BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES

DEPARTMENT OF NATURAL RESOURCES

CAMPFIRE AND HUMAN-WILDLIFE CONFLICT IN GUDZA WARD 10, BINDURA DISTRICT

MACHEKA SUSAN

B202713B

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN NATURAL RESOURCES MANAGEMENT

JUNE 2024

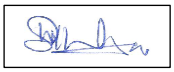
DECLARATION

The undersigned certify that they have read this research project and have approved its submission for marking in relation to the department's guidelines and regulations.

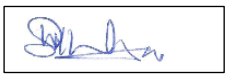
Student: Susan Macheka

Signature: S Macheka Date: 2nd October 2024

Supervisor: W. Mhlanga

Signature:  Date: 2nd October 2024

Chairperson: W. Mhlanga

Signature:  Date: 2nd October 2024

DEDICATION

This study is dedicated to Aiden A. and Tyrol K. Denhere, my beloved sons with love.

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to my family for their unwavering support and encouragement during the challenging times of this endeavour. My greatest appreciation goes to Mr. W. Mhlanga, my immediate supervisor for his invaluable guidance and insightful feedback throughout the development of this dissertation. His expertise and mentorship have been instrumental in shaping the direction and quality of this project. I would like to acknowledge the contributions of Mr. C. Chindewere and Ms. W. Mhendami who played a pivotal role in providing access to essential resources and support throughout the research. I extend my sincere appreciation to my peers and colleagues who generously shared their valuable suggestions during the course of the project. Above all, I would like to thank the Lord Almighty for keeping me alive up to this day for I can do all things through his strength.

ABSTRACT

The research examined the various factors contributing to human-wildlife conflict in Gudza Ward 10 in Bindura District. Data were collected using key informant interviews, a questionnaire survey and analysed using the Statistical Package for Social Science (SPSS) version 2020. Statistical parameters such as the frequency of problem animal species, crops affected and the nature of human-wildlife conflict were quantitatively analysed. The research investigates the various factors contributing to human-wildlife conflict in areas without direct proximity to traditional conservation areas and determines the community's attitude towards main problem animals, the nature of conflict, economic effects and mitigation measures. Most households rely on farming, hence human-wildlife conflict is a significant factor that affects their livelihoods. More than 70% of the respondents experienced conflicts with jackals, pythons, baboons, birds, guinea fowls, monkeys, bushpigs, eagles, mongoose, warthogs, and hyenas. The major types of conflict encountered were seed consumption, trampling, crop raiding and livestock predation. The respondents highlighted an increase in the conflict and usually took personal action such as snaring, killing and scaring away. Livestock and crop losses incurred in 2022 were USD 28 372 and USD 2022 respectively. Despite the losses incurred most respondents were keen to develop a positive attitude towards wildlife through collaborative education and awareness for sustainable development.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Human-wildlife conflict is a complex issue that arises when human activities intersect with the natural habitats of wild animals, leading to negative outcomes for both humans and wildlife (Merkebu and Yazezew, 2021). Incidences of human-wildlife conflict are increasing, posing a threat to lives, livelihood activities and food security as most rural communities depend on agriculture for food security and source of income (Granados, Weladji and Loomis, 2012). It is mainly caused by human pressure on natural resources (land, water, and pastures), human encroachment into wildlife habitats, and an increase in wildlife population (Musiwa and Mhlanga 2020) and rapidly increasing in areas where human and wild animals' needs surpass each other (Chomba *et al.,* 2012).

The conflict is not specifically directed to certain geographical areas or climatic conditions, but in all areas where humans and wildlife co-exist (Matseketsa *et al.*, 2019). Gemeda and Meles (2018), Musimbi, (2013) and Steven and Ndong, (2017) noted that in Africa, rapid urbanization, expansion of agricultural activities and land-use changes often encroach upon natural habitats, leading to increased interactions between humans and wildlife. Additionally, the absence of conservation measures and limited awareness about conservation can exacerbate the conflict (Mhlanga, 2001). Community-based natural resources management initiatives like CAMPFIRE have promoted the concept of involving local communities in the management of natural resources, empowering them to have direct authority over the utilization and advantages derived from these resources (Gandiwa *et al.*, 2013).

In most areas where human-wildlife conflict is common, elephants, lions, hyenas, baboons, hippopotami, monkeys and birds were reported as problem animals as highlighted in the Mhokwe study by Musiwa and Mhlanga, (2020), (Gandiwa *et al.*, 2013), (Matseketsa *et al.*, 2019) and (Le *et al.*, 2011). However, according to Chomba *et al.,* (2012), abundant populations of small animals can cause significant harm to the surroundings. It was also noted in most studies of human-wildlife conflict, considerable economic losses were incurred (Ndava and Nyika, 2019), (Gandiwa *et al.*, 2013), (Musiwa and Mhlanga, 2020). In Zimbabwe, human-wildlife conflict was reported to be increasing in areas that have proximity to national parks and conservation areas and mainly considers large carnivores and herbivores which cause much

damage to humans, crops and livestock (Gandiwa *et al.*, 2013) (Matseketsa *et al.*, 2019). This study aimed to enhance the understanding of human-wildlife conflict dynamics in areas without direct proximity to conservation areas or wildlife hotspots and contribute to the development of practical and sustainable solutions for conflict mitigation.

1.2 PROBLEM STATEMENT

Human-wildlife conflict incidences are reported annually, especially from areas that are close to conservation areas and wildlife hotspots. Most studies are centred on areas that are close to national parks and communities adjacent to conservation areas. This study was aimed at assessing human-wildlife conflict in an area that is not close to any wildlife-protected area.

1.3 JUSTIFICATION

Human-wildlife conflict in areas without conservation areas may exhibit unique dynamics compared to conflict in traditional wildlife hotspots. Factors such as different land use patterns, limited conservation measures and varying community perceptions and attitudes towards wildlife can contribute to distinct conflict scenarios. Investigating these dynamics will provide valuable insights into conflict drivers and mitigation strategies.

1.4 RESEARCH AIM

To enhance the understanding of human-wildlife conflict dynamics in areas that are not adjacent to conservation areas or wildlife hotspots.

1.5 STUDY OBJECTIVE

The broad objective of the study was to understand the dynamics and drivers of human-wildlife conflict in an area without direct proximity to conservation areas.

1.6 SPECIFIC OBJECTIVES

1. To determine the socio-demographics of the respondents.
2. To determine the community's attitude towards the main problem animals.
3. To determine the nature of conflict, economic effects and mitigation measures.

