBs, which are democratic local institutional structures through which local communities can collaborate with ZAWA to manage wildlife in GMAs and Open areas (ZWA, 1998). To complement the wildlife policy, the Zambia Wildlife Act No. 14 of 2015 governs the management of wildlife resources and protected areas throughout the country by enabling community participation in wildlife management by specifically providing for the formation of CRBs as local institutional structures through which local communities in GMAs and open areas could partner with the Department of National Parks and Wildlife (DNPW) in managing and sharing the benefits from wildlife. The mode of participation is through local CRBs, established within the geographical boundaries of contiguous chiefdoms. The communities, through their traditional chiefs, apply

to the director of National Parks and wildlife for the formation of a CRB. The specific functions of CRBs are shown in Table 2.

Table 2. Functions of community resource boards

Functions	
1	Manage wildlife in their areas of jurisdiction within set quotas, in partnership with the government.
2	Appoint/employ village scouts to perform the functions of wildlife police officers.
3	Develop and implement management plans in GMAs, in consultation with government.
4	Implement socio-economic projects in the particular chiefdoms.
5	Responsible for the formation of village action groups.
6	Sensitise and educate the general public in respect of chiefdoms and the importance of wildlife so that they can appreciate its value and consequently conserve it.
7	Negotiate co-management agreements with operators, that is photographers and hunting in partnership with the government.

Source: Adapted from Ostrom, 1990.

To date, a total of 74 CRBs have been established within the proximity of the National Parks (GRZ, 2014). Despite these efforts, however, community based management of wildlife resources is still weak throughout Zambia, leading to the loss of biodiversity (MTENR, 2007; GRZ, 2014). The reasons behind weak community based management of wildlife resources in the GMAs is attributed to inadequate benefits from wildlife to the local people.

In order to add substantial weight in addressing factors that contribute to the loss of biodiversity in Zambia, we aim to 1) assess the sustainability of wildlife resources in Mumbwa and Lupande GMAs based on the design principles of natural resource management (Ostrom, 1990), and 2) using case study data from the two GMAs, to propose improvements for addressing the unsustainable use of wildlife resources in the CBNRM initiative in the GMAs.

1.1. Community-based Natural Resources Management

Historically, two CBNRM initiatives were launched in Zambia, the Luangwa Integrated Resource Development Project (LIRDPA), and the Administrative Management Design (ADMAD). LIRDPA was funded by Norwegian Agency for Development Co-operation (NORAD) and was established in 1986 as a community development initiative while ADMAD was established in 1983 (Shackleton & Campbell, 2000). It had full government

support and was subsequently developed to an independent initiative without direct involvement and control by the Department of National Parks and Wildlife Service (NPWS).

The emphasis of the programme was to generate income from wildlife in the Lupande GMA and to distribute it among the local communities (Hachileka et al., 1998; Dalal-Clayton & Child, 2003). In this way, individual households obtained direct income from the programme and a large number of community-level projects such as roads, schools and clinics were completed (Dalal-Clayton & Child, 2003). An integral part of this initiative was the appointment of village scouts by the community who patrolled the GMA (Dalal-Clayton & Child, 2003). A remarkable success of the LIRD project was the degree of enthusiasm for which sustainable management of wildlife was generated among the Lupande communities. However, a conflict arose because the broader communities felt that the traditional chiefs wanted to monopolise the benefits of the initiative (Dalal-Clayton & Child, 2003).

In Mumbwa GMA, the ADMADE programme started operations in 1987. It was funded by USAID and launched in collaboration with the NPWS. This was the precursor of the current system in Mumbwa and Lupande and was envisaged as a mechanism to promote wildlife conservation with the help of local communities in the GMAs. The financial benefits for communities were around 20% of the concession income of which 5% was given to the chief and the remaining 15% was given to the community in the form of community funds (Lyons, 1998; Dalal-Clayton & Child, 2003; MTA, 2018).

NPWS managed the programme, including the appointment of concessionaires and were decision makers using the top down approach (Dalal-Clayton & Child, 2003). Communities made decisions on how to spend the income from the hunting concessions only. After the repeal of Act No. 10 of 1990 and the subsequent enactment of Act No. 12 of 1998, which established Zambia Wildlife Authority, a number of adjustments included the conversion of the Department of National Parks and Wildlife Service into a semi-autonomous body corporate called the Zambia Wildlife Authority. Clear formalisation of community-based natural resource management and the introduction of CRBs as democratic local institutions to work in partnership with ZAWA were provided (Simasiku et al., 2008).

