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# Land Use Changes and Human-Wildlife Conflict in Kajiado County, Kenya

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## ABSTRACT

**Purpose:** The broad objective of the study was to assess the effect of Land Use Changes on Human Wildlife Conflict in Kajiado County, Kenya. The specific land use changes that was focused on comprised of settlement pattern changes and agricultural expansion.

**Methodology:** The Land Tenure Theory and Habitat Suitability Theory anchored the study. The study used descriptive design targeting the local community representatives, farmers and pastoralists, wildlife rangers and officers, community leaders, Government and County Officials and Wildlife Conservation Organizations. In total, the target population comprised of 2419 respondents. A stratification of the population was done to enhance sampling while random sampling was applied to identify the specific respondents from ach stratum. A sample size of 343 respondents was determined using Cochran's formula. A combination of structured questionnaires and semi structured interview guides were employed to gather both quantitative and qualitative data. Quantitative data was analyzed using mean and standard deviation and Pearson Correlation Coefficient for inferential analysis. Qualitative data was analyzed using thematic analysis. The results of the analysis were displayed in form of tables and figures.

**Findings:** The study established that land use changes comprising of settlement pattern changes and agricultural expansion positively and significantly affect human wildlife conflict in Kajiado County. This was depicted by beta values of 0.538 and 0.411. The study concluded that increase in the land use changes increases animal wildlife conflicts in Kajiado County.

**Unique Contribution to Theory, Practice and Policy:** The study recommends regulating settlement patterns, and implementing wildlife friendly farming to minimize human wildlife conflicts in Kajiado County.

**Key Words:** *Land Use Changes, Human Wildlife Conflict, Settlement Pattern Changes, Agricultural Expansion*

**Background of the Study**

Globally, conflicts between human versus wildlife is becoming a bigger issue, especially when human activity and wildlife habitats collide. This conflict occurs when wildlife kills livestock, ruins crops, or endangers human safety, resulting in financial losses and a rise in poverty (World Bank Group, 2023). Such conflicts often occur near protected areas or along migration routes, where agricultural activities and settlements expand into traditional wildlife territories. The negative socio economic impacts of these conflicts can influence community perceptions of wildlife, leading to retaliatory killings and reduced support for conservation efforts (Dickman & Hazzah, 2016). Globally, HWC takes different forms depending on the region. In India, habitat degradation has pushed Asian elephants into human settlements, causing frequent and sometimes fatal conflicts. Over 500 people and 100 elephants die annually due to human wildlife encounters, exacerbated by poaching, poisoning, and habitat destruction (Anoop, Krishnan, & Ganesh, 2023; Krishnan, Rao & Hegde, 2022). In Europe, the resurgence of large carnivores such as wolves has sparked disputes among conservationists, hunters, and farmers, necessitating strategic management approaches (Grossmann, Patkó et al., 2020; Trouwborst, 2018). These conflicts highlight the complexity of balancing wildlife conservation with human livelihoods.

Significant HWC occurs in Africa, where many human and animal losses are documented each year. This is a critical ecological and conservation concern since conflicts have intensified as a result of human settlements and agricultural practices expanding into animal regions (Sayantani, Rostovskaya et al., 2023; Ifaw, 2024). Wildlife predation and crop devastation in Zimbabwe cause financial losses for people, which in turn leads to retaliatory killings that jeopardize conservation efforts (USAID, 2022; World Wildlife Fund, 2022). Similarly, in Ethiopia, efforts to reduce HWC have been made more difficult by restricted protected area rules that have exacerbated unfavorable opinions about animal conservation (Mekonen, 2020; Esayas et al., 2024; Biset et al., 2019).Over time, HWC has increased in Kenya, especially in places close to protected areas. Wildlife intrusions frequently result in property damage, injuries, and mortality for local residents, which heightens opposition to conservation efforts (Kahumburu & Ochieng, 2023). Retaliatory deaths of wildlife, which endanger biodiversity and conservation efforts, worsen the problem. Furthermore, certain species are in danger of going extinct due to economic considerations like poaching for financial gain (Gathua, 2022). To combat HWC in Kenya, a comprehensive approach that balances conservation with the needs of affected populations is required. In the southern part of Kajiado Sub County, environmental problems like pasture and water scarcity have led to a very high incidence of HWC. Poor agricultural yields, financial losses, and animal and human deaths have been caused by wildlife encroachment into farmlands (Kutatoi & Waweru, 2017). Finding long-term solutions to disputes becomes crucial as they intensify in order to protect animal populations and livelihoods. Initiatives for conflict mitigation, habitat restoration, and community involvement are all important ways to encourage cohabitation between local wildlife and people.

