Journal of Sustainable Development in Africa (Volume 25, No.1, 2023)
*ISSN: 1520-5509*
*Pennsylvania Western University, Clarion, Pennsylvania*

# EXPLORING CHALLENGES FOR THE SUSTAINABLE MANAGEMENT OF WILDLIFE RESOURCES IN MATUSADONHA NATIONAL PARK AND ITS HINTERLANDS.

Zvikonyaukwa, Jesse, Musengi, Kudakwashe and Mudzengi, Clarice

## ABSTRACT

In Africa, game reserves have been shifting away from protectorate conservation towards integration of community participation to ensure sustainable development. Thus, this study sought to investigate the challenges faced in managing wildlife resources in the Matusadonha game park. The study used a qualitative research methodology. A semi-structured-interview survey was conducted in Nyamhunga, Mahombekombe, Siakobvu and Mola-Kasvisva. The study results showed that all the 100 participants identified illegal killing of animal as a major challenge to the park authorities. Amongst the solutions suggested to a low effective wildlife management were, technical systems and relocation of communities was lowly ranked, with participants favoring community integration and employment creation. The major benefit of game reserve activities was maintenance of roads. Other development needs were not supported such as schools, health facilities and construction of bridges. In conclusion, the communities in the around Matusadonha game reserves realise limited benefits from the game reserve and in part this has created challenges in the sustainable management of wildlife.

**Keywords:** human-wildlife conflicts, community based wildlife resources management, community development, sustainable wildlife conservation, Matusadonha

## INTRODUCTION

Game reserves are geographical areas set out to effectively protect, develop and maintain various biotopes. Traditionally, human exploitation of game reserves was discouraged using the fine and fence approach, but this approach has proved to lead to degradation of biodiversity through illegal exploitation of wildlife. There has been pressure for wildlife management systems to change towards a co-management approach that includes human livelihoods and development of hinterlands to ensure sustainable conservation (Vodouhe, *et al*., 2010). Some scholars argue that for sustainable conservation to be achieved local community benefits are important in making people appreciate the value of wildlife and maximise community benefits reducing incurring costs associated with human-wildlife conflicts (Hulme and Murphree, 2001; Moswete and Thapa, 2018). In Africa, rural communities that live close to game reserves put pressure to derive benefits from game reserves either legally or illegally mainly due to historical shared relations with the landscapes were the game reserves are established and traditional human attachments to the space. This usually causes challenges to the management of game park reserves. In Zimbabwe, at the policy level, there are set structures for wildlife management through the Department of National Parks and Wildlife Management (DNPWM) and community participation through CAMPFIRE. Hence this study investigated wildlife management challenges experienced in the Matusadonha Game Park and its surrounding communities. It goes further to interrogate human-wildlife conflicts which ensue as a result of costs incurred by either the communities or the game reserve management system.

## LITERATURE REVIEW

Global biodiversity is being threatened by widespread habitat loss, over-exploitation of species, invasive species, pollution and climate change (Hoole and Berkes, 2010). The African savanna regions are habitat to unparalleled diversity and abundance of wildlife (Fynn, *et al*., 2016). The threat on the African wildlife species and habitat makes conservation an important issue. In Africa, areas rich in biodiversity and face significant degradation, considered as 'hotspot' by some conservationists, have been put under protectorates notably national parks (Hoole and Berkes, 2010; Mbaiwa, Stronza and Kreuter, 2011). In Africa the concept of biodiversity protected areas follows the yellow stone model, that conceptualized national parks as areas under strict state control, exclusively for the protection, conservation, and management of vegetation and wild animals (Hulme and Murphree, 2001; Hoole and Berkes, 2010). This conceptualization of game reserves excluded local communities from benefiting and management of the game reserves.

This fortress approach of game reserves creates injustices for the people that have cultural and have been benefiting from resources fenced inside the parks areas. In Africa, game reserves to be established communities have been displaced from their traditional areas of use and occupancy (Fynn, *et al*., 2016). For example, The Herero people of Ehi-rovipuka were forcibly moved out of the Etosha National Park in the 1970s. This alienated them from traditional territory, shrines and places of importance not to mention water and land resources that supported their livelihoods (Hoole and Berkes, 2010). Hoole and Berkes (2010) call the processes of communities loosing ties with traditional environment, 'decoupling'. Literature from Africa demonstrates that communities have been known to resist decoupling resulting in the degradation of biodiversity. Imposing modern conservation paradigm and establishment of protected areas on local communities had received resistance

from members of public and resulted to number of negative consequences including restriction of access to traditionally used resources, disruption of local culture and economies by tourists, increased depredation on crops and livestock by wild animals and, displacement of inhabitants from their traditional lands leading to social and cultural destructions. Case studies on community Contestations to access game reserves have been done in Africa, examples include; Benin (Vodouhe, *et al.*, 2010), Botswana (Mbaiwa, *et al*., 2011; Moswete and Thapa, 2018), Tanzania (Benjaminsen, *et al*., 2013), Namibia (Hoole and Berkes, 2010), Kenya (Shibia, 2010), Zimbabwe (Mhlanga, Nyikahadzoi and Haller, 2014).