External funding for both LIRD and ADMADE ceased around 2002 and much of the impetus has been lost. However, with the transformation of NPWS into ZAWA, a new opportunity arose for the community initiatives to have continued with government support (Dalal-Clayton

& Child, 2003). Our contribution is in assessing the sustainability outcomes of the initiative, 15 years later from 2001 to 2016 using the sustainability criteria of Ostrom (2009).

2. Materials and methods

2.1. Study Areas

Mumbwa and Lupande GMAs were selected for the study because of the availability of large mammals such as buffalo (*Syncerus caffer*), Elephant (*Loxodonta africanas*), lion (*Panthera leo*) and leopard (*Panthera pardus*) which are popular for resident and trophy hunters (ZAWA, 2004; MTA, 2018).

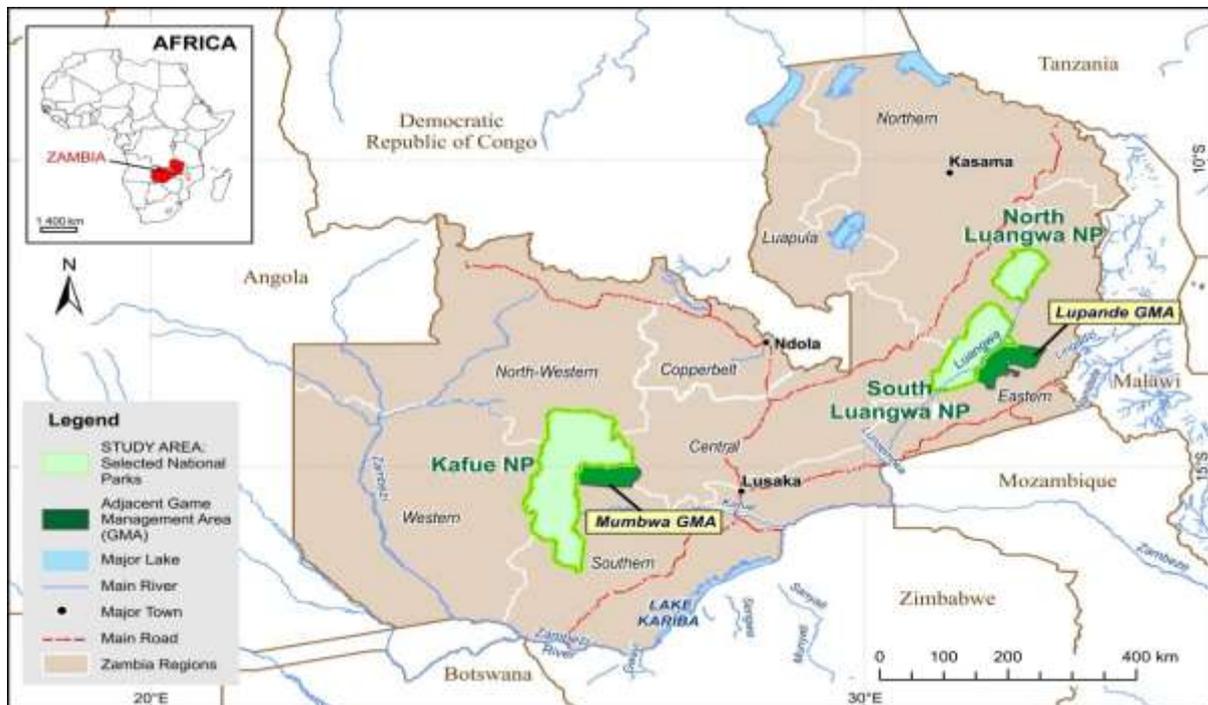


Figure 1. The location of Mumbwa and Lupande game management areas within Zambia

Mumbwa GMA (Fig. 1) is in the Mumbwa district and covers an area of approximately 3,400 km² (Nshimbi & Vinya, 2014). It was proclaimed as a GMA in 1972 and shares a boundary with Kafue National Park in the North and West, while in the South, it borders Namwala GMA (Fig.1). It is a prime hunting area for highly valued species in trophy hunting such as sable antelope *Hippotragus niger* (ZAWA, 2004; MTA, 2018).

