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Assessment of the Efficiency of Problematic Animal Interventions in Mitigating Human-Wildlife Conflicts in Uganda: A Case Study of Lake Mburo National Park

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Human-wildlife conflict is a significant challenge in Uganda, particularly in areas where human populations and wildlife habitats overlap. This study examines the efficiency of various interventions aimed at mitigating human-wildlife conflicts in and around Lake Mburo National Park, a region renowned for its rich biodiversity and diverse ecosystems. Lake Mburo National Park is surrounded by agricultural and pastoralist communities that frequently experience crop raiding, livestock predation, and threats to human safety from wildlife. Various interventions, including physical barriers, deterrents, translocation of problematic animals, and community engagement initiatives, have been implemented to address these conflicts. This study employs a mixed-methods approach, incorporating both quantitative and qualitative data collection methods, including field observations, community surveys, and analysis of intervention outcomes. A total of 125 households were interviewed across several parishes of Rurambira, Rwamuhuku, Rwabarata, Kizimbi, Kashojwa and Rwetango in Kiruhura and Isingiro districts. The findings indicate that the majority of respondents have lived in the area for over 20 years, providing them with extensive knowledge of local wildlife interactions. The results highlight that hippos (76%) are the most problematic animals, primarily causing crop damage, which significantly impacts local livelihoods. The study reveals that guarding property (98%), though stressful and time-consuming, is the most effective and commonly used intervention. Other measures, such as strong shelters, trapping, translocation, and various deterrents, show varying degrees of effectiveness depending on the species involved. The study concludes that understanding the species-specific and context-specific effectiveness of these interventions is crucial for developing sustainable strategies to mitigate HWC. The insights gained from this research can inform future conflict mitigation strategies and contribute to the broader discourse on human-wildlife coexistence in Uganda and similar settings worldwide.

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INTRODUCTION

Human-wildlife conflict is a pressing issue in many parts of the world, particularly in regions where human populations and wildlife habitats overlap (Anand & Radhakrishna, 2017). In Columbian National parks, predating animals have affected the surrounding communities by claiming their lives. This has put some of the activities carried out in the area at a standstill. These animals like tigers and Bears have also affected forestry activities in Columbia by claiming workers' lives in the industry (Artelle et al., 2016). Uganda, with its rich biodiversity and expanding human population, is a notable hotspot for such conflicts (Nicole, 2019). Lake Mburo National Park (LMNP), a protected area in southwestern Uganda, exemplifies the challenges of balancing wildlife conservation with the needs and safety of local communities (Nicole, 2019).

The park, renowned for its diverse ecosystems and a variety of species, including Impalas, Zebras, and Hippos, is also surrounded by agricultural and pastoralist communities whose livelihoods are frequently disrupted by wildlife (Kideghesho et al., 2013; Bond et al., 2022). Incidents of crop raiding, livestock predation, and even threats to human safety are common, leading to significant

economic losses and fostering negative attitudes toward wildlife conservation (Bond et al., 2022).

To address these conflicts, various problematic animal interventions have been implemented within and around LMNP. These interventions range from physical barriers, such as fences and trenches, to the use of deterrents like scarecrows, noise devices, and community vigilance programs (Wallace & Hill, 2016). Additionally, the translocation of problematic animals and community engagement initiatives aim to reduce the frequency and severity of HWC incidents (Bonacic et al., 2016; Nkansah-Dwamena, 2023).

Despite these efforts, the effectiveness of these interventions in mitigating conflicts remains a subject of debate (Autesserre, 2014). Some measures have shown promise in specific contexts, while others have yielded limited or mixed results. Understanding the efficiency of these interventions is crucial for developing sustainable strategies that protect both wildlife and human interests (Lamarque et al., 2009). This study aims to assess the efficiency of various problematic animal interventions employed around Lake Mburo National Park. By evaluating the success and shortcomings of these measures, the research seeks to provide insights into best