Besides lost access to traditional environments and benefits, the communities still are not benefiting and bear the costs associated with wild animals destroying their property. Wildlife and associated tourism has been documented as a major revenue earner for African governments (Stone and Stone, 2011; Benjaminsen, *et al*., 2013). African governments have mainly paid lip service to decentralisation of natural resources management in practice, but rather consolidating wealth and rent-seeking power by the state ensuring bottom-upwards flow of revenue (Benjaminsen, *et al*., 2013). Thus the central governments benefit more than the local communities that bear the cost of sustaining the wildlife population. This angers communities who develop negative attitudes and perceptions over wildlife, game reserve officials and the state.

Mbaiwa and others (2011) summarized the short-comings of the 'yellow stone model' that informs national game reserves' biodiversity conservation management. Firstly, it failed to realise the complex socio-cultural needs of people especially in developing countries. Secondly, parks are associated with the forced removal of people from their native lands, making them conservation refugees. Finally, parks hinder communities from providing for their own livelihoods, thus engendering poverty and dependency. Sentiments of disenfranchisement are exacerbated when communities often see little financial benefit from the game reserves, yet they must bear the burden of wildlife conflicts, leading to resistance against conservation activities (Fynn, *et al*., 2016). The community rationale to conserve wildlife is linked to the services and goods they provide for their development. This realisation has led to governments and conservation efforts valuing community management for the sustainability of wildlife both in the game reserves and adjacent landscapes.

Form the 1980's upto the 1990's African governments were compelled by donors to provide direct and indirect benefits to local communities that habit areas adjacent to game reserves. This meant balancing conservation and community development which would ensure a win-win situation for human livelihoods and ecological conservation. In southern Africa, governments adopted the Community-Based Natural Resources Management (CBNRM) model. Scholars have had a mixed approach to the CBNRM in resulting in a win-win situation (Moswete and Thapa, 2018). A number of scholars have questioned the effectiveness of people-centered approaches to conservation (Oates, 1999; Terborgh, 1999). Locke and Dearden (2005) argue that a focus on people comes at the expense of 'wild biodiversity,' thus undermining the purpose of strictly protected reserves management approach. This and similar critiques have led to a resurgence of the yellow stone park model for wildlife management (Mbaiwa, et al 2011).

This paper supports the counter argument to the yellow stone principles of strictly protected game reserves because of the failure of top-down management approaches in ensuring sustainable wildlife management and sustainable community development. This paper argues for more participation by rural communities in rural game reserve management and for communities to have greater control in decision-making and benefits flowing to them, for effective conservation and

community development (Stone and Stone, 2011). While increasing numbers of park and resource managers that have turned to co-management as a strategy for reconciling the social and economic needs of people and biodiversity conservation (Phillips, 2003), such collaboration is fraught with challenges (Brockington, 2004). This study asks the question what challenges are being faced in ensuring sustainable management of wildlife in the Matusadonha game park and its hinterlands. In answering this research question, this paper's specific objectives are:

- To examine the wildlife management structure and challenges being experienced by the DNPWM at the Matusadonha game park
- To explore the benefits being derived by the surrounding communities from the wildlife in and around the Matusadonha game park
- To deduce benefits of co-management on sustainable conservation and community development

***Background of the Study Area***

The newly established Zimbabwean government in the 1980s was faced with a serious problem of poachers from the country and Zambia. The Zambian poachers mainly targeted rhinoceros (*Diceros bicornis*) and elephants (*Loxodonta Africana*) for their horns and tasks respectively. While local poachers targeted species that provided bush meat. The local poachers dominantly stayed in communities adjacent to the game parks. Literature has documented how Shona tribes reclaimed parts of their historical lands back after independence in the middle-Zambezi valley (Mbereko, Scott and Kupika, 2015; Mbereko, Kupika and Gandiwa, 2017). The people settled in the Zambezi game park's buffer zone encroaching into wildlife space. The practice of agriculture including animal rearing increased conflicts between the farmers and wildlife that crossed the game fence boundary. The animals would destroy people's crops and prey on their livestock. The people responded by killing problem animals. Furthermore, human wildlife conflicts and the traditional practice of hunting created an impetus for adjacent communities to illegally hunt wildlife in and outside the game reserve. The increased loss of wild life and destruction of habitat created serious challenges for the department of National Parks and Wildlife Management. Police and Parks officials intensified patrol efforts with the objective of controlling illegal hunting and arresting trespassers into the parks dotted in along the Zambezi valley.

With the increased criticism of the yellow stone approach to wildlife conservation the Zimbabwean government changed their conservation style by incorporating community participation and benefits. The government established the CAMPFIRE programme with the aim of ensuring that local communities have the motivation and responsibility for ensuring the survival and continuity of their wildlife resources and in the short term, to make sure that these communities gain in terms of livelihood from the natural resources (Biggs, *et al*., 2019). The CAMPFIRE programme was introduced in the Zambezi valley in the 1980s starting with Nyaminyami Rural district and spreading to lower Zambezi. A lot of research has been done on the CAMPFIRE in the mid-Zambezi districts, most of the studies have been on the evaluation of the livelihoods benefits derived by communities from the programme (Moswete and Thapa, 2018; Biggs, *et al*., 2019). While there are few studies that critic the inadequate decentralization in wildlife management, ethnic divisions, corruption by council official and the effects of the economic crisis on cash benefits. On paper the CAMPFIRE programme is still ongoing, but in practice

communities have disassociated themselves with it since they were not realizing benefits (Moswete and Thapa, 2018). Hence, it is important to carry out a study like this one to understand the community benefits from the game reserves in order to buy back their trust and willingness to participate in wildlife management.