Mumbwa GMA community comprises three chiefdoms, Chibuluma, Kabulwebulwe, and Mulendema, each with a CRB. The natural vegetation in Mumbwa GMA is dominated by the genera *Brachystegia*, *Isoberlinia*, and *Julbernardia*. Major threats and pressures that affect Mumbwa GMA include poaching and a high human population growth rate (UNDP, 2012). Poaching remains the major threat to wildlife populations in all the GMAs in Zambia (ZAWA, 2004; 2005; 2006; Simasiku et al., 2008; GRZ 2014; MTA, 2018) because it provides food and cash for basic needs through the sale of meat. The lack of formal employment opportunities is another reason for poaching in the GMA (Smasiku et al., 2008). Poaching continued to be the major threat to wildlife populations (MTA, 2018). This is evident in the increase in the number of people arrested and firearms as well as wire snares confiscated in and around the protected areas and the amount of game meat recovered during law enforcement operations in 2012. For example, the number of people arrested in 2013 was 1625 representing an increase of 27% from 1303 arrested in 2012 (ZAWA, 2013; ZAWA, 2014). With regard to firearms recovery, 598 firearms were recovered in 2012 representing an increase of about 1 % from the 584 recorded in 2011 (ZAWA, 2012). There was an increase in the recovery of wire snares from 5370 recovered in 2012 to 8406 in 2013 representing an increase of 36% (ZAWA, 2013; ZAWA, 2014). The amount of game meat seized in 2013 also increased to 13 542 kg from 8 328 kg representing an increase of 39 % (ZAWA, 2013; ZAWA, 2014). Other threats included charcoal production and illegal fishing. Furthermore results from law enforcement operations carried out by the wildlife law enforcement unit between 2012 and 2017 indicate that in 1920 poachers were arrested in 2015 and in 2016 the figure remained the same (MTA, 2018). In 2015, the amount of bush meat recovered was 29 427 kg. In 2016 however, bush meat recovered reduced to 20 703 kg (MTA, 2018). These constitute formidable challenges for sustainable wildlife resource use.

Lupande GMA (Fig. 1) in the Luangwa Valley in Mfuwe district of Eastern Province covers an area approximately 4 840 km² (Nshimbi & Vinya, 2014), bordered by South Luangwa National Park on the west. It is also a prime hunting area providing habitat to some of Zambia's finest wildlife species which include the buffalo, elephant, zebra (*Equus burchelli*), Waterbuck (*Kobus ellipsiprymnus*) (Balakrishnan & Ndhlovu, 1991; MTA, 2018). Lupande GMA comprises the chiefdoms of Kakumbi, Mkhanya, Nsefu, Jumbe, Malama and Msoro. Lupande had 68 918 people in 2012 (CSO, 2012). The dominant vegetation in Lupande GMA includes woodlands with Miombo (*Brachystegia*, *Isoberlinia*, and *Julbernardia* species), Mopane (*Colophospermum mopane*) and Munga (*Acacia spp.*) (Balakrishnan & Ndhlovu, 1991). The

majority of the people of Lupande are subsistence farmers who grow maize, cotton, millet, sorghum, beans, pumpkin, and sweet potatoes (Nyirenda et al., 2013). Other crops in the area include cassava, groundnuts and rice. Like many GMAs in Zambia, major threats and pressures that affect the Lupande GMA include poaching and encroachment due to growth in human population (Simasiku et al., 2008; Lindsay et al., 2013; MTA, 2018).

2.2. Study methods

Our study was based on primary and secondary data collected from June to August 2014. The primary data were collected through two methods: a household survey and key informant interviews as briefly outlined below. We received ethical clearance for this work from the University of Pretoria (EC 140514–046) (Appendix A). Secondary data were obtained from published materials and policy documents and we reviewed the included indicators used to evaluate utilisation so as to improve the sustainability of wildlife resources and food security in GMAs. Documents such as journal papers, the Zambia Wildlife Act (1998), Wildlife policy (1998), Zambia Wildlife Act (2015), Forest Act, (1999), Fisheries Act, (2011) and government records like the national policy on the environment were examined before conducting interviews. Such data provided an overview of policies and legislation for achieving sustainable wildlife resources and a contextual insight into factors that affect sustainable natural resources.

