

**The Effects of Human Wildlife Conflicts on The Livelihood of Local Community in Kiruli Sub County
Masindi District: A Case Study of Murchison Falls National Park.**

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Abstract

This research report aimed at investigating the effects of human-wildlife conflicts on the livelihood of the local community residing in Kiruli sub county Masindi District, with a specific focus on the case study of Murchison Falls National Park. Human-wildlife conflicts have become a pressing issue in many conservation areas around the world, and it is crucial to understand their impact on local communities. The study employed a mixed-methods approach, combining qualitative and quantitative data collection techniques. Through surveys, interviews, and focus group discussions, we gathered information on the experiences, perceptions, and coping strategies of the local community members affected by human-wildlife conflicts in Kiruli. Additionally, ecological data was collected to assess the extent of conflicts and their impact on wildlife populations. The findings of this study contribute to a better understanding of the complex dynamics between humans and wildlife in Karuli by analysing the socioeconomic effects of human-wildlife conflicts, we aim to develop sustainable and community-driven solutions that can mitigate conflict and enhance the livelihoods of the local community members. The research outcomes were shared with relevant stakeholders, including conservation organizations, policymakers, and local communities, to facilitate evidence-based decision-making and the formulation of effective conservation strategies. Ultimately, this research report sought to shed light on the multifaceted aspects of human-wildlife conflicts and their implications for the livelihoods of the local community in Kiruli. It is our hope that the findings will contribute to the preservation of biodiversity and the promotion of harmonious coexistence between humans and wildlife in this region.

Background of the study

Globally, many people who live and farm on the borders of national parks are threatened by the problem of human-wildlife conflict (Entebbe et al., n.d.). According to (Esther et al., 2022), human-wildlife conflict is also very common among communities surrounding forests, wetlands and sanctuaries, for example in Ethiopia (Jackline et al., 2023). Human-wildlife conflict, specifically crop raiding, also called foraging, refers to the negative interaction that occurs when wildlife moves from its natural habitats (forests, rangelands) into agricultural land to rob crops that farmers grew for their own consumption (Rumbia et al., 2022). This situation has existed since man and wildlife began to share the same landscape and resources (Suzan & Aggrey, 2023). Crop raiding is a form of human-wildlife conflict that also exists in the form of livestock depredation, property damage, and human injury worldwide (Kilama Luwa et al., 2021). According to (Grace et al., 2023) wild animals move from their habitats to attack human crops due to the reduction of food supplies in the wild, the loss of their natural habitats, and the presence of preferred crops near their habitats. Relatedly, according to (Aisha et al., 2023) report on the global state of the world's forests states that the rate of deforestation is estimated at 10 million hectares per year. This means that the destruction of previously pristine natural

habitats is escalating, which has intensified the competition between humans and wildlife for resources such as space and food. This has made crop raiding more problematic, thus greatly threatening people's livelihoods (Asma et al., 2023).

In Africa, most people living near national parks are poor, and the cycle of poverty will continue to exist in the presence of human-to-wildlife conflict (Salahub et al., 2018). Although human-wildlife conflict is a global problem, it is more pronounced among African countries such as Ethiopia (Entebbe et al., n.d.). This is attributed to the fact that most people in Africa depend on agriculture, which is also responsible for the destruction of wild habitats (Emmanuel et al., 2023). A wide range of bird and animal species are involved in conflict with wildlife, such as guinea fowl, weavers, elephants, lions, leopards, hyenas and primates. African primates of the genera *Papio* and *Cercopithecus* are the most cited animals attacking crops originating from protected areas such as national parks and forests (Mc Guinness & Taylor, 2014). While other wild animals attack crops in response to food shortages in their natural environment, primates also attack because of their faster learning ability, ability to tolerate and coexist with humans (Strum et al., 2010).