CHAPTER 2: LITERATURE REVIEW

2.1 CAUSES OF HUMAN-WILDLIFE CONFLICT

Human-wildlife conflict has become an increasingly prevalent issue as human populations expand and encroach upon natural habitats. The conflict arises when the interests and activities of humans and wildlife intersect, leading to negative interactions and consequences for both parties (Merkebu and Yazezew, 2021). One of the fundamental causes of human-wildlife conflict is the loss and fragmentation of wildlife habitats due to human activities. Musimbi, (2013) and Mhlanga, (2001) noted that rapid urbanization, agricultural expansion and infrastructural development led to the destruction of natural habitats forcing wildlife to seek resources in human-dominated landscapes. This proximity increases the likelihood of conflicts as wildlife encroach upon human settlements in search of food, water and shelter (Mhlanga, 2001).

Mhlanga, (2001) highlighted that human-wildlife conflict can be caused by the growth of human populations which leads to competition for limited resources such as water, food and grazing land. Mhuriro-Mashapa *et al*., (2018) and Matseketsa *et al.*, (2019) noted wildlife species such as baboons, elephants, hippopotami, quelea birds, lions, hyenas, pythons, monkeys and birds may raid fields, damage crops and prey on livestock as they struggle to meet their survival needs. Matseketsa *et al.*, (2019) highlighted that the competition for resources often results in economic losses for farmers leading to hatred between humans and wildlife.

As humans venture into wildlife territories for tourism, recreation or resource extraction conflicts with wildlife become more likely (Matseketsa *et al.*, 2019). Human activities such as land clearance for agricultural expansion, deforestation and mining disrupt wildlife behaviour and natural habitats, leading to increased encounters and potential conflicts (Musimbi, 2013). Wildlife may perceive humans as threats and respond aggressively to protect themselves resulting in human-wildlife confrontations (Hohbein and Abrams, 2022).

Climatic changes are an important cause of human-wildlife conflict. Droughts, wildfires, floods and other erratic natural hazards can contribute to a reduction in appropriate wildlife habitat and therefore affect the frequency and extent of human-wildlife conflicts (Matseketsa *et al.*, 2019). Similarly, the seasonal alteration of habitats due to rainfall can also have an impact on

human-wildlife conflict. (Granados *et al,.* 2012). Seasonal changes in rainfall are directly connected with predation intensity (Gandiwa *et al.*, 2013). Patterson *et al.,* (2004) observed a positive correlation between rainfall and attacks by wild animals on livestock in Tsavo National Parks, Kenya. This indicates that during the rainy season in this region, there is an increased likelihood of wild animals attacking livestock. Similarly, Butler (2000) found a strong association between seasonal changes and the intensity of livestock predation near the Sengwa Wildlife Research Area in Zimbabwe. These studies suggest that rainfall has a stimulating effect on crop raiding, as it enhances raiding activities during the crop-growing period. On the other hand, livestock predation tends to occur more frequently during the dry season when crops are not available in the fields (Gandiwa et al., 2013).

2.2 RESULTS OF HUMAN-WILDLIFE CONFLICT

Human-wildlife conflict is a complex issue that has far-reaching effects on both the environment and humans (Chomba *et al.,* 2012). Many rural communities rely on agriculture and livestock rearing for their livelihoods (Musiwa and Mhlanga, 2020). When wildlife encroaches on farmlands or preys on livestock, it directly affects food security and the economic well-being of communities (Mhuriro-Mashapa *et al.,* 2018); (Matseketsa *et al.*, 2019). This loss of livelihood can perpetuate a cycle of poverty and dependence on external aid (Gandiwa *et al.*, 2013).

Safety concerns are another critical consequence of human-wildlife conflict (Tchakatumba *et al.*, 2019). Encounters with dangerous animals such as elephants or big cats pose a significant risk to human lives, especially in rural areas where communities co-exist with wildlife (Gandiwa *et al.*, 2013). The fear and threat of attacks not only endanger human lives but also create a sense of insecurity among local populations (Le *et al.*, 2011).

Economic losses incurred due to wildlife damage further exacerbate the challenges faced by communities already struggling with limited resources (Dube and Kavhu, 2022). Destruction of property, crops and livestock leads to financial burdens that are heavy on marginalized rural communities (Le *et al.*, 2011). Gemeda and Meles, (2018), Zvidzai *et al.*, (2023) and Spierenburg, (2002) highlighted that these economic losses not only impact individuals but also hinder local economies and hamper sustainable development efforts.

Moreover, human-wildlife conflict poses significant challenges. Negative interactions between humans and wildlife can foster aggression towards conservation efforts and threaten the

protection of endangered species (Gandiwa *et al.*, 2011). Shereni and Saarinen, (2021), Muposhi *et al.*, (2016) and Mhuriro-Mashapa *et al.,* (2018) noted that misunderstandings and conflicts resulting from human-wildlife interactions hinder conservation initiatives.

In extreme cases, Mhuriro-Mashapa *et al.,* (2018) highlighted that human-wildlife conflict can result in the displacement of communities as people are forced to vacate conflict-prone areas. This disruption of livelihoods and the loss of homes further compound the socio-economic impacts of such conflicts, leading to social instability and displacement crises in already vulnerable regions (Mutanga *et al.,* 2017), (Nyirenda, 2012), (Zvidzai *et al.*, 2023) and (Kissui, 2008).

2.3 HUMAN-WILDLIFE CONFLICT STUDIES IN ZIMBABWE

Studies on human-wildlife conflict in Zimbabwe have been directed mostly to areas that are traditional conservation areas or wildlife hotspots and areas that have direct proximity to them. Different studies have shown how human-wildlife conflict has impacted the economies of local communities.

Ndava and Nyika, (2019) highlighted that human-baboon conflict was more prevalent in resettled areas in Zimbabwe due to human encroachment into wildlife corridors and mountainous areas. Conflicts noted were crop raiding and livestock predation which had a great impact on crop yield, food security and livelihood diversification. The study highlighted that an average of 0.20% of maize crop per hectare was lost to baboons and an estimated cost which ranges from USD 60 to USD 510 per farmer. Also Butler, (2000) highlighted baboons as problem animals in the Gokwe study where it was noted that 241 livestock were predated by baboons, lions and leopards which contributed to 52%, 34% and 12% of the killings respectively. This showed that more predation was done by baboons and estimated losses of USD 26 or more per household were significant.

