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Assessment of Community Capacity Building and Recovery of the Hirola Antelope in Ijara Sub-County, Garrissa County, Kenya

Mohamed Yassin[1*], Ahmed M. Mohamed[1], Sitati Isiah[2] & Ali Abdullahi[3]
[1*]Masters Student, Department of Mathematics and Natural Sciences, Garissa University, Kenya
[1]Professor, Department of Mathematics and Natural Sciences & Institute of Peace and Security Studies, Garissa University, Kenya
[2]Senior Lecturer, Department of Mathematics and Natural Sciences, Garissa University, Kenya
[3]Researcher, National Museums of Kenya (NMK)

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Abstract

Purpose: This study aimed at establishing the role of community capacity building in the recovery of the hirola antelope.

Materials and Methods: A Pragmatic research design was used to assess how community capacity building in the recovery of the hirola antelope. A total of 357 respondents were targeted by this study. A chi-square test was done to establish the effect of community capacity building for conservation and the recovery of endangered Hirola antelope. Moreover, logistic regression was used to establish the relationship between community capacity building and the recovery of the hirola antelope. The collected data was presented in form of Figures and Tables.

Findings: Half (55.5%) of the respondents reported coexisting harmoniously between the community and the Hirola in the area. Similarly, half (52.4%) of the respondents reported a high extent of Hirola poaching cases in the area. Half (52.70%) of the respondents reported a high extent of the conservancy engaging in education on wildlife conservation. Moreover, the results revealed a statistically significant relationship between Harmonious co-existence between the community, predation on Hirola, Hirola poaching cases, the extent of low deforestation, capacity building, awareness creation on community conservation and sensitization and awareness on anti-poaching and Hirola recovery (p=<0.05). In addition the study observed harmonious coexistence (COR= 2.66, C.I= 1.151-6.188, p-value = 0.022), predation of hirola (COR= 4.31, C.I= 1.277-14.567, p-value = 0.019), hirola poaching cases (COR= 3.205, C.I= 1.091-9.416, p-value = 0.034), extent of deforestation (COR= 2.46, C.I= 0.995-6.105, p-value = 0.050), awareness creation on community conservation approaches (COR= 1.764, C.I= 1.124-2.769, p-value=0.014) and sensitization and awareness on antipoaching (COR= 1.764, C.I= 1.124-2.769, p-value=0.014) were significantly associated with the recovery of the hirola antelope.

Implications to Theory, Practice and Policy: The decline of the Hirola antelope population is attributed to a complex interplay of factors including disease, habitat loss, and predation, exacerbated by increased tree cover that diminishes their grazing space and heightens predation risks. However, community capacity building showed a significant association with the recovery of the endangered hirola antelopes. Policy implications of these findings necessitate multifaceted conservation strategies such as reducing tree encroachment through controlled deforestation, enhancing habitat management to maintain open grazing areas, and implementing comprehensive disease monitoring to prevent outbreaks. Additionally, community-based conservation efforts, such as anti-poaching initiatives and local capacity building, which have shown effectiveness should be sustained and expanded. Policymakers must prioritize integrated approaches that address both ecological and socio-economic dimensions to ensure the long-term recovery and survival of Hirola antelopes.

Keywords: *Community Capacity Building, Hirola Antelope, Endangered Wildlife, Community Conservation, Predation, Deforestation, Hirola Conservation*

JEL Codes: Q57; Q23; Q24; Q28; Q56.

1.0 INTRODUCTION

Endangered wildlife faces numerous threats worldwide, including habitat destruction, poaching, and climate change, necessitating concerted conservation efforts. Community capacity building is a pivotal strategy, enhancing local communities' ability to address conservation challenges effectively (Bosworth et al., 2016). In wildlife conservation, this involves empowering communities to actively participate in protecting endangered species and their habitats, fostering a sense of ownership and responsibility (Wondirad & Ewnetu, 2019). Measures such as property zoning, community involvement, and range rehabilitation are crucial. For instance, the CAMPFIRE program in Zimbabwe demonstrated that empowering local committees to manage wildlife significantly reduced poaching and enhanced sustainable conservation practices (Mazambani & Dembetembe, 2010).