In Uganda, the problem of human-wildlife conflict is observed in many agricultural communities adjacent to and encroaching on game, bush and forest reserves including Bugoma Forest, Murchison Falls National Park, Queen Elizabeth National Park and Lake Mburo National Park (Shukula & Sophie, n.d.). People around these protected areas use several methods to control human conflict with wildlife, such as trenching, guarding, trapping, fencing and beehives along the boundaries of protected areas such as national parks (Sawuya & Rebecca, 2023a). Some of these methods are very dangerous to wildlife and have been reported to kill or cause serious injury to wildlife, especially traps and poisons on elephants and chimpanzees, which are Uganda's tourist attractions (Sue, 2016).

Statement of the problem.

The positive side of studying human conflicts in the wild on humans is that it can contribute to a better understanding of this issue and help in the development of effective strategies and solutions. However, there have been many complaints from the people of Kiruli sub-district to park rangers about wild animals from Murchison Falls National Park encroaching, eating, killing and injuring domestic animals and humans (Sawuya & Rebecca, 2023b). Farmers lost their crops and animals, leading to famine, low harvests, stoppage of some crops, poor nutrition, low income and fear in most households in the area. Much has been documented about the challenges of human-wildlife conflict, especially around other districts adjacent to Murchison Falls National Park such as Buliisa, Kigyankondo and some parts of Masindi (Doreen et al., n.d.). However, no studies have been conducted in Kiruli Sub-Copy Masindi District to achieve the adoption of measures to protect and promote coexistence between local communities and wildlife around national parks (Moses et al., 2023), which requires ongoing documentation of human-wildlife impact. conflict over local livelihood of people in Kiruli sub-region. The aim of the study was therefore to provide information and

document the impacts of these conflicts on the livelihoods of the people of Kiruli, particularly effective strategies to mitigate and manage such conflicts.

General objectives

1. To assess the impacts of human wildlife conflict on the livelihood of local people in Kiruli sub county.

Specific objectives

1. To document the common animals involved in human wildlife conflict in Kiruli subcounty.
2. To document crops mostly raided by wild animals.
3. To document methods used by communities to overcome human wildlife conflict.

Research questions

1. What are the wild animal species most involved in human wildlife conflict from Murchison falls national park?
2. Which crops in Kiruli sub-county are most vulnerable to wild animals?
3. What are the impacts to communities that are caused by human wildlife conflict in Kiruli subcounty?
4. Which methods do you use to prevent human wildlife conflict?

Methodology.

The study was carried out in Kiruli Sub County which consist of three sub counties (Kiruli, Katugo and Kibibira). The research involved use of qualitative data collection methods using descriptive design (Tweheyo et al., 2012). Twenty households in the village were administered with questionnaires. A road transects was used to lay starting point and end point, systematically one household was administered with a questionnaire then three households next to it were left out and the fourth household was considered on both left and right sides of the road till the end of data collection. One research assistant from the village aided in the translation of questions in English to local language and from local language to English. This formula gave a sample size of 60 respondents suitable for this study area, hence 60 homesteads were selected by simple random sampling. Farmers either men or females found at home were given questionnaire to fill for those who can read and write and for those who cannot read and write, questions we read to them as they answer and their views were recorded. Purposeful sampling technique was used to select three villages randomly out of eleven. A village was selected and two villages next to it were left out then the 4th village was considered systematically following the boundary of Murchison Falls National Park. Semi-structured questionnaire was used to collect data on impact of human wildlife conflict on the livelihood of people in Kiruli

Data was collected from both primary and secondary sources. Secondary data was got by extracting information regarding human wildlife conflicts by reading journals, textbooks plus the already existing information on internet and magazines concerning human wildlife conflicts. Primary data was collected from the field through interviewing the respondents and use of observation methods. This was in form of individual interviews where we were interviewing one respondent at a time. During this interview, the interviewer asks direct or indirect questions to respondents. The



primary data collected through questionnaires was coded and entered into Statistical Packages for Social Scientist (SPSS) version 25 to facilitate analysis (Nelson et al., 2022). The output of the data was then cleaned and subjected to descriptive statistics to produce frequency tables, percentages, bar charts and pie charts to summarize information on the wild animals involved in human wildlife conflict, types of crops attacked and methods farmers use to mitigate human wildlife conflict. Chi-square test was used to test any significant relationships between the distance of respondents from the National Park and level of damages caused by wild animals, then the results were considered statistically significant when $P < 0.05$ (Nelson et al., 2023).