2.3. Household surveys

Household surveys were carried out using researcher-administered questionnaires comprising both closed and open-ended questions that generated quantitative and qualitative data. This is unlike other research methods like Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) that generate qualitative data only. The sampling unit for the two GMAs was the household, with the target respondent being the household head. The target households who included both men and women were randomly selected. A total of 349, i.e., 176 and 173 respondents were interviewed in Mumbwa and Lupande GMAs respectively. The sample size for the study was determined using the sample size calculator (<https://surveysystem.com/sscalc.htm>). The confidence interval for Lupande GMA sample size at a confidence level of 95% was 7.44. In the case of Mumbwa GMA, the sample size was obtained at 95% confidence level and confidence interval of 7.37. Of the respondents interviewed in Mumbwa GMA, 63.1% were males (36.9% females) and in Lupande GMA, 58.4% were males (41.6% females). The interviews were conducted by the researchers, assisted by 14 research assistants in both Mumbwa and Lupande GMAs. The research assistants,

conversant with local languages, were trained before conducting interviews. All the three chiefdoms were covered in Mumbwa GMA but only four (Kakumbi, Mkhanya, Nsefu and Jumbe) out of six were considered in Lupande GMA. This was attributed to logistic problems because the areas could not be easily reached. To ensure that the questionnaire was implementable in the two GMAs, we conducted a pre-test in Kabulwebulwe chiefdom in Mumbwa GMA. The households were interviewed on the following aspects: 1) Resource use activities by the communities, 2) Local community participation in the management of wildlife resources in the GMA and 3) Devolution of authority in decision making process regarding wildlife resource management.

2.4. Key informant interviews

Key informants, included ZAWA officials from the national office in Chilanga and from Mumbwa and Lupande GMAs, as well as traditional chiefs. ZAWA officials were interviewed in English, while the traditional chiefs were interviewed in their respective local languages. The responses from the traditional chiefs were transcribed and translated into English with the help of the research assistants. The chiefs were specifically asked questions about their role in wildlife resource management while the ZAWA officials were asked about the performance of CBNRM in the two GMAs regarding benefit sharing and conflict resolution mechanisms in wildlife resource management. Data were analysed using the Statistical Package for Social Sciences (SPSS V23) to generate frequencies of responses.

3. Results

3.1. Household surveys

The households were interviewed on the following aspects: 1) Resource use activities by the community, 2) Local community participation in GMA and 3) Devolution of authority in decision making process regarding wildlife resource management.

3.2. Resource use activities

In Mumbwa GMA, the main resource uses were subsistence farming (77.3%), fishing (3.5%) and *bona fide* resident hunting (1.7%). Other activities were trading and traditional harvesting of medicinal plant species (17.5%). For example, plants such as mukuyu (*Ficus sycomorus*) and musombosombo (*Vernonia aurantiaca*) were used as blood boosters. In Lupande GMA,

farming was the dominant occupation of most residents (68.8%), followed by fishing (4.0%) and *bona fide* resident hunting (2.3%). Other activities included handcraft entrepreneurship, such as baskets woven from palm leaves, and trading (24.0%). Access to forestry resources was open to anyone who had the skills to weave as the Department of Forestry was not visible in the area at the time of the study. Traditional harvesting of medicinal plant species (0.9%) such as musamba (*Lannea stuhlmannii*) that were used to cure stomach problems also occurred.

3.3. Community participation

The local communities were assessed on the following aspects regarding participation: Local communities' attending wildlife management meetings and contributing ideas. Most respondents from Mumbwa GMA (90.9%) and Lupande GMA (82.7%) do not contribute ideas or make suggestions when they attend wildlife management meetings (Table 3). Asked whether communities were consulted on issues related to the management of wildlife resources in Mumbwa GMA, 75.6% of respondents replied they were not consulted. In Lupande GMA, 74% of respondents said they were not consulted (Table 4).