A study by Lee and Bond (2018) demonstrated the short-term ecological success of a community-based wildlife conservation area in Tanzania, showing higher densities of resident wildlife and lower densities of cattle compared to a control site. The study emphasizes the necessity of ongoing participatory monitoring to evaluate management decisions and ensure long-term success. Integrating local communities in the conservation of endangered species, such as the Hirola antelope, is crucial in developing countries where government resources are limited (Ali et al., 2019). Community engagement not only enhances long-term sustainability but also supports the free movement and protection of endangered species within their natural habitats (Ali et al., 2019).

Hirola antelopes are selective grazers that prefer short, freshly sprouted grass (Hirola Conservancy Program, 2020). However, increasing livestock populations, crucial for the livelihoods of the Somali people, have led the local community to reject proposals to reduce livestock herds in favor of Hirola conservation (Ali et al., 2019). Studies show a significant relationship between controlled grazing and the successful conservation of Hirola (Omar & Ahmed, 2017; Science, 2015). Additionally, human-wildlife conflict, which undermines conservation efforts and reduces wildlife survival, necessitates proper management to balance conservation and community livelihoods (IUCN, 2022).

Plate 1: Hirola (Beatragus Hunter) Antelope

Source: KWS, 2021

Jones (2015) highlighted the importance of enhancing community capacity, especially the ability to demand rights from governments, for the success of community conservation

approaches. In Tanzania, participatory forestry management has led to reduced unsustainable harvesting, decreased agricultural encroachment, and increased wildlife populations (Binot et al., 2009). Similarly, the Naibung'a Wildlife Conservancy in Laikipia County, Kenya, has shown that community-based conservation initiatives, such as land zoning, capacity building, and range rehabilitation, have improved the security of wildlife, people, and livestock (Mureithi et al., 2019).

Problem Statement

Hirola (*Beatragus hunter*), the world's rarest and most endangered antelope, endemic to the arid woodlands and savannahs of the Kenya-Somali border, has experienced drastic population declines over the past 40 years. Historical estimates show a reduction from 13,700 in the 1970s to only 497 individuals by 2020, with just 150 within the fenced Ishaqbini Conservancy in Garissa County (Watson et al., 1973; Bunderson, 1976; Butynski, 2000; NRT, 2020; Kenya Wildlife Service, 2021). Factors contributing to this decline include disease, habitat loss, poaching, overgrazing by domestic animals, human settlements, predation, and stress from predation events (Ali et al., 2018). Hirola's preference for open grazing areas and specific grass types, combined with their daytime sleeping habits, further exposes them to predation, compounding their vulnerability (Kimiti et al., 2017; Kings et al., 2014).

Efforts to mitigate human-wildlife conflicts and promote Hirola conservation have led to the implementation of community-based conservation (CBC) strategies, particularly through collaborations between the Northern Rangelands Trust (NRT) and the Ishaqbini Community since 2005. Supported by Corporate Social Responsibility (CSR) initiatives and the Kenya Wildlife Service (KWS), these efforts aim to build local capacity for Hirola recovery. However, the effectiveness of CBC in reversing Hirola population declines remains unclear. Critics argue that CBC often idealizes community unity, faces implementation challenges, and may conflict with conservation goals when commercializing resources. Consequently, there wass a need for more focused research on CBC approaches and their impact on the recovery of the critically endangered Hirola antelope (Beatragus hunter) to ensure these strategies effectively contribute to wildlife conservation.

2.0 LITERATURE REVIEW

According to studies, property zoning, community involvement, and range rehabilitation are crucial community conservation measures. Mazambani and Dembetembe (2010) discovered that the CAMPFIRE program in Zimbabwe assisted in the development of reliable institutions in the wildlife producer wards beneath the level of Rural District Councils. The ward CAMPFIRE committees were given the authority to implement wildlife management regulations through resource monitors and game guards, to count wildlife and keep an eye on hunting activities, to take steps to mitigate problem animals, and to ensure a decrease in wildfires. The study found that poaching significantly decreased as a result of producer groups' empowerment and the advantages communities derived from wildlife.