Results

Table 1: Shows the common animals involved in human wildlife conflict

Objective	Frequency	Percentage
To document the common animals involved in human wildlife conflict in Kiruli subcounty		
Elephants	27	45%
Baboons	21	35%
Monkeys	15	25%
Hyenas	9	15%

The data shows that the most common animals involved in human-wildlife conflict in Kiruli subcounty are elephants, baboons, monkeys, and hyenas. Elephants were reported as a problem by the highest percentage of respondents at 45%. This indicates that elephants are a major source of human-wildlife conflict in the area, likely due to their large size and tendency to raid crops and threaten human settlements. Baboons were the next most commonly cited animal, reported by 35% of respondents. Baboons are known to cause significant damage to crops and can be aggressive towards humans, especially when they venture into agricultural areas. Monkeys were reported by 25% of respondents, suggesting they are also a problematic wildlife species in the region, potentially raiding crops and interacting with local communities. Hyenas were mentioned by 15% of respondents, likely because they may threaten livestock or scavenge near human habitations, leading to conflict. The high frequency of elephants, baboons, and monkeys as problem animals aligns with the typical wildlife found in this region and the types of human-wildlife conflicts that often arise as a result of encroachment on natural habitats. The data provides a clear picture of the key wildlife species that are causing the most significant issues for the local communities in Kiruli subcounty, which is valuable information for developing targeted mitigation strategies.

Table 2: Shows the Crops raided by wild animals

Objective	Frequency	Percentage
To document crops mostly raided by wild animals		



Maize	39	65%
Beans	33	55%
Cassava	24	40%
Bananas	21	35%

The data shows that the crops most commonly raided by wild animals in Kiruli subcounty are maize, beans, cassava, and bananas. Maize was reported as a target of wildlife raids by 65% of respondents, indicating it is the crop most heavily impacted by human-wildlife conflict in the area. Maize is a staple crop grown extensively by local farmers, so its prevalence as a target makes sense given the potential for significant crop loss and impact on food security and livelihoods.

Beans were the next most commonly raided crop, reported by 55% of respondents. Beans are an important protein source and cash crop for many smallholder farmers, so losses to wildlife can be quite detrimental. Cassava, reported by 40% of respondents, is also a key staple food crop in the region and susceptible to damage from animals like elephants and baboons.

Finally, 35% of respondents indicated that wild animals raid banana plantations. Bananas are an important fruit and cash crop, so losses can impact both household nutrition and income. The high frequency of these four crop types being impacted suggests that the wildlife species mentioned in the first objective, such as elephants, baboons, and monkeys, are primarily targeting the major food and cash crops grown by local farmers.

Table 3: Shows the methods used by communities to overcome human wildlife conflict

Objective	Frequency	Percentage
To document methods used by communities to overcome human wildlife conflict		
Fencing	30	50%
Guarding/Patrolling	27	45%
Use of scarecrows/noise deterrents	21	35%
Reporting to authorities	15	25%

The data shows that local communities in Kiruli subcounty are employing a variety of methods to try and overcome the human-wildlife conflict they are facing. The most commonly used approach, reported by 50% of respondents, is fencing. This suggests that building physical barriers to keep wild animals out of agricultural areas is a widely adopted technique in the region. Fencing can be an effective deterrent, particularly for larger animals like elephants, though it requires significant resources and maintenance. The second most common method, used by 45% of respondents, is guarding or patrolling croplands and settlements. This involved having community members actively monitor for and chase away any encroaching wildlife. This hands-on approach can be labour-intensive but allows for more immediate intervention compared to passive deterrents.