The study was carried out in Matusadonha Game Park and its hinterland located in the middle-Zambezi valley. The middle-Zambezi valley is located in Mashonaland province of Zimbabwe. Matusadonha game park covers an area of 1 370Km2 on the southern side of on the Zambezi valley on the Zimbabwean shore of Lake Kariba. The park is made up of two topographically distinct areas which are the escarpment and the valley floor. Generally, the park has very little water especially during the dry season. The valley floor is predominantly woodlands (*Colospermum mopane, Combretum and Terminalia*) while the escarpment is predominantly *miombo* woodlands. This habitat is densely populated with large herbivores. There are a number of communities that practice agriculture in the hinterland. The creation of the lake by damming the Zambezi River pushed rural communities outwards from the centre of the valley, while creating the Kariba urban town close to the dam. Four study community sites were selected that surround Matusadonha Game Park, two in the rural namely Siakobvu and Mola-Kasvisva and the other two Nyamhunga and Mahombekombe from an urban settlement called Kariba.

## METHODS AND METHODOLOGY

### Study design and Methods

The study dominantly adopted a qualitative methodology approach, which is informed by the interpretivism paradigm of research (Creswell, 2014). Henning (2014) defines a paradigm as a theory or a hypothesis within which theories are constructed, which fundamentally influences how one sees the world, and determines the background perspectives, and shapes one's understanding of the world. The qualitative methodology allowed understanding of multiple realities experienced by the National Parks and Wildlife authorities and those of the communities. Furthermore, the study required in-depth understanding of the phenomena hence qualitative methodology was selected.

This study used multiple cases selected for their experience to understand wildlife management benefits and costs (conflicts) experienced by both rural and urban communities in the game reserves adjacent to Matusadonha Game Park. The case studies were drawn from the geographical and social spaces of Nyamhunga, Mahombekombe, Siakobvu and Mola-Kasvisva. These areas were purposively sampled considering that they form part of the hinterland to the game park. The case studies represent the district populations since two are rural and the other two urban settlements. Transects cutting across the residential units in each case study were drawn on maps and located on the ground. Study participants were drawn from the vicinity of the transect line drawn on the map. The study utilized a cross-sectional survey, using semi-structured interviews.

The semi-structured interviews had both structured and open-ended questions. The interviews gathered data on the following variables; wildlife management structure, challenges associated with the management of wildlife, benefits derived at a household and community levels, and suggested solutions. Household heads were the participants to the survey. In the household surveys, the household head was defined as male or female parent responsible for the upkeep of the family either through productive or reproductive functions. The interviews were done until a point of data saturation. Thus, data saturation

was used to determine the sample sizes which were; Nyamhunga (20), Mahombekombe (25), Siakobvu (25) and Mola-Kasvisva (30). Along the transects, study participants were selected using purposive sampling. The following inclusion criteria was used; one had to have stayed in the study site for more than 15 years; household head, and not employed by parks or tourism company. Key informant interviews were conducted with park rangers at different levels (5), the Environmental Management Agency (EMA) (1) and local leadership (4).

Thematic analysis was used to analyse data. The responses were cleaned and coded using numerical values to represent a group of similar responses (themes). The data was broken down to allow coding. The data was then synthesized creating categories and patterns were established. Catergorisation assisted the researchers to make comparisons and contrasts between patterns for the four case studies. Coded data was presented in charts and tables, while string data is presented using paraphrased statements and direct citations. For the coded data descriptive statistics using a computer package called microsoft-excel was done.

## RESULTS

### *Matusadonha Game Park Management*

The study found fragmented land management systems, alone that present challenges. The Matusadonha Game park area is predominantly managed by a government department called the DNPWM. According to a key informant from DNPWM there are a number of stakeholders that have rights to participate in the management of sectors of the park such as EMA, the Zimbabwe National Water Authority (ZINWA), the department of Forestry (DF) and Ministry of Tourism. It was reported that although these state departments had jurisdiction they are usually not involved in day to day management of the wildlife but resource units such as forest, water e.t.c.

DNPWM conducts regular patrols within the park and in the hinterlands to protect the parks wildlife from poachers. In the hinterlands there is another layer of institutions that is a key stakeholder in wildlife management. According to a key informant the rural areas are legally entrusted to the Nyaminyami Rural District Council (NRDC) on behalf of the state. It was reported by a local leader in an interview that DNPWM assists in training the scouts that are under NRDC. In an interview with another local leader, he reported that the community wildlife management systems were stronger when CAMPFIRE was effectively running as opposed to now due to lack of resources. Thus, DNPWM does patrols in the communal areas but due to limited resources these are fewer than desired. A key informant from DNPWM indicated that usually they attend to reports in the adjacent rural areas of poaching activities and problem animal control.

Another layer in the fragmentation is the wildlife management in the Kariba town. The study results show that the land is entrusted to the Municipality of Kariba, but it does not have power ove wildlife management issues. Predominantly the wildlife resources in the town are managed by DNPW. A key informant from DNPWM reported conflicts in the intrests and mandates of the municipality and the DNPWM over rapid development. He (Key informant interview 4) said, "There is a problem the municipality is mandated by the state to develop the town while in the same space DNPWM is also mandated to protect wildlife."