In a study by Lee and Bond (2018), the ecological success of a community-based wildlife conservation area in Tanzania was quantified. They found that, compared to the control site, there were significantly higher densities of resident wildlife (giraffes and dik-diks) and lower densities of cattle, indicating short-term ecological success. According to the study, ongoing monitoring is necessary to assess management choices and determine longer-term consequences in order to maintain success. According to Jones (2015), who focused on the causes of both the successes and failures of community conservation approaches, more

attention needs to be paid to developing community capacity, particularly the capacity of communities to demand rights from governments in addition to conservation, in order to establish those conditions. In Tanzania, according to Binot et al. (2009), the benefits of participatory forestry management included a decrease in uncontrolled and unsustainable levels of harvesting (such as logging, the production of charcoal, and the hunting of game), a decrease in the encroachment of agricultural land into forest areas, and an increase in the numbers of game and wildlife species. By using the example of the Naibung'a Wildlife Conservancy in Laikipia County, the study by Mureithi et al. (2019) examined the community-based conservation initiatives taking place in northern Kenya. It showed how conservancies have improved the security of wildlife, people, and their livestock through land zoning, community capacity building, and range rehabilitation.

3.0 METHODOLOGY

Description of the Study Area

The study was carried out in Ijara, Garissa County, Kenya. The Ishaqbini Hirola Community Conservancy, which is situated on a 19,000-hectare parcel of land in the Ijara area of Northeast Kenya, was the site of the study. In Garissa County, it can be found between latitudes 10°C and 34°C degrees South. The Hirola antelope, which is critically endangered, was the focus of the conservancy's creation. About 3,500 Somali pastoralists who live in the area own and run the Conservancy.

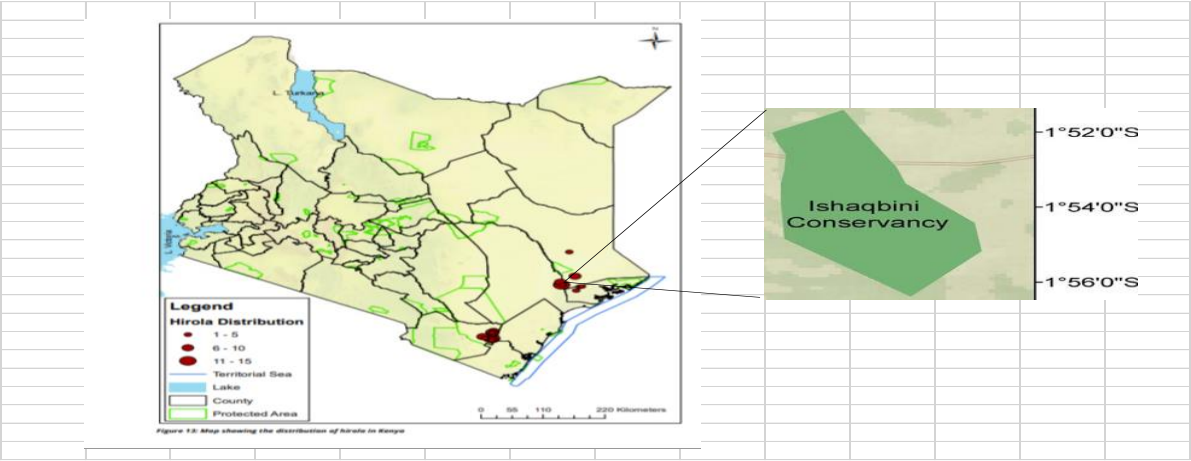

Figure 1: Map of the Study Site

Source: NRT, 2021

Sample Size and Sampling

The sample size was calculated using Yamane formula. $n = N / 1 + N (e^2)$

Where: n is the sample size; N is the target population (3,570) and e is the error term (5%)

Replacing the values in the formula, the sample size for the community households therefore becomes: $= 3570 / 1 + 3570 (0.05^2) = 360$.

The sample size of 360 was targeted from the community households surrounding Ishaqbini conservancy addition to Community Trustees managing Ishaqbini Conservancy, employees of Ishaqbini Conservancy and Community Scouts. The community members were sampled through a simple random sampling procedure. However, the study was able to attain 357 of the sample sizes at the end of the study.

