

**LAND USE CHANGES AND HUMAN-WILDLIFE CONFLICT IN KAJIADO
COUNTY, KENYA**

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DECLARATION

This study project is entirely original to me and has never been submitted to another university for an award or degree.

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As the University supervisor, I have given my consent for the submission of this project for examination.

Signature

Date.....

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DEDICATION

I dedicate this work to my family in appreciation of their steadfast support during the time I was executing this project.

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ABBREVIATIONS AND ACRONYMS

AE	Agricultural Expansion
CA	Cronbach's Alpha
CBOs	Community Based Organizations
EC	Ecological Corridors
HWC	Human Wildlife Conflict
ID	Infrastructure Development
IUCN	International Union for Conservation of Nature
KC	Kajiado County
KNBS	Kenya National Bureau of Statistics
LCM	Local Community Members
PA	Protected Areas
PC	Pastoralist Community
SPC	Settlement Pattern Changes
SPSS	Statistical Package for the Social Sciences
SQ	Structured Questionnaire
SSIG	Semi Structured Interview Guides
USAID	United States Agency for International Development
WMO	Wildlife Management Officials

OPERATIONAL DEFINITION OF TERMS

Agricultural Expansion refers to the increase in land area dedicated to farming activities, driven by the objective to increase food and food items as well as raw materials to support growing populations.

Human wildlife conflict is the term used to describe interactions among people and animals that have detrimental effects on either party, creating difficulties for communities at large and wildlife conservation.

Infrastructure Development refers to the construction and expansion of foundational systems that support economic growth and improve quality of life but can also contribute to land use changes that impact wildlife habitats.

Land Use Changes refers to the transformation of land from its natural state through activities such as pastoral activities, settlement pattern changes, agricultural expansion and infrastructure development.

Pastoral Activities Pastoral activities encompass the practices and lifestyles of communities engaged in herding and managing livestock, which is a primary source of livelihood for many in Kajiado County. These activities include grazing, breeding, and the movement of herds in search of water and pasture.

Settlement Pattern Changes refers to changes in the number and distribution of people in a certain area brought about by urbanization, population increase, and economic advancements.

ABSTRACT

In recent years, specific land use changes have been identified as key drivers of human wildlife conflict in Kajiado. Pastoral activities, which once coexisted with wildlife, are increasingly leading to competition over dwindling grazing lands. Settlement pattern changes and infrastructure development, such as roads and housing projects, have fragmented habitats, increasing the frequency of wildlife entering human settlements. Agricultural expansion, which converts wildlife corridors into farmlands, has been noted as a major contributor to habitat loss, driving wildlife to forage in farms, leading to destruction and tension between wildlife conservation efforts and community livelihoods. 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 changes in pastoral activities, settlement pattern changes, agricultural expansion and infrastructure development. 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 each 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 analysed 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. The study established that land use changes comprising of changes in pastoral activities, settlement pattern changes, agricultural expansion and infrastructure development positively and significantly affect human wildlife conflict in Kajiado County. This was depicted by beta values of 0.213, 0.538, 0.411 and 0.329 and significant values of 0.009, 0.000, 0.000 and 0.000 respectively. The study concluded that increase in the land use changes increases animal wildlife conflicts in Kajiado County. The study recommends promoting sustainable grazing practices, regulating settlement patterns, and implementing wildlife friendly farming to minimize human wildlife conflicts in Kajiado County. This study recommends integrating wildlife considerations into development plans, enforcing land use policies, and engaging stakeholders may help balance conservation efforts with economic growth.

CHAPTER ONE

INTRODUCTION

1.1 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.

1.1.1 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. Changes in pastoral activities, adjustments in settlement patterns, agricultural growth, and infrastructure development are the four main characteristics that the study uses to conceptualize land use changes.

Primi *et al.* (2024) state that changes in pastoral activities, which are frequently impacted by climatic and economic variables, include adjustments to cattle management, grazing patterns, and seasonal migration. Wildlife is impacted by these changes because they modify their access to water supplies and grazing areas.

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.

According to Kuncoro *et al.* (2024), infrastructure development includes the building of roads, urbanization, and utility expansion, all of which disturb migration routes and fragment wildlife habitats. Urban sprawl and increased road density diminish wildlife-friendly natural areas, escalating confrontations between people and wildlife. Together, these land use changes in Kajiado County lead to ecological imbalances and heightened hostilities between animals and human groups.