The wildlife management challenges indicated by 100% of participants are poaching and human-wildlife conflicts (Table 1). These two challenges had 100% responses in all the four study sites. In interviews with parks officials the species targeted by commercial poachers were elephants, lions, leopards and buffaloes. It was also indicated that rhinocerous were in danger but had been placed in special protectorates.Other animal species of relatively lower value were mainly poached by communities for meat or traditional rituals.

There were a number of issues identified to be responsible for human-wildlife conflicts. Human-wildlife conflicts were identified as a cost by both officials from the department of National Parks and Wildlife Management and the community respondents. The rangers interviewed highlighted the high costs associated with maintaining the park boundary and the loss of wildlife biodiversity as major issue to the costs of human-wildlife conflicts. The community lamented the costs associated with crops, livestock killed and other property. For example, at the time of the study a cow was estimated to be between US$350 and US$600. Communities usually responded by harming or killing the problem animals.

Table 1 Wildlife management challenges identified in structured interviews

| **Management challenges identified** | **Study Area** | | | |
|---|---|---|---|---|
| | **Nyamhunga** | **Mahombekombe** | **Siakobvu** | **Mola-Kasvisva** |
| Poaching | 20 (100) | 25 (100) | 25 (100) | 30 (100) |
| Death of wild animals | 20 (100) | 18 (72) | 22 (88) | 19 (63) |
| Increasing wildlife population | 17 (85) | 12 (48) | 19 (76) | 16 (53) |
| Forage shortages | 10 (50) | 22 (88) | 17 (68) | 26 (87) |
| Human-wildlife conflicts | 20 (100) | 25 (100) | 25 (100) | 30 (100) |

Table two shows results of the suggestions made by the study participants from the four study areas to resolve wildlife management challenges experienced in the park and its hinterlands. The majority of the study participants (79%) suggested that it was important to educate communities on the importance of the game reserve (Table 2). Although the majority of the respondents (73%) suggested that the game scouts should be increased, rural communities had lower proportions of participants supporting the idea (60%) compared to urban participants (90%). The majority of the study participants (83% out of the 100 people) were of the opinion that maintenance and erecting the game boundary fence would resolve human-wildlife conflicts in the four areas. About 83% (n=100) of the study participants thought community engagement and participation in

the game reserve operations and management would be effective in dealing with human-wildlife conflicts. The frequency of responses had a standard deviation of 1.6 across the four study sites.

Table 2 Suggested solutions to the challenges faced in the management of the Matusadonha game reserve

| **Responses** | **Nyamhunga** | **Mahombekombe** | **Siakobvu** | **Mola-Kasvisva** |
|---|---|---|---|---|
| Education of local people | 18 (90%) | 12 (48%) | 22 (88%) | 27 (90%) |
| Increasing the number of parks scouts | 20 (100%) | 20 (80%) | 14 (56%) | 19 (63%) |
| Use of remote sensing in monitoring animal movement and ecological changes | 6 (30%) | 3 (12%) | 12 (48%) | 7 (23%) |
| Maintaining boundary fence on monthly basis | 14 (70%) | 20 (80%) | 22 (88%) | 27 (90%) |
| Community participation | 20 (100%) | 20 (80%) | 19 (76%) | 24 (80%) |
| Employ local people to maintain fence and as wildlife officers | 17 (85%) | 11 (44%) | 19 (76%) | 10 (76%) |
| Relocate people to safer areas | 6 (30%) | 12 (48%) | 8 (32%) | 17 (57) |

Majority of the participants from Nyamhunga (85%), Siakobvu (76%) and Mola-Kasvisva (76%) were of the opinion that creating employment for locals to carry out manual work would reduce the wildlife management challenges. While 60% (n=25) of the participants from Mahombekombe were of the opinion that providing general hand employment to local community does not help resolve human-wildlife.

Interviewed park officials indicated the use of remote sensing technologies. It was reported that collars have been put on several endangered animal species in the park. The use of remote sensing technologies was lowly supported (28%) as a strategy to resolving the challenges being faced in the game reserve. Relocation of people to safer areas out of the game reserve was lowly supported by participants in Nyamhunga (30%), Mahombekombe (48%) and Siakobvu (32%). While majority of the study participants (57%) from Mola-Kasvisva supported the idea that relocating people would be desirable as a strategy to resolve human-wildlife conflicts.

**Benefits derived from wildlife by communities**

A total of 11 benefits were identified by the 100 study participants from the four case studies. All the participants indicated having benefited from game meat in the past (Figure 1). The sources of the game meat were varied. Residence of Nyamhunga and Mahombekombe reported buying game meat from game scouts, people working for hunters and crocodile meat from the crocodile farms. Some (15% of 20) participants from Nyamhunga reported buying game meat from poachers. In Siakobvu and Mola-Kasvisva the sources of game meat included illegal hunters (poachers), CAMPFIRE, people who work for hunters. Participants lamented how hunters and Nyaminyami Rural District Council was taking away meat after a hunt or shooting of a problem animal.