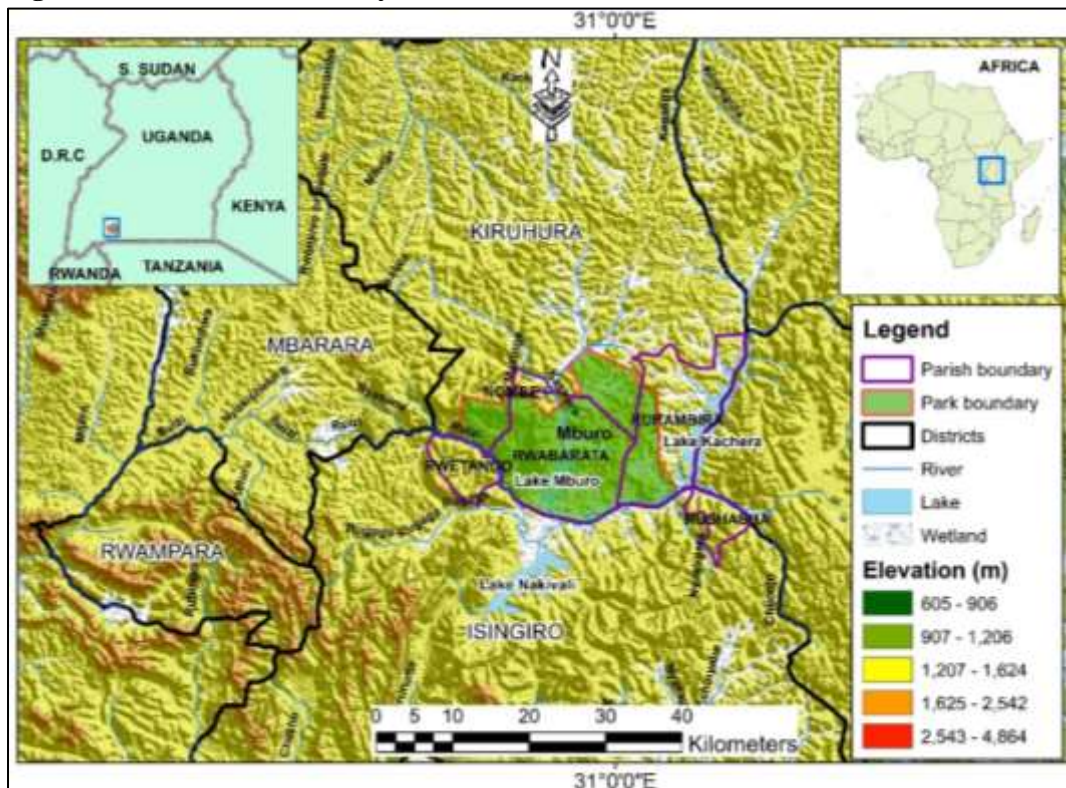
practices and inform future conflict mitigation strategies. Through a combination of field observations, community surveys, and analysis of intervention outcomes, this study will contribute to the broader discourse on human-wildlife coexistence in Uganda (Autesserre, 2014). The study main aim was to assess the efficiency of interventions addressing problematic animal in mitigating Human-Wildlife Conflicts in Uganda a case study of lake Mburo National Park. The study aimed to answer the following research questions i) to assess the nature of problem animal conflicts, ii) to assess problem animal conflicts and frequency of occurrence, iii) to evaluate conflicts and the level of severity, and to determine the effectiveness of the different methods in deterring predators, herbivores, and Omnivores around Lake Mburo National Park.

Materials and methods

Study area

The study was conducted in and around Lake Mburo National Park located in the south western part of Uganda at coordinates 0.5805° S and 30.9919° E (Figure 1). Considering the area around the park, the study was conducted in the following parishes; Rurambira, Rwamuhuku, Rwabarata, Kizimbi, Kashojwa, Rwetango. These parishes are located in Kiruhura and Isingiro districts. The area was considered appropriate because of the presence of problem animals that encroach on the community and cause damage to people as well as their properties.

Figure 1: Location of the study area



Study design

The study adopted a mixed method approach, employing both quantitative and qualitative approaches (Autesserre, 2014). The use of mixed research methods helps to investigate a problem from all sides (Haq, 2015). Usage of different

approaches also helps to focus on a single process and confirms the data accuracy. This design consists of collecting information by interviewing or administering questionnaires to a sample of individuals (Autesserre, 2014). Therefore, the research design is entailed in gathering of information about the effectiveness of problem

animals' intervention around Lake Mburo National Park.

Sampling

This study used both simple random sampling and purposive sampling techniques (Rai & Thapa, 2015). Simple random sampling was utilized to select households from the six parishes of Rurambira, Rwabarata, Rwamuhuku, Kizimbi, Rwetango, and Kashojwa, ensuring that every household had an equal and independent chance of being included in the sample. This approach was essential for obtaining a representative sample of households affected by wildlife-related property destruction and threats to their lives (Mojo et al., 2014). These were selected purposively because they were expected to have much information about the nature of problem animal conflicts around Lake Mburo National Park, the community coping strategies to problem animals at household level as well as the effectiveness of the interventions at hand around Park. Therefore, they provided an overview about the study phenomenon.

Sample size determination

The study employed the Krejcie and Morgan formula below for estimating the number of respondents who were selected for this study.

$$S = \frac{X^2 \cdot N \cdot P \cdot (1-P)}{d^2 \cdot (N-1) + X^2 \cdot P \cdot (1-P)}$$

S = required sample size

X² = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841 for 95% confidence level)

N = population size

P = population proportion (assumed to be 0.5 if not known, for maximum sample size)

d = degree of accuracy expressed as a proportion (0.05 for 95% confidence level)

A total of 125 respondents were selected from a population using the above formula.