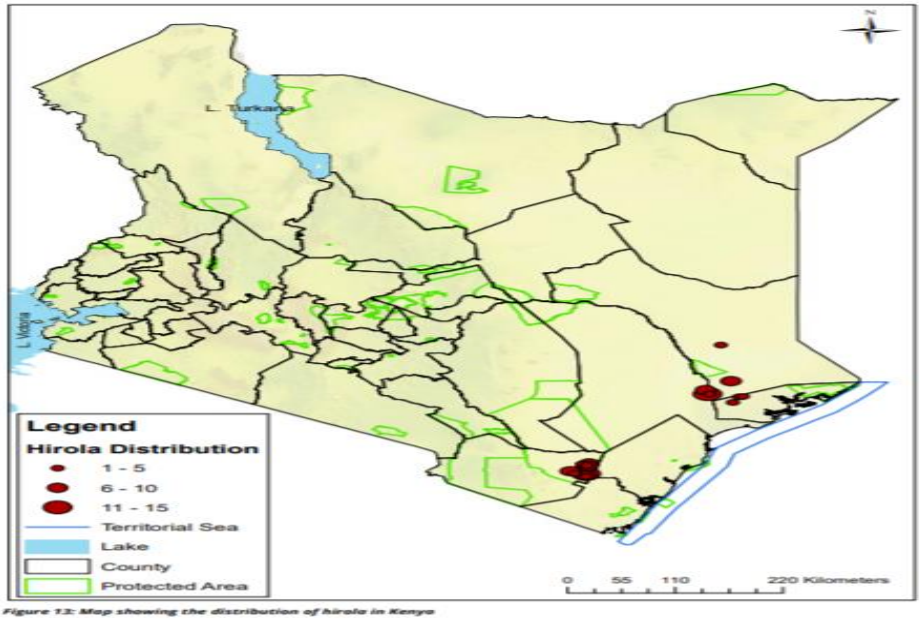

Figure 2: Map Showing Distribution of Hirola in Kenya

Source: KWS, 2021

Data Collection

A questionnaire was used in this study as the instrument to collect quantitative data. Both closed-ended and open-ended questions were included in the questionnaire's layout. The questionnaire instrument was ideal for this study because it picked measurements on observations, feelings, values and behaviour of subjects. The Likert scale was the appropriate scale to be used in this study- which rates the subjective components of the research (Nayak et al. 2021).

Data Analysis

Statistical package for social sciences (SPSS) version 24 was used for quantitative data analysis. Both descriptive and inferential statistics were used. The descriptive statistics used frequencies and percentages. A chi-square test was done to establish how to establish the effect of community capacity building for conservation on the recovery of endangered Hirola antelope in Ijara Sub- County, Garissa County. Moreover, logistic regression was used to ascertain the direction and the strength of the associations between community capacity building and the recovery of endangered hirola antelope.

Ethical Clearance

Authority to conduct the study was granted by Garissa University post-graduate directorate. Further, Permission to conduct the research was granted by the National Commission for Science, Technology and Innovation (NACOSTI) and County Commissioner of Garissa. Moreover, Permission to conduct the study was obtained from Garissa County Government. At the household level the area chief was informed about the study. Permission was also sought from the management of the Ishaqbini-Hirola conservancy. At the individual level informed signed or thumb print consent was granted by the respondents. Confidentiality was assured before carrying out the research.

While carrying out the study, ethical issues were considered. The study specifically guaranteed respondents' confidentiality and anonymity. The research tools won't include their names.

Before providing their comments, the respondents were also requested for their permission. Additionally, it was respected if they chose to stop participating in the study at any time. The material will only be utilized for academic purposes; the researcher treated this as strictly an academic activity.

4.0 FINDINGS

Community Capacity Building for Recovery of Hirola Antelope

Half (55.5%) of the respondents reported coexisting harmoniously between the community and the Hirola in the area (Table 1). Conversely, Human wildlife conflict among the Northern Rangelands Trust conservancies in Kenya is high affecting over three-quarters of the households (Northern rangelands trust State of Conservancies Report 2020). Human-wildlife conflict is of great concern in the Maasai Mara ecosystem in Kenya (Otiego & Odhiambo, 2023). Similarly, half (52.4%) of the respondents reported a high extent of Hirola poaching cases in the area. Similarly, half of the respondents reported a high extent of Hirola poaching cases in the area. Increased predation has been speculated to be a cause for the extinction of Hirola antelope (Probert et al., 2015).