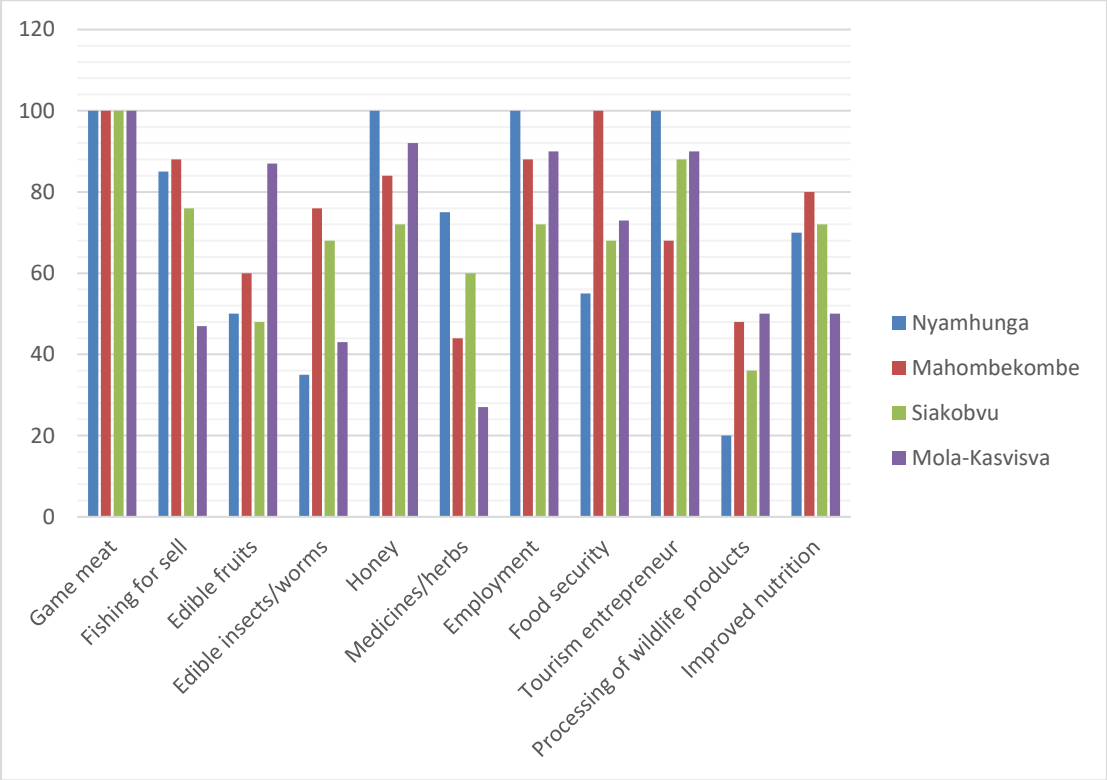


Figure 1 Benefits accrued by study participants from the game reserve

About 85% (n=45) of participants from urban areas reported benefiting from commercial fishing than the 62% (n=55) from the rural areas. Participants from Mahombekombe had the highest (88%) proportion of people benefiting from fishing in the game reserve. Followed by Nyamhunga with 85% of the 20 respondents benefiting from fishing. The rural communities of Siakobvu and Mola-Kasvisva had lower proportions of 76% (n=25) and 47% (n=30) respectively.

About 68% of the rural study participants benefited from wild fruits compared to 55% from the urban areas. Participants from Mola-Kasvisva were the highest proportion (87% out of 30) benefiting from wild edible fruits (Figure 1). Interview responses show that rural communities had access to a wider range of wild fruits unlike in urban settings were the fruits were limited to baobab tree (*Adansonia digitata*) fruit, buffalo thorn (*Ziziphus sp*) fruit and marula (*Sclerocarya birrea*) fruits. About 56% (n=45) of the urban households benefitted from edible insects and worms compared to 56% (n=55) in the rural areas. Mahombekombe had the highest (76% of 25) number of households that benefited from edible insects or worms. About 68% (n=25) households benefitted from edible worms or insects from Siakobvu. Participants from Nyamhunga reported the least number (7 out of 20) of households benefiting from edible worms or insects.

All the 20 participants from Nyamhunga reported that all their households benefitted from honey harvested from the forests that are part of the Zambezi valley game reserves (Figure 1). About 84% of the 25 participants from Mahombekombe benefitted from honey harvested from the game reserve. In the rural areas, Mola-Kasvisva had 77% of households benefiting from honey harvested from the game reserve. While Siakobvu had 72% of the study participants' households benefiting from honey harvested from the game reserve. About 27% of the 30 participants from Mola-Kasvisva benefitted from medicine harvested from the game park while Mahombekombe had 44% out of the 25 participating households. Nyamhunga had the highest proportion (75%) of households that utilized herbal medicines harvested from the game reserve, followed by Siakobvu with 60% (n=25).