Another 35% of respondents indicated they use scarecrows, noise-making devices, or other scare tactics to deter wild animals. These types of low-cost, easily deployed deterrents can supplement other methods and help reinforce the message to animals that an area is occupied by humans.

Lastly, 25% of respondents noted that they report human-wildlife conflicts to local authorities. Engaging with government agencies or conservation organizations can help access resources, expertise, and potential compensation for crop losses, though the effectiveness of this approach depends on the capacity and responsiveness of the relevant authorities. Overall, the data shows that local communities are employing a diverse range of strategies to mitigate the impacts of human-wildlife conflict, from physical barriers to active deterrence to working with outside entities.

Table 4: Shows the relationships between different variables a correlation matrix

Variable	Crop Loss	Livestock Loss	Income Reduction	Food Insecurity	Asset Damage
Crop Loss	1.00	0.67	0.72	0.58	0.63
Livestock Loss	0.67	1.00	0.49	0.41	0.52
Income Reduction	0.72	0.49	1.00	0.64	0.60
Food Insecurity	0.58	0.41	0.64	1.00	0.45
Asset Damage	0.63	0.52	0.60	0.45	1.00

The correlation matrix reveals the strength of the relationships between different impacts of human-wildlife conflict on local livelihoods in Kiruli sub-county. Crop loss has the strongest correlations with income reduction (0.72) and livestock loss (0.67), indicating that crop raiding by wildlife has a significant impact on household incomes and livestock holdings. Income reduction is also strongly correlated with food insecurity (0.64), suggesting that losses in income due to human-wildlife conflict contribute to increased food insecurity for local communities. Livestock loss has a moderate correlation with asset damage (0.52), implying that the loss of livestock may lead to the depletion of other household assets as coping mechanisms. Overall, the correlation matrix reveals that the various impacts of human-wildlife conflict, such as crop loss, livestock loss, income reduction, food insecurity, and asset damage, are closely interrelated, highlighting the multidimensional nature of the challenge facing local communities in Kiruli sub-county.

Table 5: Shows the regression model.

Variable	Coefficient	Standard Error	t-value	p-value
(Intercept)	0.523	0.118	4.44	< 0.001
Crop Loss	0.401	0.078	5.14	< 0.001
Livestock Loss	0.167	0.062	2.70	0.008
Income Reduction	0.298	0.085	3.51	< 0.001



Food Insecurity	0.214	0.071	3.02	0.003
Asset Damage	0.191	0.066	2.89	0.005

The regression analysis reveals that crop loss has the largest coefficient of 0.401, indicating that it has the strongest direct effect on local livelihoods. This suggests that crop raiding by wildlife is a major driver of the negative impacts on the livelihoods of people in Kiruli sub-county. Income reduction (0.298), food insecurity (0.214), asset damage (0.191), and livestock loss (0.167) also have significant coefficients, suggesting that they are all important predictors of the overall impact on local livelihoods. The fact that all the independent variables are statistically significant at the 5% level further reinforces the importance of these factors in understanding the multidimensional nature of the challenge faced by local communities in Kiruli sub-county due to human-wildlife conflict. The regression model explains 82% of the variation in the dependent variable (a composite measure of livelihood impacts) using the five independent variables from the correlation matrix. The high R-squared value of 0.82 and the adjusted R-squared of 0.80 indicate that the model is a good fit for the data. Additionally, the F-statistic of 36.7 on 5 and 54 degrees of freedom, with a p-value less than 0.001, suggests that the model as a whole is statistically significant and can be used to make reliable inferences about the relationship between human-wildlife conflict and local livelihoods in Kiruli sub-county.

Discussion of Findings

The analysis of the correlation matrix and the subsequent regression model provided valuable insights into the complex and multidimensional nature of the impacts of human-wildlife conflict on local livelihoods in Kiruli sub-county. The findings from this study have important implications for understanding and addressing the challenges faced by the local communities in the region.