**Land Use Changes**

Land use changes are defined by Makonjio (2020) as the modification of ecosystems for agriculture, urbanization, and infrastructure development. These changes result in habitat destruction and fragmentation due to socioeconomic factors, which reduces wildlife resources and disrupts ecosystems. Reduced biodiversity, degraded soil, elevated surface runoff, and the effects of climate change are among the repercussions (Matano et al., 2015). By enabling animals to enter human communities in quest of food and shelter, these changes exacerbate conflicts between people and nature. According to Mnyali and Materu (2021), changes in settlement patterns are defined as changes in the distribution of the human population, which have an effect on wildlife through increased population density, land use conversion, and limited access to resources. These changes bring people and wildlife closer together, intensifying rivalry for scarce resources and exacerbating hostilities. Increased human-wildlife interactions, habitat loss, and biodiversity loss result from agricultural expansion motivated by the desire to provide food (Barbier, 2020). Wildlife migrations and interactions are further impacted by the cultivated area, crop diversity, and agricultural practices, which also have an impact on soil health, ecological stability, and water consumption.

**Statement of the Problem**

Kenya's fast rise in population and the spread of human beings activities into wildlife habitats have exacerbated human-wildlife conflict. As a result, there is now less biodiversity, local populations are struggling economically, and there are more hazards to wildlife as well as humans. Human injuries or fatalities, livestock predation, and agricultural devastation are the most common confrontations. Increased demand for land has sped up the construction of infrastructure, settlements, and agriculture, further fragmenting wildlife areas and limiting animal mobility. Human-animal interactions have consequently risen, especially in areas where wildlife is essential to both tourism and conservation (Burudi, Krisztián & Tormáné, 2023). Although previous research has examined individual land use changes in connection to conflict between humans and wildlife, it has frequently concentrated on discrete factors. For example, Mukeka et al. (2019) looked at how wildlife corridors were disrupted by agricultural expansion in Narok County, but they neglected to take pastoral and settlement changes into account. Similarly, Lala et al. (2022) focused on how infrastructure development impacts on wildlife mobility in Tsavo but did not evaluate how it interacts with other land use changes. By analyzing the combined effects of agricultural expansion and changes in settlement patterns on human-wildlife conflict in Kajiado County, this study seeks to bridge this gap. The study provided a more thorough understanding of how land use changes collectively fuel conflict by taking a holistic approach, which helped to inform more sustainable land management techniques.

**Objectives of the Study**

   i   To evaluate the effect of settlement pattern changes on. Human-wildlife conflict in Kajiado
       County, Kenya.

   ii  To determine the effect of agricultural expansion on. human-wildlife conflict  in Kajiado
       County, Kenya

**Theoretical Review**

**Land Tenure Theory**

Toulmin's (2009) Land Tenure Theory provides a useful framework for comprehending the connection between changes in land use in Kenya's Kajiado County and conflicts between humans and wildlife. The theory emphasizes how important land ownership and rights are in determining how land is used, especially in pastoral and agricultural settings. The notion states that secure land tenure, in which people or groups have well-defined rights over land, promotes sustainable use through responsible land management. On the other hand, over-exploitation and disputes over land resources are frequently caused by ambiguous or insecure land tenure, which eventually results in land degradation. Secure tenure regimes encourage landholders to make investments in long-term land management plans, according to the Land Tenure Theory. Communities are more likely to adopt sustainable farming methods and manage land in a way that balances the requirements of people and animals in places where they have secure land tenure. Insecure tenure, on the other hand, encourages people to take advantage of land for temporary financial gain, such as turning it into farmland or constructing communities, which upsets ecosystems. This is particularly clear in Kajiado, where a rise in infrastructure and settlement growth due to insecure land tenure has decreased the amount of area accessible for wildlife and exacerbated conflicts between humans and wildlife. Furthermore, according to Deininger and Feder (2001), having well-defined land rights aids in lowering conflict and boosting agricultural output. There is less conflict and greater collaboration between landowners, conservationists, and local residents in Kajiado where land rights are well-defined. However, decisions about land use are frequently influenced by urgent survival demands in areas where land rights are disputed or ambiguous, which results in unsustainable practices that exacerbate conflicts between humans and wildlife. Pastoralists are frequently compelled to switch to alternate sources of income when they are unable to access their usual grazing grounds, which puts additional strain on the land and disturbs wildlife habitats.