Table 3. Responses on whether the local communities contribute ideas when attending wildlife management meetings

	Mumbwa		Lupande		Total	
	Freq	%	Freq	%	Freq	%
Yes	16	9.1	30	17.3	46	13.1
No	160	90.9	143	82.7	303	86.8
Total	176	100	173	100	349	100

Table 4. Responses to whether the local community is consulted about issues regarding management of wildlife resources

	Mumbwa		Lupande		Total	
	Freq	%	Freq	%	Freq	%
Yes	43	24.4	45	26.0	88	25.2
No	133	75.6	128	74.0	261	74.7
Total	176	100	173	100	349	100

3.4. Devolution of decision making authority

Participants were asked if they had been involvement in decision-making processes in wildlife management in their areas. Most respondents in Mumbwa (85.8%) and Lupande (61.8%) indicated that they were not involved in decision making (Table 5).

Table 5. Responses on involvement of local community in decision-making processes concerning management of wildlife in Mumbwa and Lupande GMAs

	Mumbwa		Lupande		Total	
	Freq	%	Freq	%	Freq	%
Yes	25	14.2	66	38.2	91	26.1
No	151	85.8	107	61.8	258	73.9
Total	176	100	173	100	12	100

3.5. Information from key informants

3.5.1. Conflict resolution mechanisms

There were no mechanisms for conflict resolution related to wildlife resource conflicts in the two study areas. Responses by key informants from both Mumbwa and Lupande GMAs showed that natural resource conflicts arose in several ways. Firstly, wildlife caused damage to local people’s fields. Secondly, ZAWA regulations did not allow people to hunt without permits (table 6). Thirdly, ZAWA offered no compensation scheme to affected individuals because it was not provided for in the Wildlife Act. Key informants from ZAWA, however, pointed out that the authority had over the years adopted a number of strategies to mitigate the human-wildlife conflict. In line with sections 78 and 79 of the Zambia Wildlife Act 2015 some of the strategies included killing the animals that had caused crop damage or had been involved in the killing of human beings. However, damage to crops was the main problem in the two study areas since some of the fields were located in the animal corridors that made it easy for them to destroy the crops as they passed through the fields.

3.5.2. Benefit sharing

In Mumbwa and Lupande GMAs, natural resource benefits were not shared equally, as stipulated in the Zambia Wildlife Acts of 1998 and 2015 which state that 50% of natural resource benefits should be go to the CRB with ZAWA receiving the other 50% (ZWA, 1998; 2015; MTA, 2018). The 50% allocated to the community is used for community projects such as construction of clinics, roads and schools as well as resource protection and patrols (ZWA, 2015; MTA, 2018). At the time of interview by key informants, ZAWA owed the local community huge sums of money in arrears for non-payment of their 50% share (table 6). The key informant from ZAWA stated that the situation was worsened by a ban on hunting that had been operating from 2013. The key informants attributed the situation to problems of inadequate funding from government.

Table 6. Summary table of institutional design propositions for wildlife resources in Mumbwa and Lupande GMAs in Zambia

Principles	Descriptions
1a. Clear boundaries	<p>The CBNRM programmes in Mumbwa and Lupande GMAs have a regulatory framework that clearly defines resource boundaries where the local communities are not allowed to hunt without hunting licenses. The only activities that the communities are allowed to carry out are subsistence farming and traditional harvesting of some traditional medicinal plants. Hunting is only allowed for those with hunting licenses.</p>
1b. Clearly defined membership rights	
2. Congruence with local conditions	<p>The interviews with key informants revealed unequal distribution of wildlife resource benefits in the two GMAs contrary to what is stipulated in the ZAWA Act which specifies 50% share for both ZAWA and the community.</p>
3. Collective-choice arrangements	<p>Responses from household survey and key informants revealed low community participation in Mumbwa and Lupande GMAs. The local communities do not contribute ideas or make suggestions regarding wildlife resource management when they attend meetings. They are only told what has already been decided. The information that is shared belongs to the authorities and not to the local communities. There are few or no consultations with the local community on issues regarding the management of wildlife resources in the two GMAs. The questionnaires clearly indicated that communities feel disenfranchised (Tables 2-4).</p>
4. Monitoring	<p>The key stakeholder interviews indicate that there are no effective monitoring procedures in the two GMAs. This could be attributed to the lack of regular game patrols and game counts in the GMAs. Most importantly, the local communities are not involved in monitoring activities except for a few that are employed by CRB as game scouts.</p>
5. Graduated sanctions	<p>There are no rules stated in the ZAWA Act regarding sanctions. It is unclear what punishment should be given for some offences such as cutting down trees, charcoal production and encroachment. There is also no clear graduation concerning other offences in the GMAs other than poaching. Most local people do not know who is supposed to enforce the sanctions. This is because ZAWA is the only institution responsible for protecting and monitoring animal species in the GMAs and no management responsibilities have been devolved.</p>
6. Conflict resolution mechanisms	<p>The key informants indicated that there are no mechanisms for conflict resolutions related to wildlife resources in the two study areas. In the two GMAs, wildlife resource conflicts usually arise from crop damage caused by wildlife to local people's fields, and regulations by ZAWA that does not allow people to hunt without permits. There are no conflict resolution strategies with respect to animal damage such as compensation because it is not provided for in the ZAWA Act. ZAWA key informants also indicated that the institution has no resources to sustain a compensation scheme. There are also no conflict resolution mechanisms to solve the unequal distribution of income from the GMAs with the local communities having little or no benefit and ZAWA keeping most of the income.</p>
7. Recognition of the right to organisation	<p>Documents show that the ZAWA Act of 1998 recognises the authority of chiefs in GMAs and therefore the government and local community universally recognise their authority. According to the Act, the chiefs are patrons of CRBs and therefore advise on issues of land use and effective and sustainable conservation and utilisation of natural resources,</p>

