

Human - Wildlife Conflicts: Assessing the Causes, Consequences and Management Strategies in Mosi-Oa-Tunya National Park Livingstone in Zambia

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Abstract: Human Wildlife Conflict occurs (HWC) around the boundaries of protected areas where there are high human and animals interaction. Such is the case with Musiotunya National park in Livingstone of Zambia. We conducted an assessment of HWCs around Musi Oa Tunya national park by exploring the nature, causes and mitigation measures of HWC. Questionnaire, semi-structured interviews, and a focus group discussion guide were used to determine the causes, consequences and management strategies as well as to identify animals causing human wildlife conflict in the study area. The study found that the major causes of conflict included crop damage and other properties, declining wildlife resources which is linked to human actions through overexploitation, habitat destruction, and habitat fragmentation among others. Other causes of human wildlife conflict were livestock depredation, and risk posed to people's lives through disease transmission and attacks by wild animals. The study also established that elephants were the most destructive animal in farm raiding incidences. Based on the research findings, the study recommends government to allocate more funds to organize educational and training activities at different levels in the study area as this would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of Human-Wildlife Conflicts. Finally there is need for a compensation scheme for people that are affected by wild animal destructions.

Keywords: *Crop damage, habitat destruction, Mosi- Oa- Tunya National Park, Animal-human conflict, sustainable wildlife management*

1. INTRODUCTION

Human wildlife conflict (HWC) is the main threat to the continued survival of many species in different parts of the world, and is also a significant threat to local human populations. It occurs when the needs and behaviour of wildlife impact negatively on humans or when humans negatively affect the needs of wildlife (Mekonen, 2020). These conflicts according to Mekonen 2020, may result when wildlife damage crops, threaten, kill or injure people and domestic animals. Animal-Human conflicts normally happen when Animals or human beings start having adverse impacts on the environment. Osei-Owusu and Bakker, 2008 also observed that conflicts emerges when wildlife and human requirements overlap with consequential costs to humans and the wildlife (Osei-Owusu & Bakker, 2008). Human wildlife conflict occurs in a vast range of situations and is also specific in terms of habitat, geographical location, vegetation and climate with a diverse population of species. According to Thirgood (2005) there are five types of HWC namely, crop raiding, predation upon games species, predation upon livestock, human attacks and disease transmission. Others include human injuries and house or property damages. With the spread of settlements, changing land use and natural habitats, much of the world's remaining biodiversity have become increasingly restricted to small, fragmented patches within a matrix of human-dominated landscapes (Milupi *et al*, 2022; Laurance and Bierregaard 1997; McCloskey and Spalding 1989; Primack 1993).When animals raid crops or threaten human life in local villages, the communities feel that their economy and existence are undermined, especially since there is no policy on compensation in most African country (Milupi *et al*. 2017). The animals that are involved in crop damage, livestock attacks and human injuries include;

elephants, lions, buffaloes, monkeys and many others (Harjot and Røskoft, 2015). Because HWC is a reciprocal process, humans and animals are negatively affected by the conflict, and it is one of the most complex and urgent issues facing wildlife management and conservation (Mekonen, 2020). There are different forms of HWC all over the world and these conflicts are experienced more in developing countries (Amajet *et al.*, 2016; Makindi *et al.*, 2014; Fairet *et al.*, 2012; Lamarque *et al.*, 2009; IUCN, 2005). The HWC mostly experienced in developing countries is mainly due to increasing human and livestock populations and changing socio-economic and land use patterns (Amaja *et al.*, 2016). The World Conservation Union (World Park Progress, 2003), assert that Animal-human conflict occur when animal needs go beyond those of human beings, making local people and wild animals compete over resources. A lot of African Communities bear the costs of coexisting with animals without getting any payback (O'Connell Rodwell *et al.*, 2003). Express contacts with animals occur in both urban and rural areas. Animals often stray into surrounding cultivated fields or grazing areas to cause extreme damage. Current conservation policy changes have stressed the necessitate to incorporate socio- economic improvement with protection of Animals (UN 1992-agenda 21) but it has been with little achievement (Adams and Mcshane 1992; Wells and Brandson, 1992). Animal-human conflict and its repercussion is today acknowledged. Thus, addressing the issue of HWC like crop raiding around the peripheries of protected areas will aid in improving the livelihood of communities around the area while conserving the rich fauna and flora biodiversity of the protected areas. Effective integrative strategies are still rare in African arid and semi- arid lands (Milupi *et al.*, 2020;2021: Bonner 1993; Kiss Kusigi 1999). In this paper, we aim to assess the causes, consequences and management strategies of HWCs in Mosi-Oa-Tunya National Park Livingstone in Zambia by determining the key wildlife species causing damage, establishing the nature and extent of conflicts experienced with wildlife, and documenting management strategies employed by DWNP in order to minimize the conflicts.