All the 20 participants from Nyamhunga had a household member employed in the game reserve followed by Mahombekombe with 88%. Siakobvu had 72% (n=25) employed in the game reserve while Mola-Kasvisva had 9% (n=30). Higher proportions (76%) of households in the rural areas realise improved food security from the game reserve compared to 71% from urban areas. Most (87%) of the 100 participants to the study indicated benefiting from tourism. Interviews show that households benefitted from tourism activities in the game reserve. Some study participants were engaged in petty trading and enterprising ventures. More households from rural areas (43%) made artifacts from resources harvested from the game reserve than 34% in urban areas. The artifacts were made from wood, skins and stones that were obtained from the game reserve. Interviews indicate that these resources were obtained illegally (without a permit). One respondent indicated that the people harvest trunks of tree species such as pod mahogany (*Afzelia quqnzensis*) (for making stools, beds, carving different animals, wooden plates, kitchen utensils, tables and folding chairs), munhondo (*Juibernardia globiflora*) and silver cluster leaf (*Terminalia sericea*) (for making scotch charts and other farm implements) needed for use in the household and for sell to tourists and neighbors.

## DISCUSSIONS

The results show that Matusadonha game park authorities have not changed much from the yellow stone approach of wildlife management. The results of this study show that the DNPWM is the authorities that principally manage wildlife resources in the park and in the hinterland. Results of this study showed that since the demise of CAMPFIRE in the Nyaminyami district communities was excluded from wildlife management and benefiting from the wildlife resources. The locus of wildlife management is invested in state departments. A number of studies reviewed in this paper show that this approach could lead to unsustainable wildlife conservation (Shibia, 2010; Stone and Stone, 2011; Benjaminsen, *et al*., 2013). The existence of numerous departments dealing with environmental issue could create problems of jurisdiction. However, there is no evidence of serious conflicts amongst the different government departments operating in Matusadonha in this study. This could be because of the limited scope of the study. Studies using a critical structure approach are recommended.

The Matusadonha reserve and its hinterland in particular are vast tracks of land and fragmented in land use making their micro-space management difficult for the department of National Parks and Wildlife Management (Ngorima, *et al*., 2022). The economic crisis in Zimbabwe has left government departments, DNPWM included, underfunded without adequate resources for operations. Bringing local community on board could be opportune for sustainable conservation while ensuring community development.

The study results show the exclusion of local communities from directly benefiting from the park. The nature of benefits found by this study was not from official arrangements but individual household initiatives. Although official channels to allow access to the reserves resources exist but have limited relevancy to local communities. According to Chenje (2000), in the case of Zimbabwe, permits have to be obtained for access or any activity that brings benefit to any patron of the game reserves in the country. Thus, the DNPWM levies exorbitant fees for individuals to benefit from resources in the games reserves such as fishing, harvesting of river sand, gathering firewood, harvesting honey, harvesting plant parts, hunting and other resources. People who benefit from the game reserve resources without a permit are heavily fined or imprisoned, hence the practice is called 'the fence and fine approach' in literature (Mutange, *et al*., 2015). The poor communities who cannot afford the permits find ways to evade or opportunities to take advantage of so that they benefit from the parks.

This finding on informal access and benefits being derived from the Zambezi game reserves agrees with other studies in Africa. Other studies have shown communities that live adjacent to game reserves will strive to access and benefit from the wildlife being it legally or illegally (Mbereko, *et al*., 2017). This is usually done for the survival of their families. If legal usufruct rights are restricted, subtle and usually ecologically destructive methods are used to benefit from the game reserves to meet household food security, grazing lands, household fuel needs, protection of livestock and crops from wild animals and income to cover other family requirements such as medical, accommodation and school fees (Mutanga, *et al*., 2015). Due to the greediness embedded in human nature such illegal uncontrolled harvesting might end up in serious poaching activities for big game which has higher returns that meets higher extravagant human needs. Unfortunately it is these serious poaching for big game such as rhinoceroes, elephants, buffalo, leopards, lions etc that is largely documented (Ngorima, *et al*., 2022; Ndaimani et al., 2017) omitting the desire for a household to meet basic survival needs.

The second major challenge connected to lack of direct benefits in this study is the issue of human-wildlife conflicts. The study documented serious human-wildlife conflicts in the Matusadonha game reserve and its hinterland. In confluence with other studies like (Hoole and Berkes, 2010; Mhuriro-Mashapa, *et al*., 2018), the take home message is communities do not want to bear the costs associated with wild animal destructions. Conflicts have been documented in the middle and lower Zambezi valley game parks for a longtime (Mhlanga, 2015), but their continued existence to date is worry some. It might point to the game reserve managers' resistance to change from the protectorate approach, this has been observed in Kenya (Shibia, 2010). Human-wildlife conflict is thus identified as one of the major threats to conservation and one of the most difficult problems that conservation managers are facing across Africa (Mhuriro-Mashapa, *et al*., 2018). However, we recommend that further studies should be done to investigate the continuity of human wildlife conflicts in the middle-Zambezi game reserves.

From the communities view point, this study found that the above mentioned wildlife management challenges can be resolved through a number of strategies. These strategies include having a functional boundary fence (even better electrify it), educate the community on importance of the game reserve to their livelihood and animal conservation, educate communities on animal behavior, increase number of game scouts to patrol the park and community participation in the game park benefits, maintenance and management. The major drive by the DNPWM, the donor community and ecologists has been on increasing technological monitoring and patrolling techniques such as GIS collars, Spatial Monitoring and Reporting Tool and unmanned aerial vehicles (Ngorima et al., 2022; Lynam et al., 2016). Unfortunately, there is a contradiction between the official strategy and the study participants' strategies.