Human-hyena conflict was also more prevalent in communal areas adjacent to protected areas where hyenas patrol for easy prey especially small livestock such as goats, sheep, calves and young donkeys. (Gonhi *et al.*, 2024) highlighted the increase of human-hyena conflict in areas adjacent to the Sengwa Wildlife Research Area where incidences increased from 13 reports per annum in 2014 and 2017 to 30 reports per annum between 2017 and 2021. It was further highlighted that livestock predation was more prevalent, in some cases 16 goat killings were recorded in a single incident which amounts to an estimated loss of about USD 480.

Utete *et al.*, (2017) highlighted human-hippopotamus conflict to be more significant in areas adjacent to the Manjirenji Dam in Chiredzi. It was noted that the hippopotamus moves into the adjacent crop fields in search of forage posing a threat to household food security as they can graze the whole field in a single night. Estimated costs ranging from USD 200 to 500 per household were significant due to grazed fields mainly consisting of maize.

In areas adjacent to Nyanga National Park, human-python conflict was more prevalent (Dube and Kavhu, 2022). The increase in human settlements in areas adjacent to the parks poses a significant threat to the python population and other wildlife that include their prey base. Major conflicts included livestock predation, especially goats and the economic value of losses were not quantified.

CHAPTER 3: MATERIALS AND METHODS

3.1 STUDY AREA

Bindura District has the smallest area in Mashonaland Central Province and covers only 2 306 square kilometres. About 60 % of the District is largely A1 and A2 commercial areas while the rest comprises Masembura and Musana communal lands located at the Southern fringes of the province (Mugandani *et al.*, 2012). The area falls within the savannah climatic zone in natural region 2 (Moyo and Chikuvire, 2007). The region is characterized by an annual rainfall of 500-1000mm, mid-dry spells and high temperatures ranging from 27^0C to 35^0C (Mugandani *et al.*, 2012). Production systems are based on drought-tolerant crops and semi-intensive livestock production (Moyo and Chikuvire, 2007).

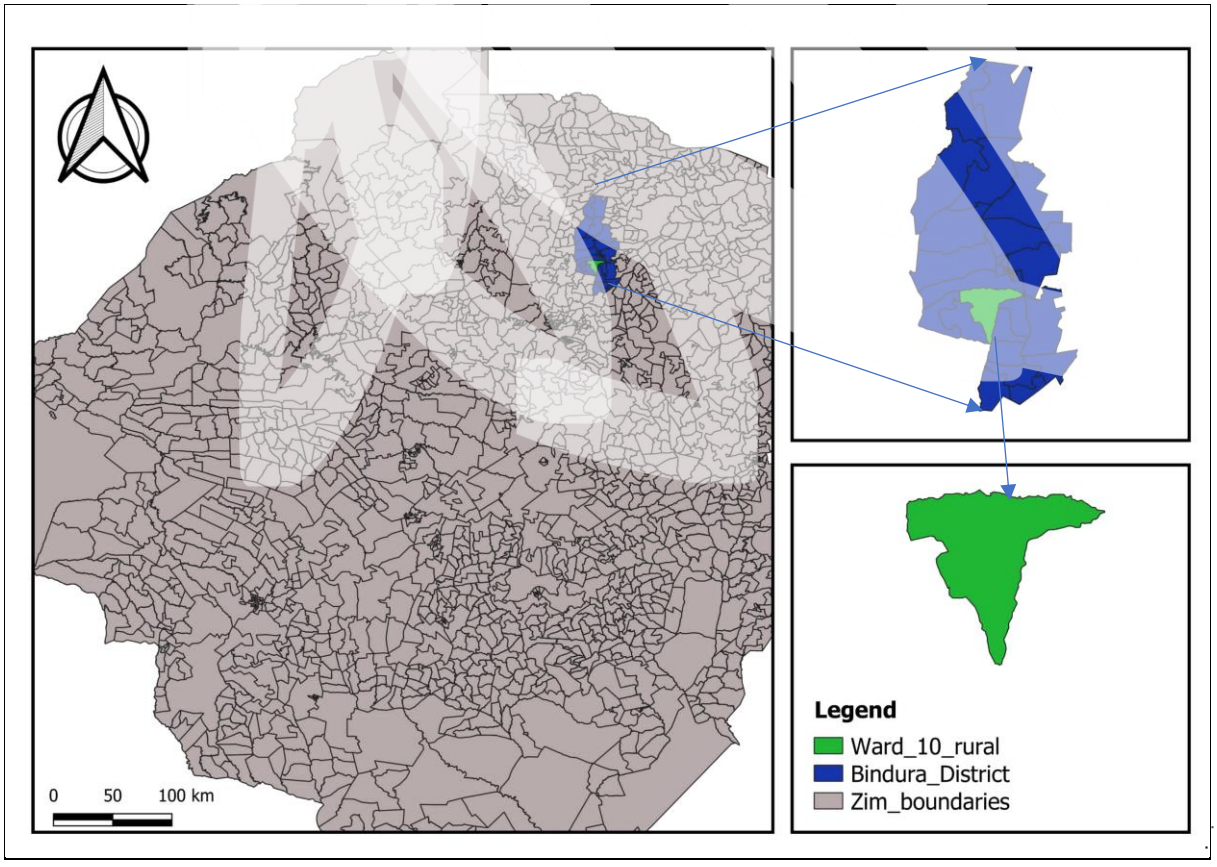


Figure 1: Study area map, Gudza Ward 10, Bindura District.

3.2 STUDY DESIGN

Stratified and purposive sampling were used to select respondents from 4 villages in Ward 10. Within the study villages, households were purposively selected based on the extent of human-wildlife conflict as well as households that recorded a higher frequency of livestock predation.

3.3 METHODS AND MATERIALS

Households were purposively selected amongst the four villages resulting in 98 respondents being selected. To gather comprehensive information on the conflict, a key informant from Bindura Rural District Council was purposefully selected for an interview. This informant supplied detailed insights into the problem animal species involved in the conflict, the seasonal patterns of the conflict, and any changes in the frequency of conflicts over time.

To explore different sides of the conflict, questionnaires containing both open-ended and close-ended questions were employed. The questionnaires were designed to gather information on various aspects related to the conflict. To determine the estimated crop losses, a field officer from the Department of Agricultural, Technical and Extension Services (AGRITEX) assisted. Using the acreage as a basis, the losses for each crop were calculated by subtracting the actual yield from the expected yield. The selling price for each crop was then based on the average market price at Bindura Green Market (Table 3.1). Livestock losses were based on the number of livestock that were predated and the economic losses were based on the average market price of adult animals (Table 3.2). The questionnaire was aimed to get information on the following aspects; livestock and crops affected, types of conflict, actions taken in case of a conflict, major factors contributing to human-wildlife conflict and livelihood activities. Descriptive summaries were computed for the questionnaire data.