Table 1: Community Capacity Building on Conservation of Endangered Hirola

Community capacity building	**N=357**	
	N	**%**
Harmonious co-existence between the community and Hirola in the area		
Low		
High	198	**55.5**
Predation on Hirola	159	44.5
Low		
High	198	55.5
Hirola poaching cases	159	44.5
Low		
High	170	47.6
Death of Hirola through diseases	187	52.4
Low		
High	331	92.7
Extent of deforestation	26	7.3
Low		
High	233	**65.3**
Extent of and overgrazing	124	34.7
Low		
High	169	47.3
Community capacity building and awareness creation on community conservation approaches	188	52.7
Low		47.3
High	169	52.7
Conservancy engaged in sensitization and awareness of wildlife conservation	188	
Low		
High		57.4
Sensitization and awareness of anti-poaching	205	42.6
Low	152	
High		55.2
Training on rural development and livelihoods	197	44.8
Low	160	
High		65
	232	35
	125	

Notably, about three-quarters (65.3%) of the respondents reported a low extent of deforestation in the area (Table 1). Diminishing rangeland has been speculated to be the cause of the extinction of the Hirola antelope (Probert et al., 2015). Moreover, the current study found that 52.7% of the respondents reported a high extent of overgrazing in the area. Similarly, overgrazing has led to the destruction and degradation of rangeland in many parts of Africa (Ali, 2016; Hanke et al., 2014). Grass abundance has been diminishing in the Ijara Sub-county range land due to high livestock grazing (Ali et al., 2019).

Additionally, half (52.7%) of the respondents reported that conservancy engaged in community capacity building and awareness creation on community conservation approaches to a high extent (Table 1). Integration of local communities in the conservation of endangered species such as the Hirola antelope is pivotal in developing countries since governments lack enough resources to implement such conservation beyond the protected zones (Ali et al., 2019). furthermore, engagement from the local communities enhances long-term sustainability and allows free movement and protection of the endangered species in their natural range (Ali et al., 2019). On the other hand, 57.4% of the respondents reported that the conservancy engaged in Sensitization and awareness of wildlife conservation to a low extent (Table 1). In Uganda through the Uganda Wildlife Authority (UWA), Community education and engagement have been important in awareness creation and subsequently lead to wildlife conservation (Hangi, 2023). Local communities' perceptions and opinions have been found to positively influence the conservancies (Campbell et al., 2010; Larijani & Yeshodhara, 2008). Therefore, conservancies led by the local communities are successful (Ingram et al., 2012; Sebele, 2010). Half (52.70%) of the respondents reported a high extent of the conservancy engaging in education on wildlife conservation (Figure 2).