**Habitat Suitability Theory**

Originally created in the context of island biogeography, the Habitat Suitability Theory (McArthur & Wilson, 1967) offers a helpful framework for understanding the relationship between species distribution and habitat availability. According to this hypothesis, a habitat's suitability—including its size, quality, and connectivity—is essential to a species' ability to survive and spread. Wildlife populations may be pushed to adapt to new and frequently less suited locations when these habitats

are changed or fragmented as a result of human activities like changes in land use. Increased human-wildlife interactions may arise from this change, and these encounters may intensify into conflict (Cushman et al., 2010; Fahrig, 2003).The idea shed light on how land-use changes are directly influencing wildlife behavior and increasing the risk of conflicts. The notion emphasizes how crucial it is to preserve habitat connectivity in order to lessen fragmentation and encourage wildlife migration across landscapes. Conflict results from species being pushed to adapt to less-than-ideal habitats, which raises the possibility of contacts with human populations (Cushman et al., 2010). Using the theory, the study examined how land use changes in Kajiado County lead to habitat loss and fragmentation and how these changes escalate conflict between humans and wildlife. By combining human development and wildlife protection, the strategy highlights the need for effective land-use planning that strikes a balance between the needs of people and wildlife. Implementing policies that protect significant wildlife corridors, reduce habitat fragmentation, and promote coexistence between human populations and animals is necessary to mitigate the root causes of human-wildlife conflict in the region (Fahrig, 2003).

**Empirical Literature Review**

By examining government documents and field assessments from 2010 to 2016, Buchholtz, Stronza, Songhurst, Graham, and Fitzgerald (2024) sought to quantify human-wildlife conflict, particularly crop-raiding incidents, with an emphasis on the connection between conflict and landscape connectivity. Their findings showed that while linear barriers like fences, dune crests, and waterways negatively impacted wildlife mobility and linkage, higher vegetation score values and greater distance from villages greatly predicted animal movement. But the study didn't look at how shifting settlement patterns would affect human-wildlife conflict; instead, it concentrated mostly on crop-raiding episodes and terrain characteristics.By evaluating the impact of shifting settlement patterns on human-wildlife conflict in Kajiado County, Kenya, the current study aims to close this gap and shed light on the sociospatial factors that influence interactions between wildlife and local communities.

Examining how landscape changes impact human-wildlife interactions was the aim of Mustaţea and Ileana Pătru's (2021) study. The study's findings were deemed pertinent to long-term spatial planning for human infrastructures, wildlife control tactics, and the conservation of the region's forest ecosystems. Their study did not specifically look at how changing settlement patterns can further impact these linkages, despite the fact that it clarified the relationship between HWI and landscape dynamics. By evaluating the shifting settlement patterns impact on human versus wildlife conflict in Kajiado County, Kenya, this project seeks to bridge this gap. This facilitated understanding of the variables influencing HWI in various contexts.

Yunrui, Xuelei, Fang, Diqiang, and Jiahua (2024) examined the causes and temporal and spatial patterns of human-animal conflicts and discovered that they were unevenly distributed, happening less frequently in densely populated areas and more frequently near protected areas. With forests

and croplands being crucial factors for Asiatic black bears and shrub zones for rhesus monkeys, their Poisson regression analysis revealed that land use was the primary factor driving the spatial patterns of HWC. Additionally, the study found that although encounters with Asiatic black bears declined significantly, HWC occurrences—which included rhesus and wild boar monkeys— volvered throughout time, rising between August and October and escalating between 2012 and 2021. The study did not investigate how shifts in patterns of human settlement can further impact these conflicts, while offering important insights into the dynamics of HWC across various species and environments. By evaluating the impact of shifting settlement patterns on human-wildlife conflict in Kajiado County, Kenya, the current study seeks to close this information gap and advance our understanding of the socio-environmental factors affecting HWC.

Bagheriyan, Karimi, and Yazdandad (2023) investigated the temporal and spatial distribution of human-wildlife conflicts in a densely populated area of Iran, discovering factors that are species-specific and human-induced that contribute to conflict zones. According to their investigation, the main animals that attacked people and livestock were wolves, leopards, and wild boars. Wild boars were responsible for more than 90% of the damage done to agricultural lands. The majority of recorded livestock incidents occurred inside protected areas and close to villages. The study did not, however, investigate the potential impact of shifting human settlements on these disputes. To offer a more comprehensive comprehension of the connection between animal interactions and human settlement, the current study looked at how changes in settlement patterns affect HWC in Kajiado County, Kenya.

Machoka (2017) investigated the factors influencing human-life conflict in villages that border protected areas using the Kenya Wildlife Service as a case study focusing on the Maasai Mara National Reserve in Narok County. According to the findings, the most common way that people and wildlife conflict occurs in Africa is through agricultural destruction, and a number of wildlife species, such as hippopotamuses, baboons, rodents, elephants, squirrels, pigs, deer, spotted, hyenas, porcupines, leopards, and lions, significantly impair local livelihoods. They underlined how wildlife's damage of crops and animals creates major barriers to protecting wildlife in their natural habitats, exacerbating poverty and food scarcity. Notwithstanding these revelations, the study did not really look at how agricultural growth influences confrontations between people and wildlife.By assessing the impact of agricultural growth on human-wildlife conflict in Kajiado County, Kenya, the current study aims to close this gap by offering a targeted examination of how agriculturally driven land-use changes affect human-wildlife interactions in the area.