2. MATERIALS AND METHODS

2.1. Description of the Study Area

Musi -Oa- Tunya National Park (figure 1) is located along the Zambezi River and borders the city of Livingstone. The national park is the smallest park in Zambia and a UNESCO World Heritage Site consisting of two parts, Mosi-Oa-Tunya National Park and the Victoria Falls World Heritage National Monument Site. Mosi-Oa-Tunya National Park is located about 11 kilometres from Livingstone town and covers an area of 25 square miles (66 sq km). The national PARK was established in 1972 to represent the wildlife species of Zambia. Wildlife species such as rhino, elephant, zebra, giraffe, wildebeest, buffalo, hippo, and crocodile are common in Musi Oa Tunya national park.

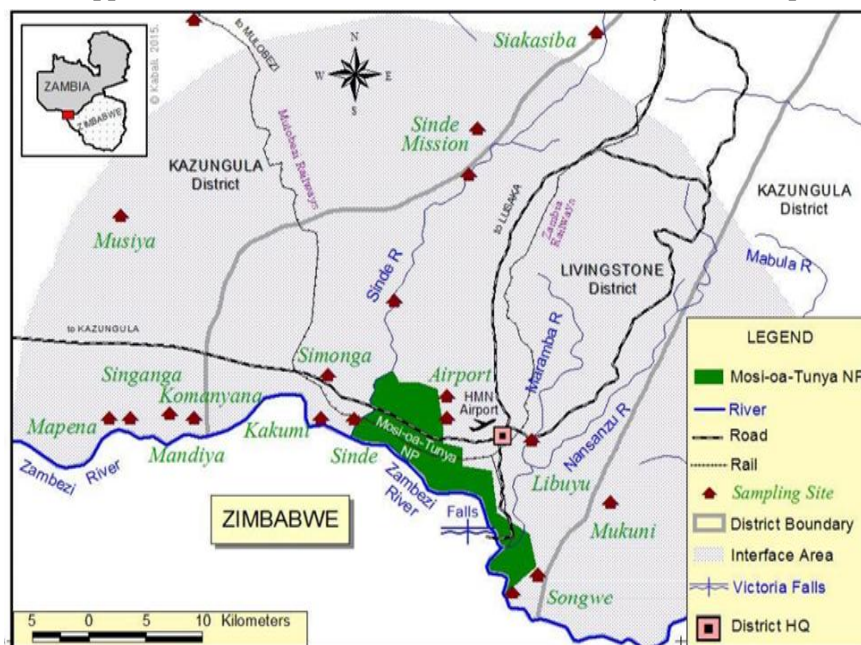


Figure1. Showing the location of the location of Mosi-Oa-Tunya National Park

2.2. Data Collection

The study was based on secondary and primary data collected from the study area. Secondary data were derived from published materials and policy documents, whereas primary data was collected through three methods, namely household surveys, key informant interviews with DNPW officials and field observations as outlined below. Secondary data analysis provided a better understanding of the causes and consequences of HWC and the possible HWC management strategies put in place by the DNPW manage Animal-Human conflict. Secondary data analysis provided a better understanding of the causes and consequences of HWC and possible HWC management strategies. In the present study, journal papers, the ZAWA Act, the Forest Act, the Fisheries Act and government records such as the national environmental policy were examined. These documents provided background information for the research and allowed for assessment of the suitability of the project before conducting interviews (Owen, 2014). The households were interviewed as regards the following aspects of HWC:

1. Key wildlife species causing HWCs in and around MosiOaTunya.
2. Nature and extent of conflicts experienced in and around the Mosi-Oa-Tunya.
3. Measures put in place by the DNPW in resolving HWC in and around Mosi-Oa-Tunya National Park?

2.3. Key-informant Interviews

Key informants from DNPW were asked about the causes of HWC and measures put in place in resolving HWC in and around Mosi-Oa-Tunya National Park. Quantitative data were coded and processed using Statistical Package for Social Sciences (SPSS) software to generate the frequencies of responses. Below, we report the results of the study, highlighting the causes and consequences of HWC in the study area and measures taken to resolve HWC in and around Mosi-Oa-Tunya National Park.

3. RESULTS

3.1. Key Wildlife Species Causing HWCs in Mosi-Oa-Tunya National Park

Most respondents (93%) claimed that they had encountered conflicts with wildlife, whilst a Small proportion of the respondents (7%) claimed not to have experienced or witnessed HWC in the study area. With regard to species involved is causing damage, a total of ten (10) wildlife species were perceived as causing severe damage in the study area. The leading damage-causing animals across the study area were elephant (during our fieldwork we also observed evidence of elephants crossing the main road and going to nearby villages), Baboon, Hippos, buffalo and wild pigs and rhino in that sequence. Buffalo and wild dogs were rarely witnessed or reported as conflict species (Table 1).

Table1. Showing Key wildlife species causing HWCs in Mosi-Oa-Tunya National Park

No	Common Name	Scientific Name	Total Number
1	Hippos	<i>Hippopotamus amphibious</i>	6 (7.7)
2	Wild dogs	<i>Lycaonpictus</i>	1 (1.3)
3	African Elephants	<i>Loxodontaafricana</i>	23 (29.5)
4	Baboons	<i>Papioursinus</i>	6 (7.7)
5	African Buffalo	<i>Synceruscaffer</i>	3 (3.8)
6	Bushpig	<i>Potamochoeruslarvatus</i>	5 (6.4)
Total (n= 40)			40 (100)

3.2. Nature and Extent of Conflicts Experienced in and around the Mosi-Oa-Tunya

HWC takes many forms. In Musi -Oa -Tunya national park most respondents (35; 86%) indicated that they encountered crop damage, perpetrated chiefly by the elephant. Elephants were reported to stimulate intense conflict as they invade fields, forage on crops and even threaten human security, while a minority (2%) of the respondents mentioned that they encountered destruction of property in the study area. The study further revealed that local people perceive HWC to be a major problem. Study participants when asked, "To what extent is HWC a problem?" most 82.0%) respondents in the study area reported that HWC is a "severe" problem, whereas some respondents (5.4%) said that it was "not a problem" (Table 2).some respondents (5.4%) from the study area said that it was "not a problem" (Table 2).

Table2. Showing Respondent ranking of HWC in the two study area

Question	Response	Total n (%)
To what Extent is HWC a problem	Severe	32(80)
	Moderate	14(35)
	Not a problem	3(3.8)
	Do not know	3(3.8)
Total (n= 40)		40(100)

3.3.Measures Put in Place by the DNPW in Resolving HWC in and around Mosi-Oa-Tunya National Park?

The study showed that Zambia Wildlife Act has no provision regarding compensation. However respondents revealed that the law provides for killing of the wild animal that caused the damage or loss of life and this has to be reported to the authorities within 24 hours. The study also showed that wildlife officers have also taken it upon themselves to engage and sensitize the communities on animal behaviour. Other measures done by wildlife officers in the area include helping the local people to dig trenches around their fields in order to protect them from elephant raids. Shooting in the air is also done in the area to scare elephants.