Data collection methods

This study utilized both primary and secondary sources of data (Ajayi, 2017; Waring, 2021). Primary data was collected firsthand using interview guides and questionnaires administered to respondents (Ajayi, 2017), ensuring accuracy and direct relevance to the study's objectives. Secondary data, on the other hand, was sourced from existing literature, including published books, journals, internal reports, in-house magazines, and information from the internet (Perdana et al., 2015). These secondary sources were chosen for their cost-effectiveness, time efficiency, availability, and reliability.

Results

The socio-demographic profile of the respondents provides a comprehensive understanding of the study sample. The age distribution reveals that the largest age group is 36-50 years, comprising 45.7% of the respondents, followed by the 18-35 age group at 24.8%, the 51-70 age group at 20.0%, and those aged 71 and above at 9.5%. This indicates a relatively mature population with a significant portion in their prime working years. In terms of gender, the sample consists of 45.7% males and 54.3% females, showing a slight female majority. This gender distribution suggests a balanced representation that may reflect the household structure and participation in community activities.

The length of residency in the area highlights that a majority, 54.3%, have lived in their respective areas for over 10 years, indicating a long-term relationship with the community and a deep understanding of local issues. Meanwhile, 33.3% have been residents for 6-10 years, and 12.4% for 1-5 years, showcasing a blend of long-standing and relatively newer residents. Marital status data shows that a significant majority of respondents, 79.0%, are married. Those never married account for 5.7%, widowed 6.7%, separated 7.6%, and divorced 1.0%. The high percentage of married individuals suggests a stable community structure with family units being a central component.

Educational attainment varies among respondents, with 39.4% having completed primary education, which is the most common level of education. Those with no formal education constitute 27.9%, highlighting challenges in educational access. Respondents

with lower and upper secondary education each represent 12.5%, while those with post-secondary education make up 7.7%. This distribution indicates a predominance of basic education, with fewer individuals advancing to higher levels of education.

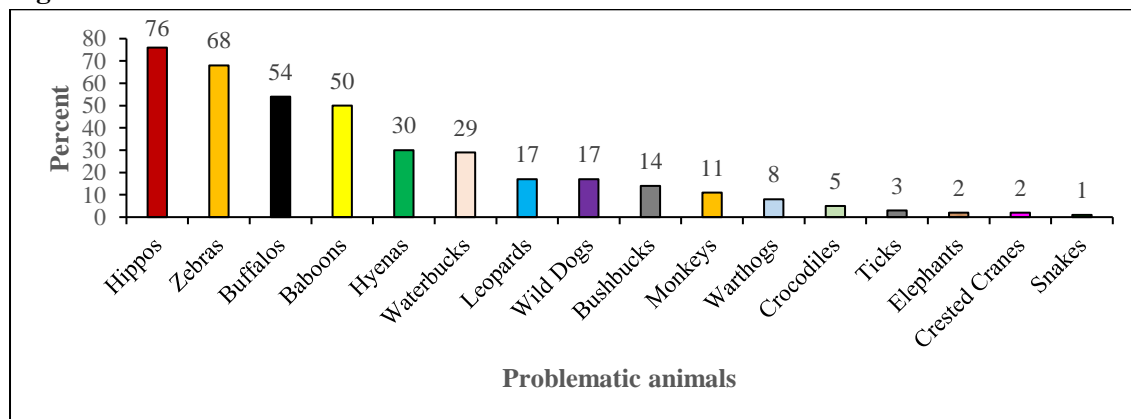
Socio-demographic profile of the respondents

Age	Frequency	Percent
18-35	26	24.8
36-50	48	45.7
51-70	21	20.0
71 and above	10	9.5
Sex		
Male	48	45.7
Female	57	54.3
Years spent as a resident in the area		
1-5 years	13	12.4
6-10 years	35	33.3
Over 10 years	57	54.3
Marital status		
Never married	6	5.7
Married	83	79.0
Widowed	7	6.7
Separated	8	7.6
Divorced	1	1.0
Total	105	100.0
Highest level of education		
No formal education	29	27.9
Primary	41	39.4
Lower secondary	13	12.5
Upper secondary	13	12.5
Post-secondary	8	7.7