Principles	Descriptions
8. Nested governance	<p>particularly wildlife. Chiefs also help in conflict resolution in their respective area when requested. However, key stakeholder interviews as well as the questionnaires revealed that practice does not agree with what is stated in the legislation. It turns out that there is no recognition of rights by communities to make important decisions concerning wildlife resources because ZAWA is still firmly in control of them. Anything significant has to be approved by ZAWA. The local institutions such as the CRBs are upwardly accountable in that they are only mandated to report to higher authorities in this case ZAWA. The CRBs have to present a financial report to ZAWA but is not obliged to do the same to the community. Most of the legislation with respect to CRBs is not implemented.</p> <p>Document analysis reviews that the guidelines in the ZAWA Act of 1998 provide step-by-step directions on how to set up CBNRM institutions such as CRBs in a GMA. It also clearly outlines the composition and function of a CBNRM institution. There is therefore a lot of uniformity with this principle of Ostrom. When it comes to locally tailored rules and regulations, these have to be compatible with the main legislation and when they are part of the management plans, they have to be approved by ZAWA before they can become legally binding. This removes sources for inconsistencies between one level of wildlife management and the next to be implemented and confirmed by the legislation or regulations that create the authority of these nested levels of decision-making.</p>

Source: Adapted from Ostrom, 1990.

3.5.3. *Threat to resources*

Key informants from ZAWA in Mumbwa GMA revealed that major threats to resources and pressures included poaching and human encroachment. The rampant use of wire snares by poachers was evidenced by the confiscations made by ZAWA officers in the GMA (ZAWA, 2013; ZAWA, 2014). Encroachment into Kafue National Park in Mumbwa GMA was mainly due to agricultural activities, as most residents were subsistence farmers. In Lupande GMA, agricultural activities were also prominent in threatening wildlife resources by reduction of their habitat.

3.5.4. *Documentary evidence*

Documents that were examined such as Zambia Wildlife Act 1998 and 2015, National Wildlife Policy 2015 and National Policy on environment 2007 indicate the regulatory frameworks that operate in the GMAs. These include national policy on environment, legislation and institutional frameworks and national policy on environment.

National wildlife policy: In Zambia, the government recognises the important role of the wildlife sector in the economic development process of the country and also the valuable input

that local communities make in managing wildlife and other natural resources in GMAs and open areas (ZWA, 2015).

National legislation: Zambia has a national legal framework that relates to wildlife resource management. Zambia Wildlife Act No.12 and 14 of 1998 and 2015 respectively provide for community participation in wildlife management by specifically providing for the formation of CRBs as local institutional structures through which local communities living in GMAs and open areas could partner with the ZAWA in managing and sharing the benefits from wildlife.

Institutional framework: The institutional framework in Zambia provides clear guidelines for the involvement of several stakeholders in managing wildlife resources in the GMAs and open areas, with the rights or ownership of wildlife resources being entrusted to the State (MTENR, 2007b).