The central thesis to this paper has been; how are the game park authorities making efforts to ensure community beneficiation that can influence local people to develop positive attitudes and perception of wildlife allowing for effective win-win sustainable wildlife conservation? Game reserves that exclude local communities' needs or their participation have often caused negative relationships between park authorities and local communities, resulting in biodiversity loss through such challenges such as increased illegal hunting, habitat encroachment and destruction, violence, and poverty among indigenous communities (Romanach, Lindsey & Woodroffe, 2011; Graham, Beckerman & Thirgood, 2005; Choudhry, 2004; Nepal, 2002). The future success of conserving wildlife and their habitats depends on the attitudes and behaviour of communities living in and around protected areas (Snyman, 2014). Community benefits and participation from game reserves have been known to influence the development of positive attitudes and behaviour towards conservation (Hulme & Murphree, 2001). Although popular discourse in today's wildlife conservation is presented with a win-win paradigm that entails community benefits and participation and ecological conservation, the results of this study show that the communities are still not prioritized, the practice is skewed towards government centralise protectorate conservation. And this situation needs to be corrected especially given the increasing adoption of neo-liberal market systems that further disadvantage the poor in its development ideals.

## CONCLUSIONS AND RECOMMENDATION

In conclusion, this study found that the management approach of Matusadonha game reserves remains highly centralized on state. This is despite that the game part seats in a fragmented terrain characterised by game protectorate and communal areas in the hinterland. In the absents of good level of resources the protectorate approach seems to be struggling judging from the number of illegal benefits being realized by communities. The benefits they enjoy are mainly through illegal channels such as poaching, enchronchment and harvesting of woody and edible insects/vegetables. Furthermore, we infer that due to the different ethics and values in the communal areas political intrests have potential to exacerbate behaviour that is destructive to wildlife resources.

This study has adopted a pragmatic approach to study benefits and human-wildlife conflicts. We recommend further research on;

- factors driving resource use conflict
- capacity needs for game reserve officials and communities to ensue a win-win scenario
- Revamp community based wildlife resources management mechanisms that consider the poor.

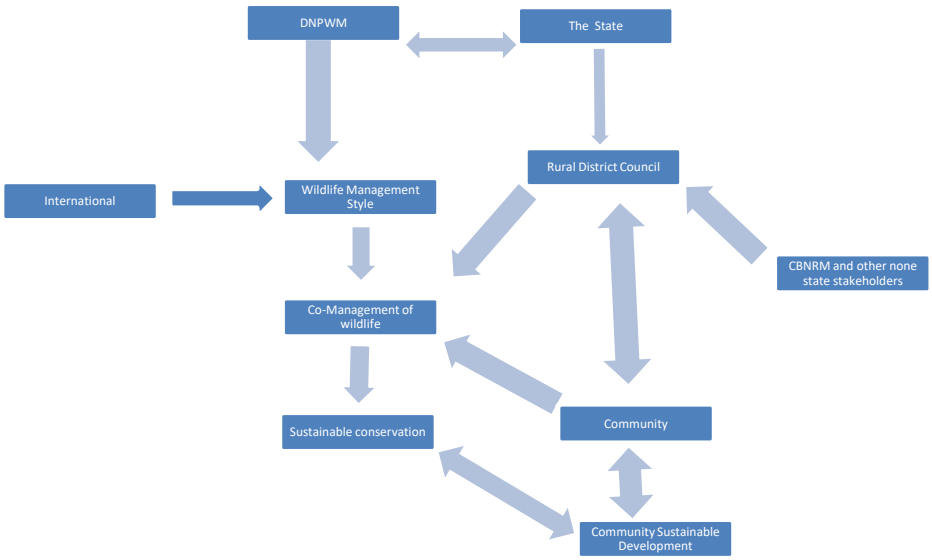


**Figure 2** A recommended simplified model of wildlife co-management

Source: Authors

**ACKNOWLEDGEMENTS**

We would like to thank the study participants from Nyamhunga, Mahombekombe, Siakobvu and Mola-Kasvisva for taking their time out to be interviewed. We would also like to thank the Nyaminyami Rural District Council and the local leaders for the permission to carry out the field work to the study. We would also like to thank the colleagues at the Great Zimbabwe University wh participated in the review and seminar presentations of this work.

**CONFLICT OF INTEREST**

The authors do not declare any conflict of interest to the best of our knowledge.

**REFERENCES**

Biggs, D, Ban,N,C., Castilla, J.C., Gelcich, S., Mills, M., Gandiwa, E.,Etienne, M., ... &Possingham, H.P. (2019). Insights on fostering the emergence of robust conservation actions from Zimbabwe's CAMPFIRE program. *Global Ecology and conservation, 17 e00538.*

Creswell, J.W. (2014). *Research Design: Quantitative, Qualitative and Mixed Methods Approaches*. 4th ed. UK: Sage Publications.

Chenje, M. (2000). *State of the environment Zambezi Basin 2000*. SADC/IUCN/ZRA/SARDC/Sida, Maseru/Lusaka/Harare.ISBNI-77910-009-4.

Choudhry, A. (2004). Human-elephant conflicts in Northeast India. *Human Dimensions of Wildlife* 9: 261-270.

Barbier, E.B. (2019). Community-based development in Africa. *In economics for the Wilds*, 103-135. Routledge.

Graham, K., Beckerman, A. P. and Thirgood, S. (2005). Human–predator–prey conflicts: ecological correlates, prey losses and patterns of management. *Biological Conservation* 122: 159-171.