Nature of problem animal conflicts around Lake Mburo National Park

Problematic animals around Lake Mburo National Park

Figure 2: Problematic animals around Lake Mburo National Park



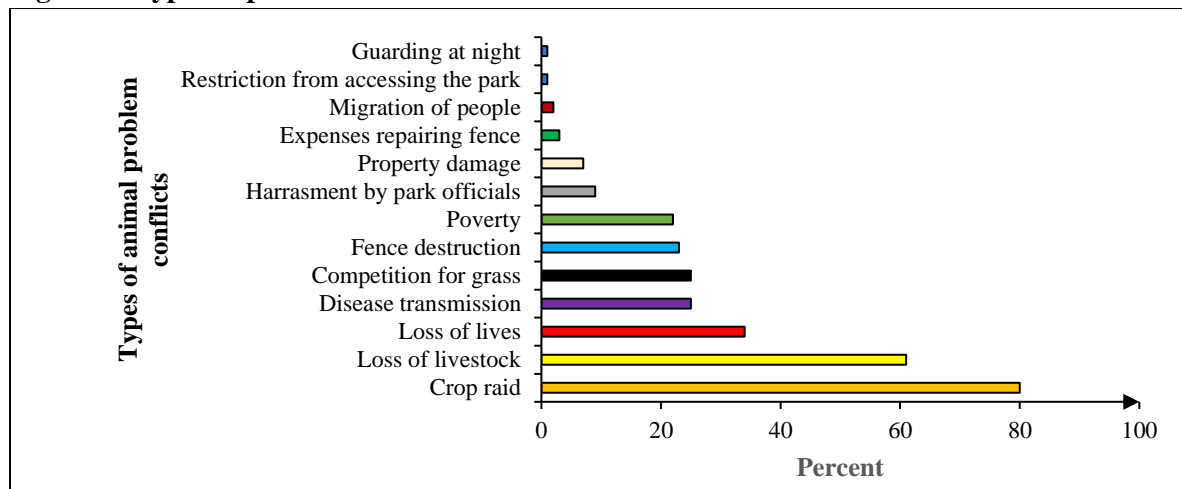
The percentage distribution of various wildlife conflicts around Lake Mburo National Park. Hippos are the most significant contributors,

affecting 76% of respondents, followed by zebras (68%), buffalos (54%), baboons (50%), and hyenas (30%). Waterbucks (29%), leopards (17%), wild pigs (17%), bushbucks (14%), and monkeys (11%) also present notable issues. Warthogs (8%), crocodiles (5%), ticks (3%), elands (3%), crested cranes (2%), and snakes (1%)

have a lesser impact. Overall, hippos, zebras, buffalos, baboons, and hyenas are the primary animals causing conflicts, with hippos being the most problematic, while the least impactful are ticks, elands, crested cranes, and snakes.

Types of problem animal conflicts

Figure 3: Types of problem animal conflicts



The graph provides a detailed overview of the various effects of animal problem conflicts on communities adjacent to protected areas, measured by the percentage of respondents reporting each issue. The most significant effect is crop raiding, with 80% of respondents indicating their crops have been affected by wildlife, highlighting a severe threat to agricultural productivity and food security. Livestock loss is also a major issue, reported by 61% of respondents, indicating direct impacts on livelihoods as wildlife attacks and kills livestock. The loss of human lives, reported by 34% of respondents, is a critical and tragic outcome, emphasizing the need for effective conflict mitigation strategies.

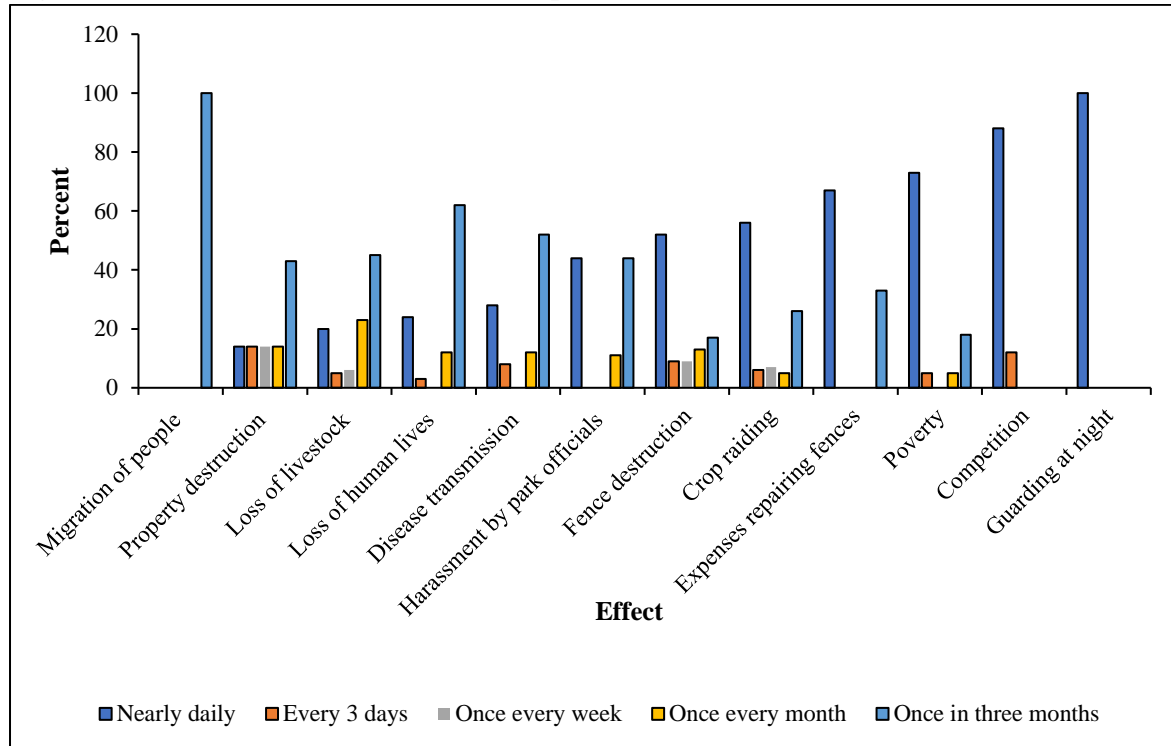
Disease transmission from wildlife to humans and livestock is noted by 25% of respondents, reflecting health risks associated with living close to wildlife habitats. Competition for grass, reported by 25% of respondents, shows conflicts over grazing resources between wildlife and livestock. Fence destruction, affecting 23% of