4. Discussion

In terms of Ostrom's principles for sustainable CPRs, we briefly discuss the requirements for sustainable CPR use:

4.1. Clearly defined geographical boundaries of CPRs (physical and membership rights)

CBNRM programmes in Mumbwa and Lupande GMAs have a regulatory framework that clearly defines resource boundaries where the local communities are not allowed to hunt without hunting licences. The GMAs therefore meet Ostrom's first criterion for sustainable use of CPRs that relates to clearly defined boundaries of CPRs.

4.2. Congruence between appropriation and provisioning rules and local conditions

The study revealed unequal distribution of wildlife resource benefits in the two GMAs, contrary to what is stipulated in the ZAWA Act which specifies 50% share for both ZAWA and the community. This finding is in line with other scholars (Bandyopadhyay & Tembo, 2009; Child & Child, 2015; Gibson & Mark, 1995) who observed an uneven distribution of gains in the GMAs.

4.3. Recognition of Rights to Organisation

The ZAWA Act of 1998 recognises the authority of chiefs in GMAs. The chiefs are the patrons of CRBs and therefore advise on issues of land use and effective and sustainable conservation and utilisation of natural resources, particularly wildlife. Chiefs also help in conflict resolution in their respective area when requested. However, the practice on the ground does not agree with what is stated in the legislation. It turns out that there is no recognition of rights by communities to make important decisions concerning wildlife resources because ZAWA is still in control: anything significant has to be approved by ZAWA. The local institutions such as the CRBs are upwardly accountable in that they are obliged to report to higher authorities, in this case ZAWA. The CRBs have to present a financial report to ZAWA that is not obliged to do the same to the community. Most of the legislation with respect to CRBs is not implemented. Although the 1998 Zambia Wildlife Act could be understood as giving substantial rights to local communities, these remain vaguely-defined or undefined (Chibeya, 2014). In order to meet this requirement of Ostrom, definitive legislation needs to be passed that recognises the rights of communities in the management of natural resources. ZAWA now (DNPW) should recognise the decision making abilities of the Village Area Groups (VAGs), the lowest formal decision making category within the LIRD framework. In addition, the CRBs do not automatically recognise the authority of VAGs.

4.4. Collective Choice Arrangement

Low community participation in Mumbwa and Lupande GMAs is evident from the local communities do not contributing ideas or making suggestions regarding wildlife resource management when they attend meetings, only being told what has already been decided (Table 3). The information that is shared belongs to the authorities and not to the local communities. There are few or no consultations with the local community on issues regarding the management of wildlife resources in the two GMAs. This finding agrees with Milupi et al., (2017) who observed that the local communities in the Mumbwa and Lupande GMAs continue to be excluded from real decision-making processes regarding management of wildlife resources. This lack of community participation in decision making, as observed by Chirenje et al., (2013), causes conflict between ZAWA and the local communities within the GMAs. The questionnaires clearly indicated that communities feel disenfranchised (Tables 2 - 4).

4.5. Effective Monitoring Procedures

The key stakeholder interviews indicate that there are no effective monitoring procedures in the GMAs, attributable to inadequate regular game patrols and game counts in the GMAs and in agreement with GRZ (2014) who observed irregular game surveys conducted in the GMAs. The absence of data regarding population trends in of important species made it difficult to monitor the degree of illegal game utilisation and of game populations and therefore makes it difficult to achieve any conservation goals. Most importantly, the local communities are not involved in monitoring activities except for a few that are employed as game scouts by CRBs.

4.6. Legitimate System for Graduated Sanction

For Mumbwa and Lupande GMAs, there are no rules in the Act regarding sanctions. It is unclear what punishment should be given for some offences such as cutting down trees, charcoal production and encroachment. There is also no clear graduation concerning other offences in the GMAs other than poaching. Most local people do not know who is supposed to enforce such sanctions because ZAWA is the only institution responsible for protecting and monitoring animal species in the GMAs and no management responsibilities have been devolved. This criterion indicates serious shortcomings for sustainable resource use. Following Ostrom's (1990) approach, the community itself needs to be involved in sanctions against transgressors of the community rules. At present, poachers are sanctioned by the State (criminal prosecution) and not by the local community (Lyons, 1998; Dalal-Clayton & Child, 2003). The reason for this is that the local communities do not see any significant loss if there is a transgression that threatens the sustainability of the CBRNM system. To meet this criterion, the local communities need to value their wildlife resources so highly that graduated sanctions against transgressors are automatic. This can only happen if the communities perceive their wildlife resources as extremely valuable (Ostrom, 1990).