Table3.1: Average crop market price.

Crop	**Average unit market price in USD (per 20litre bucket)**
Maize	5
Tobacco	400 / bale
Groundnuts	5 (unshelled)
Rapoko	8
Sweet potatoes	4
Irish potatoes	6
Round nuts	6 (unshelled)
Millet	8
Sorghum	7

Table 3.2: Average livestock market price.

Domestic animal	**Average market price in USD**
Chickens	6
Goats(kids)	30
Goats(adults)	30

3.4 DATA ANALYSIS

Questionnaire data were analysed using the Statistical Package for Social Sciences (SPSS) version 2020.

CHAPTER 4: RESULTS

The study showed that the majority of the respondents were female (Figure 4.1).

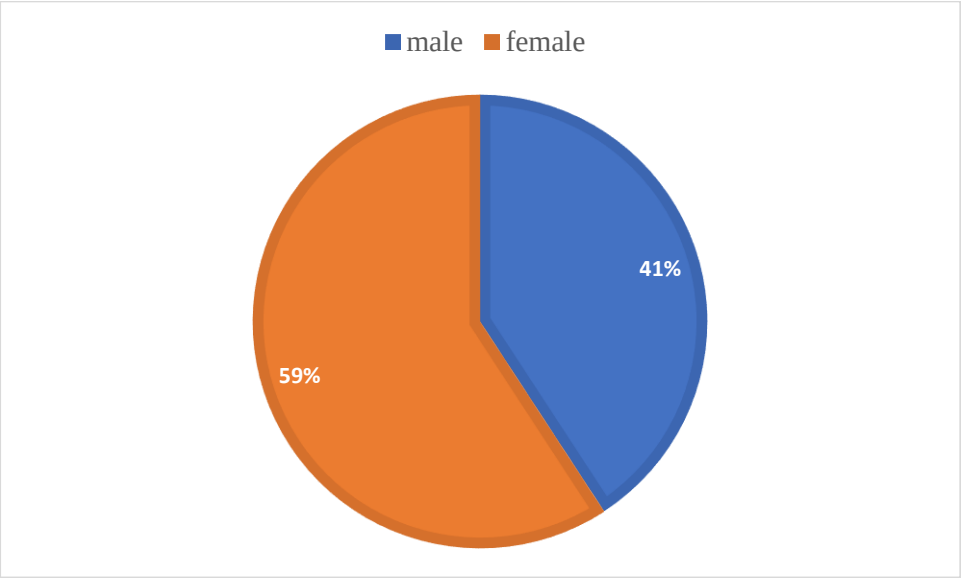


Figure 2: Gender of respondents.

The majority of the respondents were in the 40-49 age bracket as shown in figure 4.2.

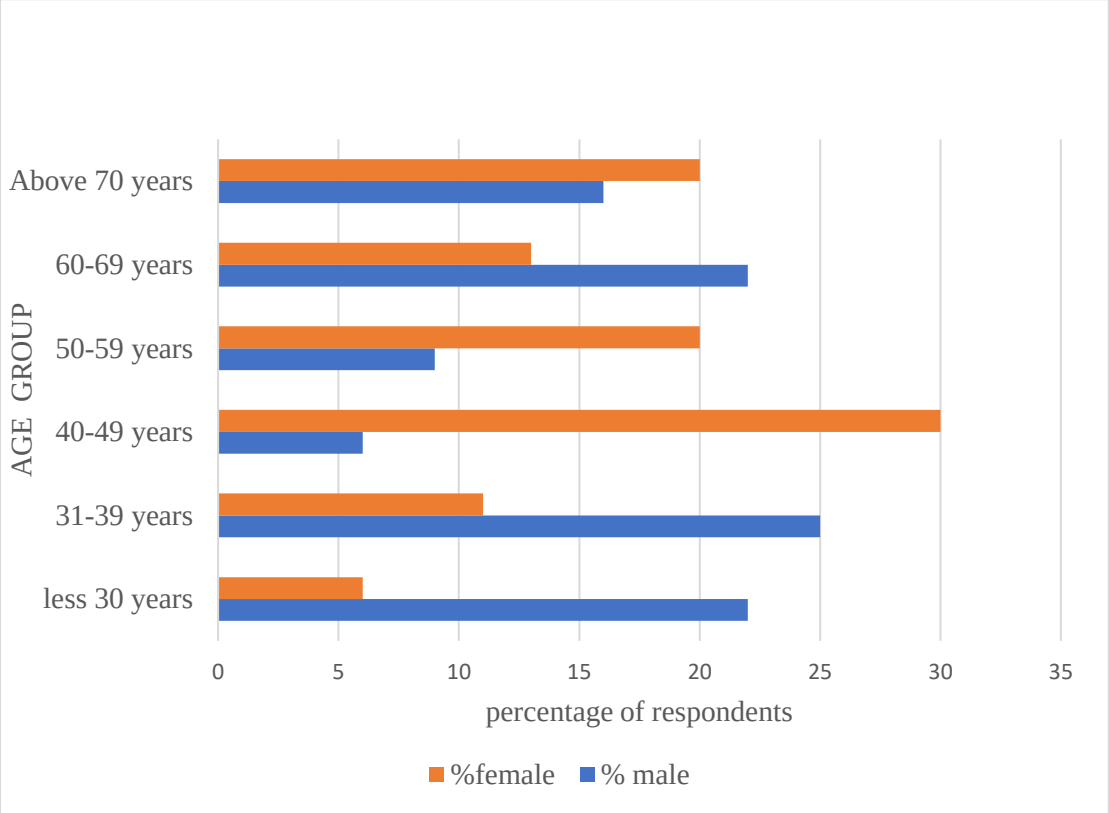


Figure 3: Age groups of respondents.

Most of the respondents (91%) had problems with wild animals. Jackals, pythons, baboons, birds, guinea fowls, monkeys, bush pigs, eagles, mongoose, warthogs and hyenas were regarded as the main problem animals. Jackals, pythons, baboons, and birds have the highest frequency of occurrences of 12.9%, 12.7%, 11.7%, and 10.3% respectively (Table 4.1).

Table 4.1: Problem animal species.