respondents, undermines efforts to contain wildlife and incurs additional repair costs. Poverty, reported by 22% of respondents, highlights the economic hardship exacerbated by these conflicts. Harassment by park officials, noted by 9% of respondents, indicates strained relations requiring better communication and cooperation.

Property damage, affecting 7% of respondents, extends wildlife impacts to residential areas. The financial burden of repairing fences, reported by 3% of respondents, underscores ongoing costs to prevent wildlife incursions. Migration due to conflicts, reported by 2% of respondents, shows some community members have had to relocate. Restrictions from accessing the park, noted by 1% of respondents, reflect limitations on community movement and resource use. Guarding at night, reported by 1% of respondents, indicating efforts to protect property and crops from wildlife.

Problem Animal Conflicts and frequency of occurrence

Figure 4: Problem animal conflicts and frequency of occurrence



The graph illustrates the frequency and impact of various adverse effects on a community, with data categorized by occurrences ranging from nearly daily to once in three months. The most frequent effects, reported as occurring nearly daily by almost 100% of respondents, include migration of people, poverty, and guarding at night, indicating significant and persistent disruptions. Other notable effects with high nearly daily frequencies are loss of livestock, disease transmission, harassment by park officials, fence destruction, crop raiding, and expenses repairing fences, each affecting approximately 40-50% of respondents. Conversely, property destruction and competition are less frequent, with once every three months and nearly daily being the highest reported frequencies, respectively, but with relatively lower percentages. The loss of human lives is also significant, though less frequent, with around 20% experiencing it nearly daily. These findings underscore the pervasive and severe challenges faced by the community, particularly in terms of economic hardship, security concerns, and frequent disruptions, necessitating comprehensive and urgent interventions to alleviate these persistent issues.