Hoole, A. and Berkes, F. (2010). Breaking down fences: recoupling social-ecological systems for biodiversity conservation in Namibia. *Geoforum*, 41(2), 304-317

Hulme, D., Murphree, M., (2001). Community conservation as policy: promise and performance. In: Hulme, D., Murphree, M. (Eds.), *African Wildlife and Livelihoods: the Promise and Performance of Community Conservation.* David Philip Publications, Cape Town, South Africa, pp. 280–297.

Fynn, R.W.S., Augustine, D.J., Peel, M.J.S. and Garine-Wichatitsky, M. (2016). Strategic management of livestock to improve biodiversity conservation in African Savannahs: A conceptual basis for wildlife-livestock coexistence. *Journal of Applied Ecology,* (53), 388-397.

Lynam, A., Singh, R., and Chimuti, T. (2016). *The SMART approach for tackling poaching, illegal trade and other forest crime: Examples from developing Asia and Africa*.

Mashapa, C., Gandiwa, E and Muboko, N. (2019). Socio-economic and ecological outcomes of woodland management in Mutema-Musikavanhu communal areas in Save Valley, southeastern lowveld of Zimbabwe. *Journal of Animal and Plant sciences*, 29 (3)

Matseketsa, G., Chibememe, G., Muboko, N., Gandiwa, E and Takarinda, K. (2018). Towards an understanding of Conservation-Based Costs, benefits and Attitudes to local people living adjacent to Save Valley Consevancy, Zimbabwe. *Scientifica*, https://doi.org/10.1155/2018/6741439

Mbaiwa, J.E., Stronza, A. and Kreeuter, U. (2011). From collaboration to conservation: insights from the Okavango Delta, Botswana. *Society and Natural Reources*, 24: 400-411.

Mbereko, A., Kupika, O.L. and Gandiwa, E. (2017). Linking social and ecological sustainability: An analysis of livelihoods and the changing natural resources in the middle-Zambezi biosphere reserve. *Journal of entrepreneural and organisational diversity*, 6(1); 49-68.

Mbereko, A., Scott, D. & Kupika, O.L. (2015). First generation land reform in Zimbabwe: historical and institutional dynamics informing household's vulnerability in the Nyamakate Resettlement community, *Journal of Sustainable Development in Africa*, 17(3): 21-38.

Mhlanga, L., Nyikahadzoi, K & Haller, T (2014). *Fragmentation of natural resources management experiences from Lake Kariba* (Vol 2) LIT Veriag Minister.

Moswete, N. and Thapa, B. (2018). Local communities, CBOs/Trusts, and people-park relationships: A casse study of the Kgalagadi transfontier park, Botswana. *The George Wright Forum*, 35(1), 96-108. 0987`

Mhuriro-Mashapa, P., Mwakiwa, E and Mashapa, C. (2017). Determinants of communal farmers' willingness to pay for human-wildlife conflict management in the periphery of Save Valley Conservancy, south southeasternbwe, *The Journal of Animal and Plant Sciences*, 27(5): 1-11.

Nepal, S. K. (2002). Involving indigenous peoples in protected area management: Comparative perspectives from Nepal, Thailand, and China. *Environmental Management* 30: 748-763.

Ndaimani, H., Murwira, A., Masocha, M., & Zengeya, F. M. (2017). Elephant (Loxodonta africana) GPS collar data show multiple peaks of occurrence farther from water sources. *Cogent Environmental Science*, 3, 1420364.

Ngorima, P., Mpakairi, K. S., Kavhu, B., Gara, T. W., Ndaimani, H., and Chakuya, J. (2022). Trends in elephant poaching in the Mid-Zambezi Valley, Zimbabwe: Lessons learnt and future outlook. *African Journal of Ecology*, 00, 1–5. https://doi.org/10.1111/aje.13039

Shibia, M.G. (2010). Determinants of attituds and perceptions on resource use and management of Marsabit National Reserve, Kenya. *Journal of Human Ecology*, 30(1) 55-62.

Snyman, S. (2014). Assessment of the main factors impacting community members' attitudes towards tourism and protected areas in six southern African countries. *Koedoe*. 56(2):1–12.

Romañach, S., Lindsey, P. and Woodroffe, R. (2011). Attitudes toward predators and options for their conservation in the Ewaso Ecosystem, in *Conserving wildlife in African landscapes: Kenya's Ewaso Ecosystem*, N. Georgadis, Editor. Smithsonian Institution Scholarly Press. p. 85-95.

Vodouhe, F.G., Coulibaly, O., Adegbidi, A., Sinsin, B., (2010). Community perception of biodiversity conservation within protected areas in Benin. *Forest Policy and Economics*, (12) 505-512.

**ABOUT THE AUTHORS**

Mr Jesse Zvikonyaukwa, wildlife scientist/professional Tour Guide, Department of Livestock, Wildlife and Fisheries, Great Zimbabwe University, Zimbabwe.

Dr Kudakwashe Musengi, Animal Scientist/ Lecturer, South African Environmental Observation Network: Arid Lands Node

Dr Clarice Mudzengi, Agriculture scientist, Department of livestock, wildlife and fisheries,, Great Zimbabwe University, Zimbabwe.