4. DISCUSSIONS

4.1.Key Wildlife Species Causing HWCs in Musi-Oa-Tunya National Park

The study revealed that the majority of the respondents encountered and have problems with wild animals in Musi-Oa-Tunya national park and surrounding areas. According to the findings, the following terrestrial vertebrate wildlife species were reported to be involved in conflicts in the area of study: elephant, baboon, Hippo and buffalo,. Elephant and Baboons were cited as the most notorious conflict animals by the majority of the respondents. This may suggest that respondents have challenges in controlling these animal species. Similarly, Gandiwa *et al.* (2013) listed elephant, lion and spotted hyena among the most troublesome species as reported by respondents living adjacent to northern Gonarezhou National Park, Zimbabwe. As observed by Owen-Smith, 1988; Sukumar, 1990, large herbivores and carnivores generally require a large home range, and due to their high energy requirements need to consume large quantities of food each day. This can therefore can be assumed that large-bodied terrestrial mammal species are likely to traverse far beyond protected areas borders onto human inhabited lands in their quest to satisfy daily dietary requirements thus making them important contributors to HWC.

4.2.Nature and Extent of Conflicts Experienced in and around the Mosi-oa-tunya

Four different categories of HWC were recorded in this study; crop depredation, livestock predation, human threat and destruction of property. The results indicating that the majority of the respondents encountered crop raiding, particularly by elephants followed by livestock depredation and domestic livestock are consistent with other studies, for instance in India and Nepal, where Karanth and Nepal (2012) found crop damage to be the most prevalent and persistent form of HWC than livestock loss, human injury and death. In the current study, the high incidences of crop damage recorded relative to other conflict types might be attributable to the proximity of crop fields to the Musi- Oa-Tunya national park. Crop damage incidences are highly influenced by the distance between farms and the boundaries of protected areas (Malugu *et al.*, 2011).

4.3.Measures Put in Place by the DNPW in Resolving HWC in and around Mosi-Oa-Tunya National Park?

From the documents reviewed such as wildlife Act 2015, it reviewed no provision regarding compensation. The Act however only provided for the killing of the wild animal that caused the damage or loss of life. One other initiative done by the wildlife officers in the study area was involving the community in the area through community sensitisation on animal behaviour. This agreed with Milupi *et al* 2021 who identified community participation as a measure to promote community participation and community sensitization through environmental education as observed by Milupi *et al*, 2020, where the local people are taught how to dig trenches around their fields in order to protect them from elephant raids and scaring of elephants by shooting in the air.

5. CONCLUSION AND RECOMMENDATIONS

Our study showed that HWCs, like in many of Africa's protected areas, are real in the Mosi-Oa-Tunya national park and not imaginary. Based on our study, we conclude that the key conflict causing species include the elephants and baboons as highlighted by respondents. Additionally, five conflict types were observed in the area based on respondents' experiences. Of the five HWC forms reported crop raiding, livestock predation, destruction of property and threatening human security were identified to have the most visible consequences. This is because human communities in the study area rely mainly on crop production and livestock rearing. Overall, local people living around Mosi-Oa-Tunya national park rated the impact of HWC as severe. In order to create a friendlier environment both for humans and wildlife in the study area, it is proposed that a multi-action approach be used. This may include:

1. The government through the Department of National Parks and wildlife should consider game cropping since the monkey population has grown in the study area
2. The government should allocate more funds to organize educational and training activities at different levels. This would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of Human-Wildlife Conflicts.
3. Government through Department of National Parks and wildlife should compensate people that are affected by wild animal destructions.
4. Proper land use planning which zones key areas for livestock versus crop land to reduce competition and overlap of interest

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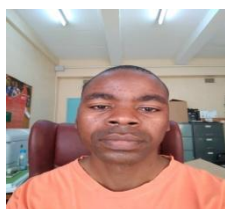
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