Conflicts and the level of severity

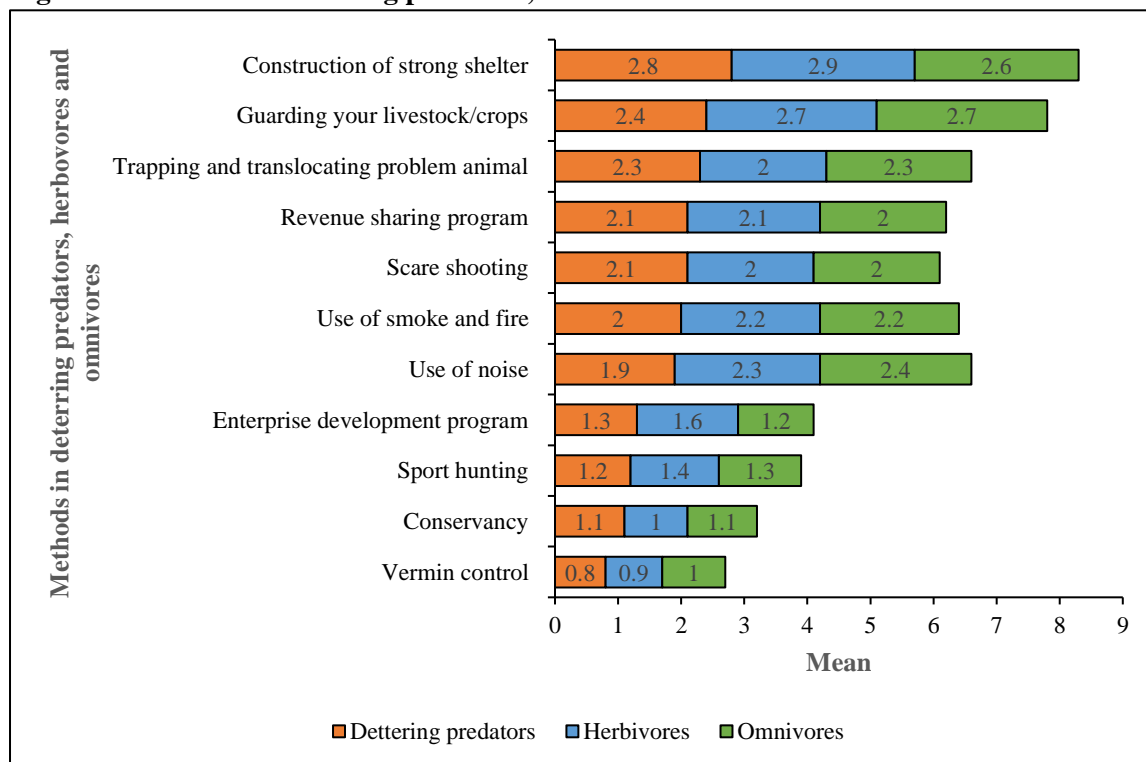
The table presents the severity of various conflicts associated with human-wildlife interactions in Lake Mburu National Park. Loss of lives (n=36) is perceived as very severe by 65.7% of respondents, with 22.9% rating it as severe. Crop raiding (n=84) is also predominantly seen as very severe (56.0%), while poverty (n=23) is rated as very severe by 81.8% of participants. Loss of livestock (n=64) shows a similar trend, with 57.1% categorizing it as very severe. Fence destruction (n=24) is viewed as very severe by 60.9%, and disease transmission (n=26) by 60.0%. Expenses for repairing fences (n=3) are considered very severe by 66.7%, while harassment by park officials (n=9) is rated very severe by 77.8%. Competition for grass (n=26) is overwhelmingly rated as very severe by 96.2%. Property damage (n=7) has 57.1% of respondents rating it as very severe. Guarding at night (n=1) is unanimously considered very severe (100%), whereas migration of people (n=2) is viewed as somewhat severe by all respondents (100%). This data highlights the intense severity of conflicts experienced by the frontline community, necessitating effective mitigation strategies.

Table 1: Conflicts and the level of severity

Conflict	Extremely less severe	Somewhat severe	Severe	Very severe
Loss of lives (n=36)	2.9	8.6	22.9	65.7
Crop raid (n=84)	10.7	17.9	15.5	56.0
Poverty (n=23)	0.0	13.6	4.5	81.8
Loss of livestock (n=64)	15.9	12.7	14.3	57.1
Fence destruction (n=24)	4.3	13.0	21.7	60.9
Disease transmission (n=26)	0.0	20.0	20.0	60.0
Expenses repairing fence (n=3)	0.0	33.3	0.0	66.7
Harassment by park officials (n=9)	0.0	0.0	22.2	77.8
Competition for grass (n=26)	0.0	0.0	3.8	96.2
Property damage (n=7)	14.3	14.3	14.3	57.1
Guarding at night (n=1)	0.0	0.0	0.0	100.0
Migration of people (n=2)	0.0	100.0	0.0	0.0

Effectiveness of the different methods in deterring predators, herbivores, and Omnivores

Figure 5: Methods of deterring predators, herbivores and omnivores



The graph presents the mean effectiveness of various methods used to deter predators, herbivores, and omnivores. The methods evaluated include the construction of strong shelters, guarding livestock/crops, trapping and translocating problem animals, revenue sharing programs, scare shooting, the use of smoke and fire, the use of noise, enterprise development programs, sport hunting, conservancy, and vermin control.

For deterring predators, the most effective method is the construction of strong shelters (mean = 2.8), followed by guarding livestock/crops (2.4) and trapping and translocating problem animals (2.3). The least effective methods for predators are vermin control (0.8), conservancy (1.1), and sport hunting (1.2). For herbivores, the construction of strong shelters is also the most effective (mean = 2.9), followed closely by guarding livestock/crops (2.7) and the use of noise (2.3). The least effective

methods for herbivores are vermin control (0.9), conservancy (1.0), and enterprise development programs (1.6). For omnivores, guarding livestock/crops is the most effective method (mean = 2.7), followed by the construction of strong shelters (2.6) and the use of noise (2.4). The least effective methods for omnivores are conservancy (1.1), enterprise development programs (1.2), and sport hunting (1.3).

Discussions

Nature of problem animal conflicts around Lake Mburo National Park

Problematic animals around Lake Mburo National Park

The data on the percentage distribution of problematic animals contributing to human-wildlife conflicts around Lake Mburo National Park reveals significant insights into the dynamics of these conflicts. The findings indicate that hippos are the most substantial contributors to these conflicts, affecting 76% of respondents. This high percentage could be attributed to the hippos' habitat preferences and behavior. Hippos often live in and around water bodies, which are crucial resources for both wildlife and human communities. Their aggressive nature and tendency to graze on crops near these water sources likely exacerbate conflicts with humans (Utete, 2020; Marowa et al., 2021).