Animal species	**Percentage of respondents**
Jackals (Black backed)	12.9
Pythons	12.7
Baboons	11.7
Birds	10.3
Guinea fowls	9.5
Monkeys	9.4

Bushpigs	8.7
Eagles(African Hawk- Eagle)	8.3
Mongoose	7.0
Warthogs	5.9
No action	2.1
Hyenas	1.0

The livestock that were reported to have been killed in 2022 were chickens (60.2%), goat kids (24.1%), and goat adults (14.2%) (Table 4.2).

Table 3.2: Livestock killed by predators.

Domestic animal	**Number of animals killed**	**Percentage of animals killed**
Chickens	372	60.2
Goats(kids)	149	24.1
Goats(adults)	86	14.2

The major types of human-wildlife conflict involved livestock predation, crop damage by raiding, seed consumption and trampling. Most of the conflict started at the planting stage where seeds were consumed before germination. In most cases, pre-emergence seed consumption was common where birds were attracted to freshly planted fields digging up the seeds. Some wild animals such as wild pigs would burrow on the planted seeds. Livestock predation was high in the dry season due to the unavailability of crops in the fields , where baboons resorted from crop raiding to livestock predation.

Table 4.3: Crops affected by wildlife.

Crop	**Percentage of estimated damage.**
Maize	40.1
Tobacco	15.9
Groundnuts	11.7
Rapoko	10.9
Sweet potatoes	9.2
Irish potatoes	4.6
Round nuts	3.5
Millet	1.5
Sorghum	1

About 40% of the total economic cost due to livestock predation in 2022 resulted from the predation of chickens.

Table 4.4: Estimated cost of livestock predation.

Livestock species	**Estimated cost (USD)**
Chickens	11 338
Goats(adults)	9 240
Goats(kids)	7 794
Total	**28 372**

Tobacco, maize, groundnuts and rapoko were the major crops that were greatly affected by wild animals and incurred huge losses in 2022.

Table 4.5: Estimated cost of crop damage.

Crop	**Estimated cost (USD)**
Tobacco	136 923
Maize	38 112
Groundnuts	9 558
Rapoko	8 832
Sweet potatoes	3 696
Round nuts	2 496
Irish Potatoes	1 728
Millet	528
Sorghum	336
Total	**202 209**

The majority of the participants in the study took individual measures to mitigate the conflict, including actions such as poisoning, setting snares, and using scare tactics to deter animals. Additionally, some respondents resorted to killing problem animals to reduce their population and safeguard their livestock and crops against predation and damage.

According to the respondents, the occurrence of human-wildlife conflict has intensified following the establishment of the CAMPFIRE area. Population growth has contributed to increased human encroachment into the protected area, and illegal poaching activities have further reduced the prey population for predators. Consequently, wildlife has resorted to preying more frequently on livestock, exacerbating the conflict. Competition for resources such as land, water and forage, wildfires, vandalism of fences, deforestation and land degradation due to tobacco farming and brick moulding were regarded as the major factors for human-wildlife conflict in the study area. Beekeeping, poultry, tobacco farming and brick moulding

were highlighted as supplementary income-generating activities since most of the villagers did not benefit much from the CAMPFIRE revenue.

Approximately half of the respondents highlighted that the Rural District Council (RDC) was a major stakeholder responsible for Problem Animal Control (PAC) and respondents wanted the authority to maintain the CAMPFIRE fences and consider resettlement of people to areas that are far from the wildlife area.

The key informant from the Rural District Council highlighted that the CAMPFIRE facility was established in 2000 as an initiative to conserve wildlife at a community level, improve local livelihoods, and change local perspectives and attitudes towards wildlife conservation. As a security measure, a fence was erected in 2002 and a security guard was employed to man the area.

However, due to poaching the fence is frequently cut and stolen. Furthermore, the key informant highlighted the erection of an electrical fence, education and community awareness on wildlife conservation as other possible measures that can be used by the Rural District Council to protect the facility from vandalism. Deforestation due to tobacco farming, competition for resources (land, water and pastures) between humans and wildlife, wildfires and human encroachment were cited as major causes of human-wildlife conflict in the area.

The key informant established that human-wildlife conflict has increased since the establishment of the CAMPFIRE facility as evidenced by frequent reports from the community and the population increase of wildlife, especially baboons and monkeys. The Rural District Council partners with other stakeholders such as the Zimbabwe Parks and Wildlife Management Authority and Traditional Leaders in reducing human-wildlife conflict while the community guards their fields and uses other traditional methods such as snaring, scaring away, killing and making smoke near their fields to protect their crops and livestock. The key informant highlighted that the Local Authority also introduced measures such as shooting and culling of problem animals.

Activities such as bird watching and boating have generated revenue for the Local Community and have been used for road maintenance and as capital to start community projects such as beekeeping, fish farming and citrus and mango farming.

CHAPTER 5: DISCUSSION

DEMOGRAPHICS

Most of the respondents depend on livestock and crop production for their livelihoods. Crops grown include maize, ground nuts and rapoko. Tobacco is grown as a cash crop by almost half of the respondents. The majority of the respondents were females.

ATTITUDE TOWARDS THE MAIN PROBLEM ANIMALS

The majority of the respondents highlighted that they had conflicts with wild animals. A high frequency of households that had experienced human-wildlife conflict was also reported in a study in Mazowe by Nyika (2019) and Mbire District, Mhokwe Ward by Musiwa and Mhlanga (2020).

As per the findings of this study, the majority of respondents identified jackals, pythons, baboons, and birds as the primary species causing problems in the area. Most of the respondents reported pythons as a problem animal species similar to a study by Dube (2022) in the local communities adjacent to Nyanga Nation Park.

While previous studies conducted in Zimbabwe, Southern Africa, and Africa have consistently highlighted the involvement of large herbivores and cats as the primary species in human-wildlife conflict (Kissui, 2008), the present study yielded contrasting results. In this study, it was found that small animal species, occurring in significant numbers, had the most significant impact on livestock and crops. Notably, baboon predation, as well as crop raiding and damage, were particularly prominent, aligning with findings from the Gokwe study by Butler (2000).

NATURE OF CONFLICT, ECONOMIC EFFECTS AND MITIGATION MEASURES

Most of the respondents indicated that there had been an increase in the frequency and occurrence of human-wildlife conflict since the establishment of the protected CAMPFIRE area. Seed consumption, crop raiding, trampling and livestock predation were the major types of human-wildlife conflict encountered by the respondents. The types of conflict were different from the observations made in the Gokwe study, where Butler (2000) noted crop raiding and livestock predation as major types of conflict. Musiwa and Mhlanga (2020) in the Mhokwe study, noted quelea birds as problem species that were attracted to grains that have reached the maturity stage, however, this differed from this study where it was noted that seed consumption

was common where birds were attracted to freshly planted fields digging up the seeds and some of the wild animals would also burrow on the planted seeds.