Gemeda (2018) examined the effects of conflicts caused by human and wildlife interactions in developing countries and discovered that as agricultural area increased, wildlife was displaced and human-animal interactions increased. According to the study, growing farms dispersed natural areas, allowing big animals like buffalo and elephants to regularly enter farmlands, resulting in severe crop damage and livestock predation. The researchers stressed that, especially in areas with insufficient wildlife conservation efforts, agricultural growth poses a combined danger to human

livelihoods and biodiversity. They came to the conclusion that in order to resolve these conflicts, integrated land-use planning is necessary to strike a balance between wildlife conservation and agricultural growth. The study did not, however, particularly investigate the local dynamics of these disputes in Kenya's Kajiado County. The current study will assess how agricultural development affects human-wildlife conflict in Kajiado County in order to bridge this gap by offering localized insights into the ways in which agricultural practices influence these conflicts.

Shaurabh and Sindhu (2017) investigated patterns of human-wildlife conflict, including perceived or actual conflict escalation. According to their research, wildlife habitats were diminished by agricultural growth, especially for palm oil and rubber plantations, which brought tigers and primates closer to human habitations. As a result, there were more cattle assaults and endangered species were killed in retaliation. To address these issues in evolving agricultural landscapes, the authors emphasized the necessity of wildlife corridors and community-based conflict resolution techniques. The study did not, however, look at similar processes in the Kenyan setting. By evaluating the impact of agricultural growth on conflict between humans and wildlife in Kajiado County, Kenya, the goal of the current work is to fill this information gap and offer localised comprehension of how agriculturally induced land-use changes affect human-wildlife interactions.

In Kenya's Maasai Mara Game Reserve, land conversion for crop production encroached on areas previously designated for wildlife migration and grazing, according to Omed and Majale's (2022) examination of gender dynamics and human-animal conflicts. Elephants and other large herbivores, in particular, invaded fields during droughts when their natural food supplies became limited, leading to frequent conflicts between wildlife and local farmers. In order to reduce tensions, the study underlined the necessity of buffer zones and compensation plans. It also highlighted the necessity of legislative changes to support sustainable farming methods that safeguard biodiversity and livelihoods. Although their study shed important light on the Maasai Mara, it did not particularly address other areas, such as Kajiado County.By evaluating the impact of agricultural growth on human-wildlife conflict in Kajiado County, Kenya, the current study seeks to close this gap by providing a targeted investigation of the ways in which shifts in land use for agriculture fuel these conflicts in the area.

**Conceptual Framework**
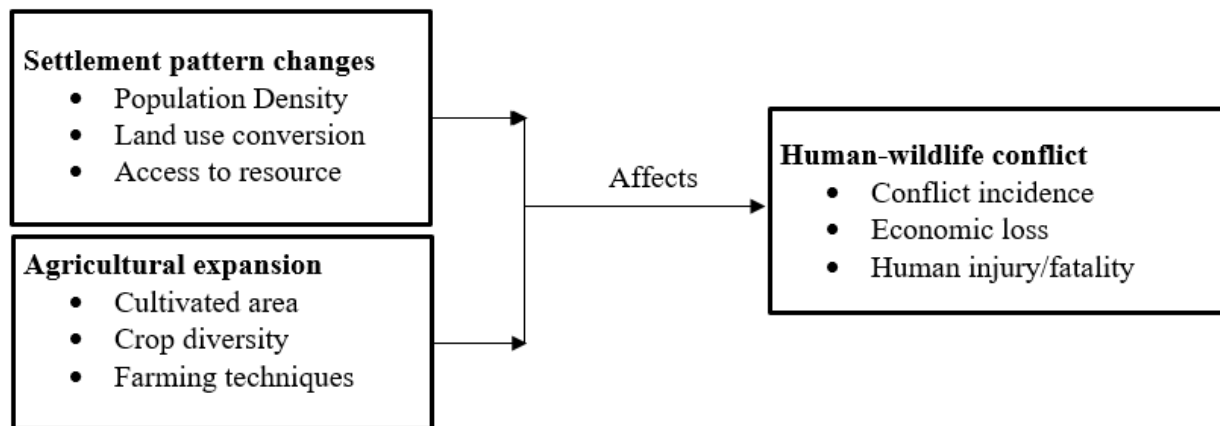


| Independent Variable | Dependent Variable |
|---|---|

**Figure 1 Conceptual Framework**

**Research Methodology**

The study's research design was descriptive in nature. In order to better understand the interplay between land use changes and human-wildlife conflict in Kajiado County, the study focused on 2419 stakeholders with a wide range of experiences and perspectives. The stakeholders comprised of Local Community Representatives, Farmers and Pastoralists, Wildlife Rangers and Officers, Community Leaders, Government and County Officials and Wildlife Conservation Organizations.