4.7. Conflict Resolution Mechanisms

The key informants indicated that there are no mechanisms for conflict resolutions related to wildlife resource conflicts in the two study areas where wildlife resource conflicts usually arises from crop damage caused by wildlife to local people's fields. There are no conflict resolution strategies with respect to animal damage such as compensation because it is not provided for in the ZAWA Act. ZAWA key informants also indicated that the institution has no resources to sustain a compensation scheme. There are also no conflict resolution

mechanisms to solve the unequal distribution of income from the GMAs with the local communities having little or no benefit and ZAWA keeping most of the income. To date, the most important conflict comprised those between a local community and their chiefs (who attempts to monopolise the financial income) and between CRBs and ZAWA who try to monopolise decision making authority (Dalal-Clayton & Child, 2003). This criterion of Ostrom can only be met if there is legislation passed providing explicit specification of financial decision-making powers at the different levels of governance.

4.8. Nested Enterprises

The guidelines in the ZAWA ACT of 1998 provide step by step directions on how to set up CBNRM institutions such as CRBs in a GMA. It also clearly outlines the composition and function of a CBNRM institution. There is therefore a lot of uniformity with this principle of Ostrom in this regard. When it comes to locally tailored rules and regulations, these have to be compatible with the main legislation and when they are part of the management plans they have to be approved by ZAWA before they can become legally binding. This removes sources for inconsistencies between one level of wildlife management and the next. However, this arrangement makes it difficult for innovation at village level because the several systems of actors with different means and interests may often conflict in the direction of their decision-making. Consequently the more powerful actors can promote their own interests at the expense of the less powerful ones. This exemplified by the decision of the government to increase hunting concession fees to levels that make it unsustainable for actors with interests in trading in these products. The CBNRM in both GMAs therefore do not implement well-organised nested decision-making structures.

5. Conclusion

Management of wildlife resources is more meaningful and effective when the local community is involved at the decision-making level rather than as collaborators. Most of the characteristics of CBNRM institutions in Mumbwa and Lupande GMAs are not consistent with Ostrom's design principles for sustainable institutions governing CPRs. Local communities are not involved in decision-making processes, resulting in the fact that the local communities are not adequately empowered to manage their wildlife resources in the GMAs. The policies indicate that the legal frameworks and institutional arrangements favour the state in terms of decision-

making rather than the local community. The combination of socioeconomic and institutional factors therefore restrains the sustainable use of wildlife resources in the two GMAs. The Zambian government should provide local communities with meaningful decision-making powers and benefits about the utilisation and management of wildlife resources. If that is not performed then there is a strong likelihood that the benefits of good management of natural resources and particularly wildlife will lead to the impoverishment of communities who live within the game management areas. In addition to the provision of the current legislation, the future of CBNRM programmes in the GMAs, however, is largely dependent on how the different actors are able to collaborate and share information and on how responsive to socio-environmental change the institutional adaptations are likely to be. It is also dependent on an intense and constant involvement of stakeholders in redefining institutional priorities.

6. Recommendations

- There is need for definitive legislation to be passed that delegate decision-making about wildlife resources to the local communities in GMAs. The study indicates that decision-making is top-down with decision either being made or acted upon by DNPW formerly ZAWA.
- DNPW as well as CRBs should recognise the decision-making abilities of the VAGs, the lowest formal decision-making category within the CRBs.
- Passing legislation with the explicit specification of financial decision-making powers at the different levels of governance, including CRBs.
- Implementing governance models that need to be implemented and strongly supported by legislation or regulations that create the authority of these nested levels of decision-making.
- There is need for an enabling framework that will genuinely devolve power from the state to the local institutions of decision-making as a way of empowering local communities to manage wildlife resources in the GMAs.
- The governance model similar to that within LIRDP needs to be implemented, and confirmed by the legislation or regulations that create the authority of these nested levels of decision-making.

- We propose that DNPW needs to collaborate with the local communities through CRBs in order to support communal decision making structures that have a direct impact on wildlife resources. The questionnaires clearly indicated that communities feel disenfranchised (Tables 2 - 4). Meaningful collective choice decisions can therefore only take place if legislation is promulgated that empowers the local communities with explicit decision-making powers.

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