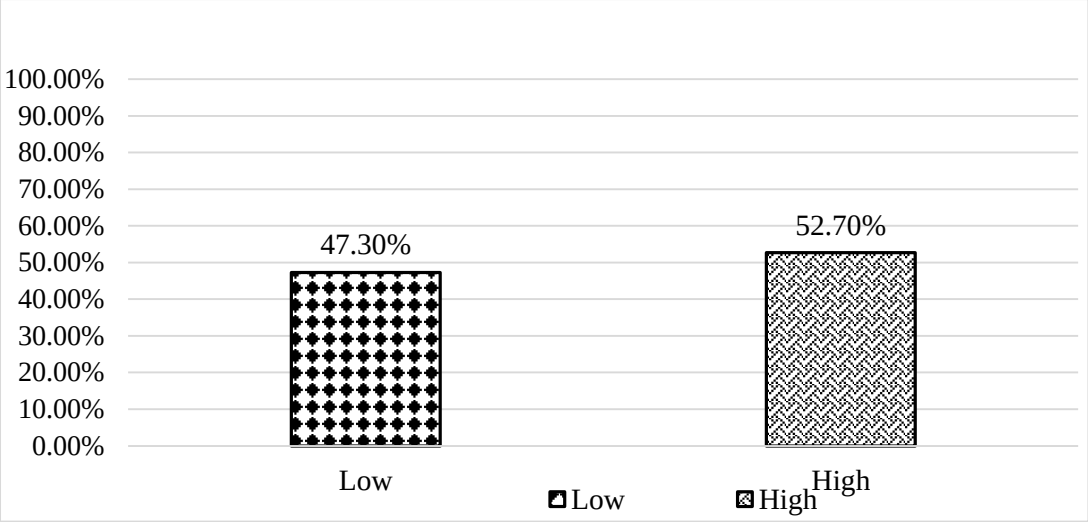

Figure 3: Education on Wildlife Conservation

Source: Field Data, 2024

Furthermore, education on wildlife conservation is crucial since the local communities understand the opportunities such as habitat regeneration, nutrient cycling and seed dispersals (Torres et al., 2018). Nevertheless, education alone will not translate into behavioral change and therefore more needs to be done (Passoni et al., 2023).

Relationship between Community Capacity Building and Recovery of Endangered Hirola Antelopes

A Chi-square test of independence was conducted to establish the relationship between community capacity building and recovery of endangered Hirola antelopes. The result revealed a statistically significant relationship between Harmonious co-existence between the community and Hirola and Hirola recovery (P = 0.013) (Table 2). This was consistent with a study conducted in Kenya where overgrazing by livestock reduced the population of Hirola antelopes through competition of the grass (Ali et al., 2019). Moreover, Hirolas are grazers which exhibit selective feeding traits and feed on grass which is short and freshly sprouted (Hirola conservancy program, 2020). It's notable that the livestock has been increasing over the years and serves as a key livelihood for the Somali people. Notably, the local community declined a proposal to reduce the livestock herd in favor of the Hirola antelopes (Ali et al., 2019). There was a significant relationship between controlled grazing and Hirola conservation (Omar & Ahmed, 2017; Science, 2015). According to an issue brief by IUCN (2022), human-wildlife conflict undermines conservation efforts and therefore reduces wildlife survival. Moreover, it leads to the destruction of livelihoods and proper management is imperative in solving the impasse.

Additionally, there was a significant relationship between predation on Hirola and recovery (P = 0.005) (Table 2). Similarly, the Participation of the local communities in Kavango Zambezi has enabled the conservation of lions by stopping retaliatory killings allowing the remaining population of lions to recover (Hanssen et al., 2020). Likewise, according to Mullin et al. (2020), predation was found to significantly affect the population recovery of the endangered freshwater turtle. Moreover, there was a significant relationship between Hirola poaching cases and the recovery of Hirola antelopes (P = 0.017) (Table 2). This was in agreement with a study conducted in Kenya which showed that poaching of the Hirola antelopes reduced their population (Ali et al., 2019). However, there was no significant relationship between the death of Hirola through diseases and the recovery of Hirola antelopes (P = 0.288) (Table 2). This was in agreement with a study that did not regard infectious diseases as a significant driver of wildlife reduction (Smith et al., 2006).

Table 2: Relationship between Community Capacity Building and Recovery of Endangered Hirola Antelopes

Community capacity building	N=357	Low	High	$\chi 2$ P value
Harmonious co-existence between the community and Hirola	Increasing slowly Increasing faster	37 (15.1) 7 (6.3)	208 (84.9) 105 (93.8)	0.013*
Predation on Hirola	Increasing slowly Increasing faster	219 (89.4) 109 (97.3)	26 (10.6) 3 (2.7)	0.005*
Hirola poaching cases	Increasing slowly Increasing faster	219 (89.4) 108 (96.4)	26 (10.6) 4 (3.6)	0.017*
Death of Hirola through diseases	Increasing slowly Increasing faster	236 (96.3) 105 (93.8)	9 (3.7) 7 (6.3)	0.288
Extent of deforestation	Increasing slowly Increasing faster	215(87.8) 106 (94.6)	30 (12.2) 6 (6.3)	0.035*
Extent of and overgrazing	Increasing slowly Increasing faster	211 (86.1) 104 (92.9)	34 (13.9) 8 (7.1)	0.056
capacity building and awareness creation on community conservation	Increasing slowly Increasing faster	146 (59.6) 51 (45.5)	99 (40.4) 61 (54.5)	0.013*
Conservancy engaged in Sensitization and awareness of wildlife conservation	Increasing slowly Increasing faster	118 (48.2) 51 (45.5)	127 (51.8) 61 (54.5)	0.644
Sensitization and awareness of anti-poaching Education on wildlife conservation	Increasing slowly Increasing faster	146 (59.6) 51 (45.5)	99 (40.4) 61 (54.5)	0.013*
Training on rural dev and livelihoods	Increasing slowly Increasing faster	118 (48.2) 51 (45.5)	127 (51.8) 61 (54.5)	0.644
	Increasing slowly Increasing faster	165 (67.3) 67 (59.8)	80 (32.7) 45 (40.2)	0.169