The sample size calculation formula developed by Cochran (Cochran, 1977) was used to find the sample size of 343 respondents for the study. Structured questionnaires and semi-structured interview guides were used to gather both qualitative and quantitative data for this study.

**Data Analysis and Presentation**

Quantitative data was analysed using SPSS. First, the demographics of the individuals were provided using descriptive statistics, the frequency of various land use practices, and the instances of human-wildlife conflict. This gave a good picture of the central tendencies and distribution of the data. The incidence of human-wildlife conflict was then examined in relation to changes in land use using inferential statistics, specifically regression analysis. A thorough grasp of the ways in which various land use practices influence interactions between humans and animals is made possible by the regression analysis, which assisted in determining the importance and strength of these associations.

The study employed the regression model below:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$

Where: Y= human-wildlife conflict, β0 = Constant, $\beta_1$ and $\beta_2$ =Coefficients, $X_1$ = Settlement Pattern Changes, $X_2$ = Agricultural Expansion and ε =Error term.

Since thematic analysis facilitates the identification of themes and patterns in qualitative data, it was employed to analyze the data (Braun & Clarke, 2006).

## Descriptive Statistics

Descriptive statistics were used in the study to show how responses to different questionnaire items were distributed across variables. The statistics were summarised using the mean and standard deviation. For each response, the researcher analyzed the average (mean) rating along with the standard deviation. A mean value closer to 5 indicated a stronger agreement among participants, whereas a mean closer to 1 suggested greater disagreement. Mean values between 2.6 and 3.4 signified a neutral or moderate stance. The standard deviation measured the extent of variation in responses. A lower standard deviation implied that responses were closely clustered around the mean, reflecting greater consistency in opinions. In contrast, a higher standard deviation suggested more dispersed responses, indicating a wider range of perceptions among participants.

### Settlement Pattern Changes
Table 1 presents the descriptive results on settlement pattern changes

**Table 1: Settlement Pattern Changes**

| Statements | Mean | Std.Dev |
|---|---|---|
| Settlement density in my area has increased over the past few years. | 3.785 | 0.792 |
| New settlements have encroached on wildlife habitats. | 4.083 | 0.295 |
| Human-wildlife encounters have risen due to settlement changes. | 3.964 | 0.777 |
| Wildlife migration routes have been disrupted by settlements. | 3.667 | 0.884 |
| The community's tolerance for wildlife has decreased with increased settlements. | 3.834 | 0.809 |
| Settlements have changed the availability of resources for wildlife. | 3.404 | 0.718 |
| Local authorities have addressed settlement-related wildlife issues effectively. | 3.262 | 1.119 |
| There are adequate buffer zones between human settlements and wildlife areas. | 3.147 | 0.994 |
| **Composite** | **3.643** | **0.799** |

**Source: Research Data (2025)**

According to the results, the composite mean was 3.643. This suggested that all participants agreed with the assertions on changes in settlement patterns and their effects on conflicts between people and wildlife. The respondents' responses varied moderately, based on the 0.799 composite std.dev. Furthermore, the results indicated that respondents agreed with the claims that settlement density in the area had increased over the past few years (mean==3.785, std.dev=0.792), that mew settlements have encroached on wildlife habitats (mean=4.083, std.dev=0.295), and that human-wildlife encounters had risen due to settlement changes (mean=3.964, std.dev=0.777).

Respondents additionally agreed with the statements that wildlife migration routes had been disrupted by settlements (mean=3.667, std.dev=0.884) and that the community's tolerance for wildlife had decreased with increased settlements (mean=3.834, std.dev =0.809). Respondents were however neutral with the statements that settlements had changed the availability of resources for wildlife (mean=3.404, std.dev=0.718), that local authorities had addressed settlement-related wildlife issues effectively (mean=3.262, std.dev=1.119) and that there was adequate buffer zones between human settlements and wildlife areas (mean= 3.147, std.dev=0.994). The findings align with Mnyali and Materu (2021), who established that changes in settlement patterns drive wildlife into closer proximity with human populations, intensifying competition for critical resources such as water, land, and food. Due to habitat disruption caused by this encroachment, animals are compelled to enter human settlements in quest of food, thereby increasing incidences of crop raiding, predation on livestock, and even direct confrontations with people. Additionally, rapid urbanization and expansion of human settlements into previously uninhabited wildlife areas worsens human-wildlife conflicts.