Similarly, Dube (2019) states that communities living in proximity to conservation areas often view wildlife as a threat to their everyday existence and disrupters of their sources of livelihoods. This is evidenced by the economic losses incurred due to crop damage and livestock predation. Similar trends of economic costs were also noted in other studies in Kenya (Patterson *et al.* 2004), in Gokwe, Zimbabwe (Butler, 2000) and in Zambia (Chomba *et al.* 2012). Crop damage and livestock predation had an impact on all the affected families since most of the crops and livestock would not be sold but used for consumption. These losses have negative impacts on food security, and livelihood diversification and families become more vulnerable to events such as drought (Murphy *et al.*,2004).

Furthermore, most studies have indicated that human-wildlife conflict was more prevalent in areas close to and adjacent to national parks and conservation areas (Musiwa and Mhlanga, 2020), (Mhuriro-Mashapa *et al.*, 2018), (Fritz *et al.*, 2003) (Matseketsa *et al.*, 2019) and (Dube and Kavhu, 2022). However, this differed from the current study where the study area is not close to any national park or traditional wildlife conservation area and neither has a CAMPFIRE status.

The respondents highlighted that in most cases the responsible authority (Rural District Council) did not take much action or respond timeously to the conflicts reported. This has made the local people resort to taking personal action such as poisoning, killing, snaring, and scaring away in case of human-wildlife conflict incidents to protect their livestock from predation and crop damage as noted by Gandiwa *et al.* (2013), in the Northern Gonarezhou National Park.

Deforestation due to tobacco farming and land degradation due to agricultural land expansion and brick moulding were also noted as major causes of human-wildlife conflict in the study area. This has led to competition for resources such as land, forage and water have caused both humans and wild animals to encroach on the buffer zones or wildlife corridors, thereby leading to conflict. Similarly, Musimbi (2013) highlighted that population increase leads to a high demand for agricultural land and crop cultivation is done at the boundaries of the protected areas, leading to more competition for resources, hence an increase in human-wildlife conflict.

Most of the respondents felt that the Rural District Council was accountable for dealing with problem animals and should partner with other stakeholders in problem animal control and maintain the fences and wildlife corridors so to minimize human-wildlife conflict. Despite the

conflicts encountered and receiving fewer benefits from the CAMPFIRE Programme, the majority of the respondents showed a positive attitude towards wildlife conservation at a community level. Similar observations of positive attitudes towards wildlife were also made in other studies by Mhlanga (2001) and Matseketsa *et al.,* (2018).

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

The study was able to capture a diverse sample of respondents mostly women, representing different age groups and socio-economic backgrounds. The research revealed that the community has mixed attitudes towards the main problem animals. While some view them as a nuisance and threat, others recognise their ecological importance and their need for coexistence. This highlighted the importance of fostering mutual understanding and building consensus within the community. The respondents were of the view that the conflict was increasing. The drivers of the conflict were reported to be an increasing human population that was encroaching the CAMPFIRE Area, deforestation, land degradation, veld fires, increasing animal populations and resource competition. The study also identified the various types of conflict including crop raiding, seed consumption, trampling and livestock predation. Livestock predation and crop raiding resulted in substantial economic losses for the affected households. Interventions that reduce conflict can contribute to ensuring that the community's positive attitude towards wildlife are enhanced. Conflict can also be reduced through the reduction of human encroachment to the protected area and timeously attending the fields.

REFERENCES

Butler, J. R. A. (2000) The economic costs of wildlife predation on livestock in Gokwe communal land Zimbabwe. *African Journal of Ecology*, **38,** pp.23-30.

Chomba, C., Ramadhani, S. R., Chabwela, H., Mwitwa, J. & Nyirenda, V.(2012) Patterns of human wildlife conflicts in Zambia: Causes, consequences and management responses. *Journal of Ecology and the Natural Environment,* **4** pp. 303-313.

Dube, K.R. and Kavhu, B. (2022) 'Opportunities and challenges of human–python conflict intervention in local communities adjacent to Nyanga National Park, Zimbabwe', *Conservation Science and Practice*, 4(1), pp. 4–7.

Fritz, H., Saïd, S., Renaud, P.C., Mutake, S., Coid, C. and Monicat, F. (2003) 'The effects of agricultural fields and human settlements on the use of rivers by wildlife in the mid-Zambezi valley, Zimbabwe', *Landscape Ecology*, 18(3), pp. 293–302.

Gandiwa, E., Lokhorst, A.M., Prins, H.H.T. and Leeuwis, C. (2013) 'CAMPFIRE and Human-Wildlife Conflicts in Local Communities Bordering Northern Gonarezhou National Park, Zimbabwe', 18(4).

Gandiwa, P., Matsvayi, W., Ngwenya, M.M. and Gandiwa, E. (2011) 'Assessment of livestock and human settlement encroachment into the northern Gonarezhou National Park, Zimbabwe', *Journal of Sustainable Development in Africa*, 13(5), pp. 19–33.

Gemeda, D.O. and Meles, S.K. (2018) 'Impacts of human-wildlife conflict in developing countries', *Journal of Applied Sciences and Environmental Management*, 22(8), p. 1233.

Gonhi, P., Chibememe, G., Utete, B., Mahakata, I. and Madamombe, H. (2024) 'Dynamics and determinants of human – hyaena conflicts in the surroundings of a protected area', (October 2023), pp. 1–11.

Granados, A., Weladji, R.B. and Loomis, M.R. (2012) 'Movement and occurrence of two elephant herds in a human-dominated landscape, the Bénoué Wildlife Conservation Area, Cameroon', *Tropical Conservation Science*, 5(2), pp. 150–162.

Hohbein, R. and Abrams, J. (2022) 'Conservation, Human-Wildlife Conflict, and Decentralised Governance: Complexities beyond Incomplete Devolution', *Conservation and Society*, 20(4), pp. 293–303.

Kahuni, T., Zisadza-Gandiwa, P., Mhlanga, W., Libombo, E., Mashapa, C., Muboko, N., & Gandiwa, E. (2014) Are fences effective in combating human-wildlife conflicts around protected areas in Zimbabwe? The case study of local communities bordering northern Gonarezhou National Park, Zimbabwe. Land: An Empowerment Asset for Africa: The Human Factor Perspective. *University of Zimbabwe Publication,* pp. 278-287.