*Significant at $p \leq 0.05$

Conversely, diseases such as rinderpest have been attributed to the reduction of Hirola antelopes over a long period (Ali et al., 2019; Mariner et al., 2012). Emerging infectious diseases have been on the rise among wildlife and humans. Lack of knowledge on pathogens

causing diseases among wildlife can result in local and even global extinction of wildlife (Smith et al., 2009).

The current study also found out the extent of low deforestation had a significant relationship with the recovery of Hirola antelopes (P = 0.035) (Table 2). Encroachment by trees has also contributed to the reduction of the Hirola antelope population. This is due to the fact that the tree cover provides a hiding area for the predators and since they are selective grazers there is a loss of space and food (Ali et al., 2019; Hirola conservancy program, 2020). Tree cover in the Hirola habitat increased by 251% between 1985 and 2012 which in turn led to a reduction in the Hirola population (Ali et al., 2017; Dasgupta, 2017). The sharp decrease in the species is due to a combination of factors such as disease, habitat loss, poaching, over grazing by domestic animals and human settlements and predation and stress and shock when one is killed through predation (Ali et al. 2018). The antelope also grazes in an open environment, since there is a certain favorite type of grass it likes and it doesn't like bushy areas and these exposes and makes it susceptible to attacks (Kimiti et al. 2017).

Furthermore, the antelope sleeps for longer periods during the day after grazing further exposes it and makes it susceptible to predation. As a result, these unique characteristics expose the antelope to predation and hence its population is gradually reducing (Kings et al., 2014). Moreover, as noticed through the GPS collars attached to female Hirola antelopes, the animals completely avoided the cover of the trees all year round (Ali et al., 2017; Dasgupta, 2017). therefore, there is a high likelihood that increased tree cover led to the reduction of the Hirola antelopes. on the other hand, in Tsavo Kenya reduction of the trees through charcoal burning for income generation has led to the reduction of some mammals such as elephants and giraffes (Tsavo trust, 2023). Furthermore, there was a significant relationship between capacity building, awareness creation on community conservation and sensitization and awareness on anti-poaching and Hirola recovery respectively (P = 0.013; P = 0.013) (Table 2). Through community engagement of the scouts, the poaching of the Hirola antelopes as well as other species has been reduced in the conservancy. notably antipoaching has to be an ongoing strategy since it is still frequent (Hirola conservancy program, 2020).

Plate 2: Ishaqbini-Hirola Community Conservancy in Annual General Meeting Yr. 2023

An odds ratio was done to establish the direction of the relationship among the community capacity building variables that were found to be significant. The current study found that when the predation of Hirola was low extent, the Hirola antelopes were 4.31 times more likely to increase faster as compared to increasing slowly (Table 3).

Table 3: Relationship between Predation of Hirola and Recovery of Endangered Hirola Antelopes

					95% Confidence Interval for Exp(B)	
Population	**Binary**	**B**	**p-value**	**COR**	**Lower Bound**	**Upper Bound**
Increasing faster	Predation on Hirola	1.462	.019	4.314	1.277	14.567
	Predation on Hirola	0[b]	.	.	.	.
	Hirola poaching cases	1.165	.034	3.205	1.091	9.416
	Hirola poaching cases	0[b]	.	.	.	.
	Extent of deforestation	.902	.050	2.46	.995	6.105
	Extent of deforestation	0[b]	.	.	.	

a. The reference category is: increasing slowly.
b. This parameter is set to zero because it is redundant.