## Agricultural Expansion

Table 2 presents the descriptive results on agricultural expansion

**Table 2: Agricultural Expansion**

| Statements | Mean | Std.Dev |
|---|---|---|
| Agricultural land has increased significantly in my area. | 3.659 | 1.001 |
| The expansion of farms has reduced wildlife habitats. | 4.172 | 0.109 |
| Crop raiding by wildlife has become a common issue. | 4.119 | 0.167 |
| Farmers have changed their practices to adapt to wildlife conflicts. | 3.354 | 0.896 |
| Agricultural chemicals have impacted local wildlife. | 3.276 | 0.992 |
| The community is aware of the effects of agricultural practices on wildlife. | 3.419 | 1.094 |
| Compensation for wildlife damages is sufficient to support farmers. | 2.412 | 0.884 |
| Collaboration between farmers and wildlife agencies is effective. | 2.647 | 0.719 |
| **Composite** | **3.382** | **0.733** |

**Source: Research Data (2025)**

From the results, the composite mean was 3.382. This implies that respondents were neutral on the statements on agricultural expansion and its impact on human wildlife conflict. Additionally, the composite standard deviation was 0.733 implying existence of moderate variability on responses amongst the respondents. The findings also indicate that respondents concurred with the claims that the area's agricultural land had grown dramatically (mean=3.659, std.dev=1.001), that the expansion of farms had reduced wildlife habitats (mean=4.172, std.dev=0.109) and that crop raiding by wildlife had become a common issue (mean=4.119, std.dev=0.167). Respondents, however, expressed neutral opinion regarding the assertions that farmers had changed their practices to adapt to wildlife conflicts (mean=3.354, std.dev=0.896), that agricultural chemicals

had impacted local wildlife (mean=3.276, std.dev=0.992), that the community was aware of the effects of agricultural practices on wildlife (mean=3.419, std.dev=1.094) and that collaboration between farmers and wildlife agencies was effective (mean=2.647, std.dev=0.719). Respondents disagreed with the statement that compensation for wildlife damages was sufficient to support farmers (mean=2.412, std.dev=0.884). The findings align with Gemeda (2018) who established that increasing agricultural land resulted in the displacement of wildlife and a rise in human-wildlife encounters. Due to the fragmentation of natural wildlife habitats caused by the expansion of cropland, animals are compelled to invade human communities in quest of food and water. This frequently results in cattle predation, crop destruction, and an increase in farmers' retaliatory kills of wildlife. Changes in land use consequently result in habitat degradation and heightened competition between wildlife and humans for resources. The conversion of rangelands into farmlands has particularly disrupted traditional wildlife migration corridors, exacerbating the frequency of human-wildlife encounters.

## Human-Wildlife Conflict

Table 3 outlines the descriptive results on human-wildlife conflict

**Table 3: Human-Wildlife Conflict**

| Human-Wildlife Conflict | Mean | Std.Dev |
|---|---|---|
| Human-wildlife conflict is a significant issue in my community. | 4.118 | 0.224 |
| I feel threatened by wildlife in my area. | 3.509 | 0.945 |
| Wildlife damages to property are common in my community. | 4.171 | 0.146 |
| I believe wildlife conservation is important despite conflicts. | 4.007 | 0.175 |
| Education on wildlife conservation is accessible in my community. | 3.419 | 0.952 |
| Local authorities effectively manage human-wildlife conflicts. | 3.386 | 0.887 |
| **Composite** | **3.768** | **0.555** |

**Source: Research Data (2025)**

According to the findings, the composite mean was 3.768, which indicates that respondents agreed with the statements on human wildlife conflict. The composite standard deviation was 0.555 implying that there was little variability on responses from the respondents. The findings also demonstrated that those who participated agreed with the assertions that conflict between people and wildlife was a major problem in the community (mean=4.118, std.dev=0.224), that they felt threatened by wildlife in the area (mean=3.509, std.dev=0.945), that wildlife damages to property was common in the community (mean=4.171, std.dev=0.146) and that they believed that wildlife conservation was important despite conflicts (mean=4.007, std.dev=0.175). Respondents were however neutral on the statements that education on wildlife conservation was accessible in the community (mean=3.419, std.dev=0.952) and that local authorities effectively managed human-wildlife conflicts (mean=3.386, std.dev=0.887). The results align with findings from Esayas *et al.* (2024), who established that human-wildlife conflict occurs when wildlife encroaches into human

settlements, farms, and grazing lands, leading to various forms of destruction. This includes crop damage, predation on livestock, and, in some cases, direct attacks on humans. Treves and Karanth's (2003) established that habitat fragmentation and declining prey populations significantly contributes to human-carnivore conflict. Additionally, local perceptions of animal play a crucial role in shaping conservation efforts, with retaliatory killings of large predators often occurring in response to livestock predation.