Kissui, B.M. (2008) 'Livestock predation by lions, leopards, spotted hyenas, and their vulnerability to retaliatory killing in the Maasai steppe, Tanzania', *Animal Conservation*, 11(5), pp. 422–432.

Le, S., Murwira, A., Mukamuri, B., Czudek, R., Taylor, R. and La, M. (2011) 'Human Wildlife Conflicts in Southern Africa: Riding the Whirl Wind in Mozambique and in Zimbabwe', *The Importance of Biological Interactions in the Study of Biodiversity*

Matseketsa, G., Muboko, N., Gandiwa, E., Kombora, D.M. and Chibememe, G. (2019) 'An assessment of human-wildlife conflicts in local communities bordering the western part of Save Valley Conservancy, Zimbabwe', *Global Ecology and Conservation*, 20, p. e00737.

Merkebu, S. and Yazezew, D. (2021) 'Assessment of Human-Wildlife Conflict and the Attitude of Local Communities to Wild Animal Conservation around Borena Sayint National Park, Ethiopia', *International Journal of Ecology*, 2021.

Mhlanga, L. (2001) 'Conflict between wildlife and people in Kariba Town, Zimbabwe', *Zambezia: The Journal of Humanities of the University of Zimbabwe.*, 28(1).

Mhuriro-Mashapa, P., Mwakiwa, E. and Mashapa, C. (2018) 'Socio-economic impact of human-wildlife conflicts on agriculture based livelihood in the periphery of save valley conservancy, southern Zimbabwe', *Journal of Animal and Plant Sciences*, 28(3), pp. 903–914.

Moyo, M. and Chikuvire, J. (2007) Determinants of Farmer Demand for "Fee-for-Service" Extension in Zimbabwe: The Case of Mashonaland Central province 96 Journal of International Agricultural and Extension Education 'Volume 14, Number 1', pp. 95–104.

Mugandani, R., Wuta, M., Makarau, A. and Chipindu, B. (2012) 'Re-classification of agro-ecological regions of Zimbabwe in conformity with climate variability and change', *International Journal of Ecology*, 20, pp. 361–369.

Muposhi, V.K., Gandiwa, E., Bartels, P. and Makuza, S.M. (2016) 'Trophy Hunting, Conservation, and Rural Development in Zimbabwe: Issues, Options, and Implications',

International Journal of Biodiversity, 2016, pp. 1–16.

Murphy, C., Vaughan, C. Katjiua, J., Mulonga, S. and Long, S.A. (2004) The Findings of the WILD Project. Final Technical Report of the Wildlife Integration for Livelihood Diversification Project (WILD). Windhoek: *Ministry of Environment and Tourism.* pp 13-56

Musimbi, M. (2013) *Factors Influencing Human Wildlife Conflict In Communities Around The Park: A Case Of Lake Nakuru National Park. A Research Project Submitted In Partial Fulfillment Of The Requirements Of Master Of Arts In Project Planning And Management Of The University Of Nairobi.* pp 15-32

Musiwa, A.R. and Mhlanga, W. (2020) 'Human–wildlife conflict in Mhokwe Ward, Mbire District, North-East Zimbabwe', *African Journal of Ecology*, 58(4),

Mutanga, C.N., Muboko, N. and Gandiwa, E. (2017) 'Protected area staff and local community viewpoints: A qualitative assessment of conservation relationships in Zimbabwe', *PLoS ONE*. Public Library of Science. 'Volume 2, Number 1', pp. 18–40.

Ndava, J. and Nyika, E.H. (2019) 'Human-Baboon Conflict on Resettled Farms in Zimbabwe: Attitudes and Perceptions among Local Farmers', *Current Journal of Applied Science and Technology*, pp. 1–10.

Nyirenda, R. (2012) 'Predicting environmental factors influencing crop raiding by African elephants (Loxodonta africana) in the Luangwa Valley, eastern Zambia', *African Journal of Environmental Science and Technology*, 6(10), pp. 391–400.

Patterson, B. D., Kasiki, S. M., Selempo, E., & Kays, R. W. (2004) Livestock predation by lions (*Panthera leo*) and other carnivores on ranches neighbouring Tsavo National Parks, Kenya. *Biological Conservation, **119***, pp. 507–516.

Shereni, N.C. and Saarinen, J. (2021) 'Community perceptions on the benefits and challenges of community-based natural resources management in Zimbabwe', *Development Southern Africa*, 38(6), pp. 879–895.

Spierenburg, M. (2002) ' African Wildlife and Livelihoods: the promise and performance of community conservation edited by David Humle and M arshall M urphree Oxford: James Currey; Cape Town: David Philips; Harare: Weaver; Zomba: Kachere; Nairobi: E.A.E.P.; Kampala: Fountain; ', *The Journal of Modern African Studies*, 40(3), pp. 499–518.

Steven, S. and Ndong, A. (2017) *Human-Wildlife Conflict And Ecotourism: Comparing*

Pongara And Ivindo National Parks In Gabon. A Thesis Presented to the Department of International Studies and the Graduate School of the University of Oregon in partial fulfillment of the requirements for the degree of Master of Arts.

Tchakatumba, P.K., Gandiwa, E., Mwakiwa, E., Clegg, B. and Nyasha, S. (2019) 'Does the CAMPFIRE programme ensure economic benefits from wildlife to households in Zimbabwe?', *Ecosystems and People*, 15(1), pp. 119–135.

Utete, B., Tsamba, J., Chinoitezvi, E. and Kavhu, B. (2017) 'Analysis of the abundance and spatial distribution of the common hippopotamus, (Hippopotamus amphibius) in the Manjirenji Dam, Zimbabwe, to inform conservation and detect human–wildlife conflict hot spots', *African Journal of Ecology*, 55(4), pp. 754–759.

Zvidzai, M., Mawere, K.K., N'andu, R.J., Ndaimani, H., Zanamwe, C. and Zengeya, F.M. (2023) 'Application of maximum entropy (MaxEnt) to understand the spatial dimension of human–wildlife conflict (HWC) risk in areas adjacent to Gonarezhou National Park of Zimbabwe', *Ecology and Society*, 28(3), pp 20-32.

APPENDICES.

APPENDIX 1

QUESTIONNAIRE

RESEARCH TOPIC: HUMAN-WILDLIFE CONFLICT IN GUDZA WARD 10 BINDURA DISTRICT.