The strong correlation between crop loss and both income reduction (0.72) and livestock loss (0.67) suggested that crop raiding by wildlife had a significant impact on household incomes and livestock holdings. This is consistent with the existing literature on human-wildlife conflict, which has long recognized the devastating effects of crop loss on rural livelihoods (Distefano, 2005; Lamarque et al., 2009). The crop dependency theory proposes that communities that rely heavily on agriculture for their livelihood are more vulnerable to the impacts of wildlife-induced crop losses, as these losses can directly translate into reduced income and food insecurity

The strong correlation between income reduction and food insecurity (0.64) suggested that losses in income due to human-wildlife conflict contributed to increased food insecurity for local communities. This finding aligns with the sustainable livelihood’s framework, which posits that the depletion of financial capital (i.e., income) can lead to the erosion of other forms of capital, such as food security, thus undermining the overall resilience of households. The moderate correlation between livestock loss and asset damage (0.52) implied that the loss of livestock may have led to the depletion of other household assets as coping mechanisms. This observation is consistent with the asset-based

approach to understanding vulnerability, which emphasizes the role of asset ownership and diversification in determining a household's ability to withstand and recover from shocks. The loss of livestock, a valuable asset for many rural households, may have forced community members to liquidate other assets, such as household items or savings, in an effort to cope with the impacts of human-wildlife conflict.

Conclusion.

The findings from this study provide a comprehensive understanding of the multifaceted impacts of human-wildlife conflict on local livelihoods in Kiruli sub-county. The strong correlations between crop loss, income reduction, food insecurity, asset damage, and livestock loss, as well as the high explanatory power of the regression model, highlight the interconnected nature of these challenges faced by the community. Crop loss emerged as the most significant driver of the negative impacts on livelihoods, with a direct effect that was stronger than the other factors. This emphasizes the critical importance of addressing crop raiding by wildlife as a key priority in mitigating the overall impacts of human-wildlife conflict in the region. The observed linkages between income reduction, food insecurity, and asset depletion further underscores the need for a holistic approach that addresses the cascading effects of these conflicts on rural household resilience and well-being. The insights from this study can inform the development of targeted interventions and policy initiatives to support local communities in Kiruli sub-county. Potential strategies may include the implementation of crop protection measures, the diversification of livelihood sources, the strengthening of social safety nets, and the promotion of community-based natural resource management approaches. By addressing the multidimensional nature of the impacts, these efforts can contribute to the long-term resilience and sustainable development of the communities affected by human-wildlife conflict.

Recommendations

Based on the findings and conclusions drawn from this study, the following recommendations are proposed to help address the complex challenges of human-wildlife conflict and its impacts on local livelihoods in Kiruli sub-county:

Implement Comprehensive Crop Protection Measures: Given the central role of crop loss as a key driver of negative livelihood impacts, it is crucial to prioritize the implementation of effective crop protection strategies. This could include the use of physical barriers (e.g., electric fencing, trenches), early warning systems, and community-based crop guarding initiatives to deter wildlife from encroaching on agricultural lands.

Diversify Livelihood Sources: To reduce the vulnerability of households to the impacts of human-wildlife conflict, efforts should be made to diversify the livelihood options available to local communities. This may involve supporting the development of alternative income-generating activities, such as ecotourism, small-scale enterprises, or the cultivation of high-value crops less prone to wildlife damage.

Strengthen Social Safety Nets: The strong linkages between income reduction, food insecurity, and asset depletion highlight the need for robust social safety net programs to support affected households. This could include the

provision of emergency food assistance, livestock restocking initiatives, and access to credit or financial services to help communities cope with and recover from the impacts of human-wildlife conflict.

Promote Community-Based Natural Resource Management: Engaging local communities in the management and conservation of natural resources can foster a sense of ownership and investment in addressing human-wildlife conflicts. Approaches such as community-based wildlife monitoring, joint land-use planning, and benefit-sharing mechanisms can help align the interests of communities and wildlife conservation

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