The thematic analysis of interview guide questions administered to Community Leaders, Government, and County Officials and Wildlife Conservation Organizations revealed that the changes in traditional pastoral practices have significantly affected human-wildlife interactions in Kajiado County. On how have changes in settlement patterns impacted wildlife movements and encounters with humans in the area, the study established that the expansion of human settlements into previously open wildlife corridors has obstructed traditional animal migration routes. Wildlife that once roamed freely now encounters fenced areas, roads, and villages, increasing the chances of conflict. For example, elephants attempting to migrate to their traditional water sources often find themselves trapped within human settlements, leading to property destruction and, in some cases, loss of human life. Similarly, nocturnal predators, now in close proximity to homesteads, have easier access to livestock. On the challenges experienced with wildlife as human settlements have expanded, challenges captured included crop destruction by elephants and other herbivores, attacks on livestock by carnivores, and even direct threats to human safety. Residents living near national parks and wildlife reserves face frequent incursions, leading to economic strain and fear among community members. The presence of wildlife in settlements has also disrupted normal activities such as schooling and travel, as people must exercise caution to avoid dangerous encounters.

On how the expansion of agricultural land in the community influenced human-wildlife conflicts, respondents mentioned that large portions of former grazing and wildlife habitats have been converted into farmlands, reducing the availability of natural food sources for wildlife. This has forced wild animals to raid farms, consuming or trampling crops. In retaliation, farmers have resorted to erecting electric fences, using deterrent methods, or even killing wildlife to protect their livelihoods. In some cases, government and conservation organizations have stepped in to provide compensation for damages, but these measures are often insufficient to fully address the grievances of affected communities. On the measures been taken to manage conflicts between wildlife and farming activities, respondents mentioned the implementation of wildlife-proof fencing to keep animals away from farms, community education programs on co-existence strategies, and compensation schemes for losses caused by wildlife. Some communities have adopted innovative techniques such as beehive fences, which deter elephants while providing an additional source of income through honey production. Government agencies and conservation groups have also promoted land-use planning strategies that create buffer zones between farms and wildlife habitats.

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**Inferential Statistics**

**Correlation Results**

A correlation analysis's goal was to ascertain the direction and strength of the relationship between land use changes and human-wildlife conflict in Kajiado County, Kenya. The analysis aimed to measure the association between settlement patterns and agricultural expansion with the occurrence of human-wildlife conflict. Table 4 outlines the results.

**Table 4: Correlation Analysis**

|  |  | Settlement Pattern Changes | Agricultural Expansion | Human-wildlife Conflict |
|---|---|---|---|---|
| Settlement Pattern Changes | Pearson Correlation | 1 |  |  |
|  | Sig. (2-tailed) |  |  |  |
| Agricultural Expansion | Pearson Correlation | .326** | 1 |  |
|  | Sig. (2-tailed) | 0.019 |  |  |
| Human-wildlife Conflict | Pearson Correlation | .539** | .403** | 1 |
|  | Sig. (2-tailed) | 0 | 0 |  |
|  | N | 209 | 209 | 209 |

**Source: Research Data (2025)**

The findings also demonstrate a positive and significant correlation between changes in settlement patterns and human-wildlife conflict in Kajiado County. A significant value of 0.000, which is less than 0.05, and a correlation value of 0.539 illustrate this. According to the results, there is a moderately substantial positive correlation between human-wildlife conflict and changes in settlement patterns, such as the growth of human settlements, urbanisation, and land fragmentation. The results suggest that human encroachment into wildlife habitats is likely to contributing to conflicts, such as crop destruction and livestock predation due to increased interactions with wildlife. The results concurs with Mnyali and Materu (2021) who established that changes in settlement patterns drive wildlife into closer proximity with human populations, intensifying competition for critical resources such as water, land, and food.

The findings also demonstrate a positive significant correlation between Kajiado County's human-wildlife conflict and agricultural expansion. A significant value of 0.000, which is less than 0.05, and a correlation value of 0.403 illustrate this. The correlation results imply that as agricultural expansion increases in Kajiado County, human-wildlife conflict also increases. The results further implies that agricultural expansion contributes to human-wildlife conflict to a considerable extent.

The results are in tandem with Gemeda (2018) who revealed that increasing agricultural land resulted in the displacement of wildlife and a rise in human-wildlife encounters. Due to the fragmentation of natural wildlife habitats caused by the expansion of cropland, animals are compelled to invade human communities in quest of food and water.

**Multiple Regression Analysis**

**Model Summary**

To ascertain the percentage of the dependent variable that can be explained by the independent variables as well as the strength of the link between the independent variables and the dependent variable, the study featured a model summary. The model summary findings are shown in Table 5.

**Table 5: Model Summary**

| R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|
| .786[a] | 0.618 | 0.544 | 0.21965 |
| a. Predictors: (Constant) Settlement Pattern Changes and Agricultural Expansion | | | |

**Source: Research Data (2025)**

According to the model summary results, there is a partially strong connection between human-wildlife conflicts in Kajiado County and changes in land use, including changes in settlement patterns, and agricultural expansion. This is demonstrated by the 0.786 R-value. According to the coefficient of determination  represented by R-square=0.618, changes in changes in settlement patterns and agricultural expansion can account for 61.8% of the variances in human-wildlife conflicts in Kajiado County.