My name is Macheka Susan, a student from Bindura University of Science Education. I am carrying out a study as a requirement for the fulfilment of a Bachelor of Science Honours Degree in Natural Resources Management under the topic "CAMPFIRE and human-wildlife conflict in Gudza ward 10 Bindura District. I'm requesting you to participate in the study. The purpose of this Questionnaire is to provide information in the questionnaire by answering the questions honestly and completely.

Information provided in this questionnaire is private and confidential.

Part A: PERSONAL INFORMATION.

1. Gender: Male ☐ Female ☐
2. Age bracket? Less 30 years ☐ 31-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐
   70 years and above ☐
3. Which village do you live and how long have you been living in this village?

Village	Period(in years)
Dengu	
Wayerera	
Nyakudya-Mazarura	
Chingwaru	

Part B: PERCEPTIONS ON PROBLEM ANIMALS.

4. Do you and your family have conflicts with wild animals? Yes ☐ No ☐

5. Livestock affected

Wild animal species	**Domestic animal affected**	**Type of problem(s) caused**	**Estimated number of animals lost in 2022**	**Estimated value in (USD)**
Jackal	Goats (adults)	predation		
Baboons	Goats (kids)	predation		

6. a) Crops affected

Wild animal species	**Crop affected**	**Type of problem(s) caused**	**Estimated hectarage (area) lost in 2022.**	**Estimated value in (USD)**

7. What do you do when you have conflicts with wild animals in your village? Report / No action/ Take personal action

8. If you take personal action, what type of action do you take?

Animal species	**Type of action taken**

9. What are the explanations for the actions you take in case of a conflict?

……

……..

……

……

10. What do you think are the major factors that have contributed to human-wildlife conflict in your ward?

1. ……

2. ……

3. ……

4. ……

5. ……

Part C: OPINION AND VALUATION.

11. In your opinion has human-wildlife conflict decreased /increased /remained the same since the establishment of the CAMPFIRE?

12. What are the reasons for your answer in 11 above?

……..

……..

……..

……..

14. Have you benefited from CAMPFIRE? Yes/No

(b) If yes, what benefits have you received from CAMPFIRE?

……
……
……
……

15.Are there any income-generating activities that you would like to do to increase your household income? Yes/No

(b) If yes, please list these income-generating activities.

……
……
……
……
……
…….

16. Do you have any other comments? Yes/No

(b)If yes, please state the comments.

……
……
……
……
……
…….

Thank you for your knowledge in this research, your response will help us to understand the problems you experience with wildlife, your attitude towards the conservation of wildlife and the possible mitigation measures for human-wildlife conflict.

APPENDIX 2

KEY INFORMANT INTERVIEW GUIDE

RESEARCH TOPIC: CAMPFIRE AND HUMAN WILDLIFE CONFLICT IN GUDZA WARD 10 BINDURA DISTRICT.

My name is Macheka Susan, a student from Bindura University of Science Education. I am carrying out a study as a requirement for the fulfilment of a Bachelor of Science Honours Degree in Natural Resources Management under the topic "CAMPFIRE and human-wildlife conflict in Gudza Ward 10 Bindura District".

Part A: PERSONAL INFORMATION.

1. Gender: Male ☐ Female ☐

2. Position……

Part B: BACKGROUND TO CAMPFIRE.

3a. How was CAMPFIRE was established?

……..

……..

……..

……..

3b. When was CAMPFIRE was established?

……..

……

4a.When was the fence erected?

……

4b. Are there any problems encountered with the fence? Yes/No

4c. If yes, what type of problems encountered with the fence?

……

……..

……..

……..

5(i) What are the current mitigation measures used by the responsible Authority to address the problems listed above?

……

……..

……

……..

5(ii) Apart from the current mitigation measures, what other possible solutions can be used to address the problems listed above

……..

……..

……..

……..

Part C: CAMPFIRE AND HUMAN WILDLIFE CONFLICT.

5(a) Is there Human Wildlife Conflict? Yes/No

5 (b) If yes what are the causes of the conflict?

……

……..

……..

……

……..

……..

(b) In your opinion has human-wildlife conflict decreased /increased /remained the same since the establishment of the CAMPFIRE?

(c) What are the reasons for your answer in (b) above?

……

……..

……..

……..

……

……..

(d)What are the problem animal control measures used by the RDC?

……..

……..

……

…….

…….

(e)Does Bindura Rural District Council partner with other Stakeholder(s) in controlling human-wildlife conflict? Yes/No

(f) If yes, who are the other stakeholders?

……

…….

……..

……..

6. What are the measures used by communities to mitigate human-wildlife conflict?

…….

……..

……..

……..

……..

7. What new measures can be used/introduced by the Local Authority to mitigate human-wildlife conflict?

……..

……..

……..

…….

…….

Part D: REVENUE AND COMMUNITY BENEFITS.

8a). Does the Local Authority realise any revenue from the CAMPFIRE facility? Yes/No

8b) If yes, which CAMPFIRE activities generate revenue?

……..

……..

…….

9a. Does the community benefit from the CAMPFIRE facility? Yes/No

9b. If yes, what type of benefits do the communities get from CAMPFIRE?

……

……

……..

……..

……

……

10a. Do you have any proposals for new income-generating projects for the communities? Yes/No

10b. If yes, list the proposed new income-generating projects.

……

……..

……..

……

……..

……..

11a. Do you have any other comment(s)? Yes/No

If yes, please state the comment(s) below

……..

……..

……..

……..

Thank you for your cooperation.

B202713B Macheka Susan

ORIGINALITY REPORT

10%	8%	7%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Aubrey Ruvarashe Musiwa, Wilson Mhlanga. "Human–wildlife conflict in Mhokwe Ward, Mbire District, North-East Zimbabwe", African Journal of Ecology, 2020 Publication	3%
2	elibrary.buse.ac.zw:8080 Internet Source	3%
3	liboasis.buse.ac.zw:8080 Internet Source	2%
4	"Mitigating People Wildlife Conflict. Human-wildlife conflict (HWC) is also fast becoming a critical threat to the survival of many globally endangered species, in particular to large and rare mammals such as the Sumatran tiger and the Asian lion,", International Baccalaureate/Anthropology, 2012-02-16 Publication	1%
5	www.researchgate.net Internet Source	1%
6	erepository.uonbi.ac.ke Internet Source	1%

7	etd.aau.edu.et Internet Source	1 %

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		