Zebras are the second most significant contributors, affecting 68% of respondents. Zebras, which are herbivores, may venture into agricultural areas in search of food, causing substantial crop damage (Prosper, 2021). Their social behavior and herd dynamics can lead to significant agricultural losses, making them a major concern for local farmers. Buffaloes, affecting 54% of respondents, are also a major source of conflict. Buffaloes are known for their strength and can cause extensive damage to crops and property. Their presence near human settlements can pose a threat to human safety, given their aggressive nature when threatened (Acharya et al., 2016; Torres et al., 2018).

Baboons and hyenas, affecting 50% and 30% of respondents respectively, are notable contributors to human-wildlife conflicts. Baboons are highly adaptable and intelligent animals that can raid crops and homes in search of food (Strum, 2023). Their opportunistic feeding behavior and ability to live close to human settlements make them significant pests (Findlay, 2016). Hyenas, on the other hand, are scavengers and predators that may attack livestock, leading to economic losses for farmers (Mkonyi et al., 2017). Their nocturnal habits can also cause fear and anxiety among local communities. Other problematic animals include waterbucks (29%), leopards (17%), wild pigs (17%), bushbucks (14%), and monkeys (11%). Waterbucks and bushbucks, being herbivores, likely cause conflicts primarily through crop raiding (Raphela, 2019). Leopards and wild pigs pose a threat to livestock and can cause significant economic damage. Monkeys, similar to baboons, can raid crops and homes, adding to the conflict (Matusal et al., 2023).

Warthogs (8%), crocodiles (5%), ticks (3%), elands (3%), crested cranes (2%), and snakes (1%) are reported to have a lesser impact on human-wildlife conflicts. Warthogs, while occasionally raiding crops, do not appear to be as significant a problem as other species. Crocodiles pose a threat primarily in areas near water bodies, but their impact is limited compared to hippos (Marowa et al., 2021). Ticks, elands, crested cranes, and snakes are less frequently reported as problematic, likely due to their less intrusive behaviors or lower populations in conflict areas.

The most significant effect is crop raiding, with 80% of respondents indicating their crops have been affected by wildlife, highlighting a severe threat to agricultural productivity and food security. This is consistent with recent studies that show crop raiding by wildlife, particularly elephants, is a major cause of economic loss for farmers living near protected areas (Gross et al., 2016; Chiyo et al., 2015).

Livestock loss is also a major issue, reported by 61% of respondents, indicating direct impacts on livelihoods as wildlife attacks and kills livestock.

Research has shown that predation by carnivores, such as lions and leopards, significantly affects livestock numbers, leading to substantial economic losses and fostering negative attitudes towards wildlife conservation (Kissui, 2018; Inskip & Zimmermann, 2009).

The loss of human lives, reported by 34% of respondents, is a critical and tragic outcome, emphasizing the need for effective conflict mitigation strategies. Incidents involving dangerous wildlife, such as elephants and large carnivores, can result in fatalities, creating fear and hostility among local communities (Pooley et al., 2017). Disease transmission from wildlife to humans and livestock is noted by 25% of respondents, reflecting health risks associated with living close to wildlife habitats. Zoonotic diseases, such as rabies and bovine tuberculosis, can spread from wildlife to livestock and humans, posing significant public health risks (Holt et al., 2016).

Competition for grass, reported by 25% of respondents, shows conflicts over grazing resources between wildlife and livestock. This is particularly common in areas where domestic livestock and wildlife share the same grazing lands, leading to resource competition and conflicts (Moyo et al., 2017). Fence destruction, affecting 23% of respondents, undermines efforts to contain wildlife and incurs additional repair costs. Wildlife such as elephants can easily damage fences, leading to frequent incursions and significant expenses for repairs (Davies et al., 2021).

Poverty, reported by 22% of respondents, highlights the economic hardship exacerbated by these conflicts. The cumulative effects of crop losses, livestock predation, and repair costs can deepen poverty in affected communities (Barua et al., 2013). Harassment by park officials, noted by 9% of respondents, indicates strained relations requiring better communication and cooperation. This issue often arises from enforcement actions that are perceived as heavy-handed or insensitive to local needs (Anthony, 2007). Property damage, affecting 7% of respondents, extends wildlife

impacts to residential areas. This can include damage to homes and other structures, further compounding the economic losses faced by communities (Madden, 2008). The financial burden of repairing fences, reported by 3% of respondents, underscores ongoing costs to prevent wildlife incursions. These costs can be significant, particularly for poor households (DeMotts & Hoon, 2012).