Moreover, when the Hirola poaching cases were at a low extent, the Hirola antelopes were 3.20 times more likely to increase faster as compared to increasing slowly (Table 3). The current study notes that when Hirola predation and Hirola poaching were done at a low extent the population of the endangered Hirola antelope were likely to increase faster. This implies that predation and poaching play a significant role in population growth as well as the reduction of the Hirola antelopes. Additionally, when deforestation was done at a low extent, the Hirola antelopes were 2.46 times more likely to increase faster as compared to increasing slowly (Table 3). It's worth noting to our knowledge that there were no studies done to show the odds between community capacity building and the recovery of hirola antelopes. The regression results showed that when there was a harmonious co-existence between the community and Hirola in the area to a low extent, the Hirola antelopes were 2.66 times more likely to increase slowly as compared to increasing faster (Table 4).

Table 4: Relationship between Community Capacity Building and Awareness Creation on Community Conservation Approaches and Recovery of Endangered Hirola Antelopes

					95% Confidence Interval for Exp(B)	
Population	**Binary**	**B**	**p-value**	**COR**	**Lower Bound**	**Upper Bound**
Increasing slowly	Harmonious co-existence between the community and hirola in the area	.981	.022	2.668	1.151	6.188
	Harmonious co-existence between the community and hirola in the area	0[b]	.	.	.	.
	Community capacity building and awareness creation on community conservation approaches	.568	.014	1.764	1.124	2.769
	Community capacity building and awareness creation on community conservation approaches	0[b]	.	.	.	.
	Sensitization and awareness of anti-poaching	.568	.014	1.764	1.124	2.769
	Sensitization and awareness of anti-poaching	0[b]	.	.	.	.

a. The reference category is: increasing faster.
b. This parameter is set to zero because it is redundant.

Furthermore, when community capacity building and awareness creation on community conservation approaches were done at low extent, the Hirola antelopes were 1.76 times more likely to increase slowly as compared to increasing faster (Table 4). Community capacity building is a strong pillar in the conservation and recovery of wildlife. An odds ratio was conducted to establish the Relationship between the predation of Hirola and the recovery of endangered Hirola antelopes. The current study also found that when sensitization and awareness on anti-poaching were done at a low extent, the Hirola antelopes were 1.76 times more likely to increase slowly as compared to increasing faster (Table 4). This shows the importance of sensitization and awareness towards the recovery of endangered species. Its worth noting to our knowledge that there were no studies done to show the odds between community capacity building and the recovery of hirola antelopes.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusions

This study provides an overview of the potential of community capacity building in the recovery of the endangered hirola antelopes. The findings have demonstrated that community capacity building can be used to help recover and restore the diminishing population of the hirola antelopes in Ijara. Notably, eendangered wildlife confronts a myriad of challenges that threaten their survival. Habitat loss, primarily driven by human activities such as deforestation

and urbanization, remains one of the most significant threats. Additionally, illegal poaching for the wildlife trade, poses a grave threat to many species. Furthermore, the impacts of climate change, including rising temperatures and habitat fragmentation, further exacerbate the vulnerability of endangered wildlife. Utilization of community capacity building is therefore imperative in the success of hirola recovery.

Recommendations

Policy implications of these findings necessitate multifaceted conservation strategies such as reducing tree encroachment through controlled deforestation, enhancing habitat management to maintain open grazing areas, and implementing comprehensive disease monitoring to prevent outbreaks. Additionally, community-based conservation efforts, such as anti-poaching initiatives and local capacity building, which have shown effectiveness should be sustained and expanded. Policymakers must prioritize integrated approaches that address both ecological and socio-economic dimensions to ensure the long-term recovery and survival of Hirola antelopes.

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Authors' Contributions

Mohammed Yassin designed the study, performed the statistical analysis and drafting the manuscript. Ahmed M. Mohamed, Isaiah Sitati and Abdullahi Ali participated in the study design. All authors contributed to the data analysis, read and approved the final manuscript.

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Competing Interests

The authors declare to have no conflict of interest.

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