**Analysis of Variance**

The study used the Analysis of Variance (ANOVA) to determine the statistical significance of the model that linked changes in land use and conflicts between humans and wildlife. Table 6 displays the results.

**Table 6: ANOVA (Model Significance)**

| | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 349.72 | 4 | 87.43 | 18.199 | 0.02127[b] |
| Residual | 979.94 | 204 | 4.804 | | |
| Total | 1329.66 | 208 | | | |
| a.   Dependent Variable: Human-wildlife Conflict | | | | | |
| b. Predictors: (Constant), Settlement Pattern Changes and Agricultural Expansion | | | | | |

**Source: Research Data (2025)**

According to the results, the significance value was less than 0.05, at 0.02127. Statistical significance indicated that the model had a good fit for assessing the relationship between the independent and dependent variables.

## Regression Coefficients

The study used a regression coefficient to evaluate how changes in the independent variables affect the dependent variable. Table 7 presents the findings.

## Table 7: Model Coefficients

|  | Unstandardized Coefficients | | Standardized Coefficients | | |
| --- | --- | --- | --- | --- | --- |
|  | B | Std. Error | Beta | T | Sig. |
| (Constant) | 0.719 | 0.633 |  | 1.1359 | 0.000 |
| Settlement Pattern Changes | 0.538 | 0.108 | 0.442 | 4.9815 | 0.000 |
| Agricultural Expansion | 0.411 | 0.121 | 0.361 | 3.3967 | 0.000 |

Dependent Variable: Human-wildlife Conflict

## Source: Research Data (2025)

Substituting the values in the model, the model becomes:

**Human-wildlife Conflict = 0.719 + 0.538 (Settlement Pattern Changes) + 0.411 (Agricultural Expansion**

The findings demonstrates that, in Kajiado County, Kenya, changes in settlement patterns have a positive significant effects on conflicts between people and wildlife as demonstrated by significant value of $0.000 < 0.05$ and a beta value of 0.538. The results suggests that suggests that for every unit increase in the measure of settlement pattern changes, human-wildlife conflict increases by 0.538 units, holding other variables constant. The results are in tandem with findings from Manoa *et al.,* (2020) who established that regions experiencing rapid settlement expansion often report heightened human-wildlife tensions due to habitat destruction and resource competition. The results further established that agricultural expansion bears a positive and significant effect on human wildlife conflicts in Kajiado County Kenya. This is shown by a beta value of 0.411 and significance value of $0.000 < 0.05$. The results suggests that suggests that for every unit increase in the measure of agricultural expansion, human-wildlife conflict increases by 0.411 units, holding other variables constant. According to Long *et al.,* (2019), when agricultural activities encroach into wildlife habitats, conflicts intensify due to habitat loss, competition for resources, and increased human-wildlife interactions.

## Conclusion

Shifts in settlement patterns, such as increased human encroachment into wildlife habitats, are a significant factor contributing to the rise in human-wildlife conflict in Kajiado County. The consistent agreement from respondents and the statistically significant positive correlation and effect shown in the regression results underscore the direct relationship between settlement changes and heightened conflict. Agricultural expansion plays a significant role in increasing human-wildlife conflict in Kajiado County, despite respondents' neutral stance in the descriptive analysis. The regression results, showing a positive and significant correlation and effect, confirm that the growth of agricultural activities heightens conflict by encroaching on wildlife habitats. This suggests that even if perceptions vary, the objective impact of expanding agriculture is a rise in human-wildlife interactions.

## Recommendations

The study also recommends the need to regulate settlement patterns to reduce conflicts arising from human encroachment into wildlife habitats. Proper land-use planning should be enforced to control settlement expansion, and the establishment of buffer zones between human settlements and wildlife areas can serve as a protective measure. Moreover, maintaining and restoring wildlife corridors ensured the free movement of animals, reducing their intrusion into human settlements. Strengthening policies that regulate human settlement in wildlife-prone areas is also essential to prevent habitat fragmentation and its associated conflicts. Agricultural expansion, which has been identified as a significant contributor to human-wildlife conflict, requires interventions such as the promotion of wildlife-friendly farming practices like agroforestry and sustainable land-use strategies. The use of wildlife-friendly fencing can help protect farmlands while allowing safe wildlife movement. Additionally, compensation schemes should be introduced to support farmers affected by wildlife damage, thereby reducing retaliatory actions against animals. Encouraging alternative livelihoods, such as eco-tourism and other non-agricultural income-generating activities, can also help alleviate pressure on land expansion and minimize conflicts.

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