Migration due to conflicts, reported by 2% of respondents, shows some community members have had to relocate. This can be a drastic measure, indicating severe levels of conflict that disrupt livelihoods and social structures. Restrictions from accessing the park, noted by 1% of respondents, reflect limitations on community movement and resource use. Such restrictions can exacerbate tensions and reduce the benefits communities derive from protected areas (Hulme & Murphree, 2001). Guarding at night, reported by 1% of respondents, is the least common effect, indicating efforts to protect property and crops from wildlife. Night guarding is a common but labor-intensive and risky strategy to mitigate wildlife conflicts (O'Connell-Rodwell et al., 2000).

Conflicts and level of severity

Loss of human lives due to wildlife encounters is a critical concern, with a significant proportion of respondents perceiving it as very severe. This aligns with global findings that emphasize the human toll of such conflicts (Nyhus et al., 2016). Crop raiding by wildlife is a widespread issue, impacting food security and livelihoods. The high percentage perceiving this as very severe reflects its substantial economic impact, corroborated by studies on crop damage by large mammals (Naughton-Treves et al., 2011).

The perception of poverty as very severe underscores how human-wildlife conflicts exacerbate socio-economic vulnerabilities, echoing findings on poverty traps exacerbated by wildlife-induced losses (Bulte et al., 2018). Similar to crop raiding, the loss of livestock is perceived as a significant challenge, affecting

household incomes and agricultural practices (Dickman, 2010). The severity ratings for fence destruction and disease transmission highlight infrastructure vulnerabilities and health risks associated with wildlife interactions, crucial for understanding mitigation strategies (Woodroffe et al., 2014). In addition, the high costs associated with fence maintenance underscore the economic burden on communities, essential for sustainable conflict management strategies (Dickman, 2010).

Perceptions of harassment underscore strained community-conservation relations, highlighting the need for improved governance and participatory management approaches (Graham et al., 2018). More so, intense competition for grass reflects ecological pressures exacerbated by human activities and wildlife foraging behaviors, influencing land-use conflicts (Redpath et al., 2013). The impact of property damage emphasizes the direct losses incurred by individuals, influencing perceptions of wildlife as a threat to personal security and well-being (Dickman, 2010). Further, the unanimous perception of guarding at night as very severe and migration as somewhat severe underscores adaptive behaviors and disruptions to daily life due to wildlife interactions (Woodroffe et al., 2014).

Effectiveness of the different methods in deterring predators, herbivores and Omnivores

The effectiveness of methods for deterring predators varies significantly, with the construction of strong shelters perceived as highly effective, aligning with studies emphasizing the importance of physical barriers in reducing livestock predation (Treves et al., 2016). Guarding livestock and crops through active monitoring and protection is also crucial, supported by research on community-based approaches to predator management (Woodroffe et al., 2005). Trapping and translocating problem animals, while effective, require careful planning to avoid unintended consequences such as increased conflict in translocation areas (Loveridge et al., 2007). In contrast, methods like

vermin control, conservancy initiatives, and sport hunting are viewed as less effective for predator deterrence, raising concerns about their sustainability and long-term efficacy in wildlife management (Redpath et al., 2013). These findings underscore the need for adaptive strategies that integrate ecological insights with community engagement to effectively mitigate human-wildlife conflicts.

Conclusion

Hippos are the most problematic species followed by zebras and buffalos whereas less conflict is caused by Snakes, Crested Cranes, and Elands. Crop raiding is the highest conflict followed by livestock injury and loss, human injury and loss, Transmission of diseases to livestock, Competition for grass, salt and water in the community land and Destruction of property (fences and water dams). People living around Lake Mbuoro National Park predominantly rely on crop growing as their main livelihood type, this is practiced alongside apiary, Poultry, animal husbandry, bricklaying, fishing, businesses.

Communities around Lake Mbuoro National Park employ a wide range of copying strategies while living with problematic animals and these include: banging of drums, guarding property making noise, use of flash lights, making fires, use of scare crows, use of dogs to scare away wild animals, and use of trench for non-jumping wild animals. Guarding their property both day and night, this is very stressful and not sustainable though it's the most effective and efficient copying strategy. Guarding at night is riskier because it exposes the farmers to attacks from wildlife and diseases like malaria and pneumonia.

Recommendations

There is need to prioritize funding of the implementation of a wide range of mitigation measures like fencing and trench excavation in order to minimize problem animal conflicts and reduce the financial burden of compensating victims affected by destructions

The local communities should be trained and involved in implementation and management of these problem animal interventions which will promote shared responsibility in conservation of wildlife

A percentage of revenues from the annual 20% gate collections given to the community and sport hunting funds should be directed to projects that address problem animals' conflicts in the surrounding areas.

The community conservation departments at PA level which directly manage Problem Animal conflicts should be highly equipped and trained with relevant skills in problem animal conflict management, management of problem animal data management and community engagement skills.

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