1.1.2 Human-Wildlife Conflict

The conflict between human and wildlife is defined as any human-animal interaction that negatively impacts the environment, wildlife conservation, or human social, cultural, or economic well-being (IUCN, 2020). It happens when human populations and wildlife have similar requirements and behaviours, which frequently results in direct conflict for resources and space. Property damage, animal predation, crop devastation, and even human injuries and deaths are some of the ways that these conflicts might appear. Growing human populations and consequent encroachment into wildlife habitats are commonly blamed for the rise in the conflicts, implying that human-wildlife interactions become more frequent and intense (Nyhus, 2016).

In Kajiado County, Kenya, the fast changes in land usage have a significant impact on emergence of human versus wildlife conflicts. According to Okello (2014), the Maasai people of Kajiado have historically coexisted with wildlife via traditional pastoralism, allowing for shared landscapes and ecological equilibrium. But migratory patterns have been interrupted and wildlife habitats have been drastically diminished by contemporary

developments like land privatisation, agricultural encroachment, infrastructure development, and human population rise. The frequency and intensity of conflicts arise when animals like lions, hyenas, and elephants seek food and water in human settlements, endangering both people and wildlife (Kioko *et al.*, 2006).

Human-wildlife conflict mitigation calls for integrated approaches that take community livelihoods and conservation into account. Participatory land use planning, community-based conservation programs that provide incentives for wildlife protection, and the establishment and upkeep of wildlife corridors are important interventions (Ogutu *et al.*, 2019). While efficient loss compensation plans can lessen tensions, structural solutions like electric fencing, predator-proof bomas, and early warning systems can lower the likelihood of encounters (Dickman, & Hazzah, 2016). Furthermore, promoting coexistence requires education and awareness initiatives. Addressing the underlying causes and maintaining long-term solutions require a concerted effort involving local people, governmental organisations, and conservation stakeholders.

1.1.3 Kajiado County

Approximately 21,900 square kilometers make up Kajiado County in southern Kenya, which has a varied terrain that includes hills, savannas, and semi-arid areas. Notable national parks in the area, such Nairobi National Park and Amboseli, promote biodiversity and draw tourists (Kajiado County Government, 2024). Local land use and climate are influenced by the county's geographic characteristics. Culturally, Kajiado County is home to the majority of the Maasai people, who continue to live a pastoralist lifestyle based on herding cattle, which is essential to their social and economic systems. Despite modernization, the Maasai continue to uphold their cultural heritage, although

increasing interactions with other ethnic groups have led to evolving social dynamics (James *et al.*, 2021).

Economically, Kajiado relies on livestock farming, agriculture, and tourism. However, land use changes driven by agricultural expansion, urbanization, and infrastructure development have escalated human-wildlife conflicts. Competition for resources, especially water and grazing land, has resulted from encroachment on wildlife habitats, which has complicated attempts at conservation and livelihoods for communities (Kajiado County Government, 2024).

1.2 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 infrastructure development, agricultural expansion, changes in settlement patterns, and variations in pastoral activity 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.

1.3 Objectives of the Study

- i. To assess the effect of changes in pastoral activities on human-wildlife conflict in Kajiado County, Kenya.
- ii. To evaluate the effect of settlement pattern changes on. Human-wildlife conflict in Kajiado County, Kenya.
- iii. To determine the effect of agricultural expansion on. human-wildlife conflict in Kajiado County, Kenya
- iv. To examine the effect of infrastructure development on human-wildlife conflict in Kajiado County, Kenya.

1.4 Research Questions

- i. What is the effect of changes in pastoral activities on human-wildlife conflict in Kajiado County, Kenya?
- ii. How do human settlement pattern changes affect human-wildlife conflict in Kajiado County, Kenya?
- iii. What is the effect of agricultural expansion on human-wildlife conflict in Kajiado County, Kenya?

- iv. What is the effect of infrastructure development on human-wildlife conflict in Kajiado County, Kenya?

1.5 Justification and Significance of the Study

The increasing conflicts between human and wildlife in Kenya, especially in regions like Kajiado County that are undergoing fast land use changes, makes this study crucial. As population growth and economic development increase the demand for land, pastoral activities, agricultural expansion, and infrastructure development are encroaching habitats meant for wildlife, escalating disputes that endanger community livelihoods and biodiversity. Despite the significance of these conflicts, there remains a gap in understanding the combined effect of various land use changes on human-wildlife conflict. Thus, this study's goal of offering a thorough examination of how the changes relate to intensify conflicts is justified. It may also help policymakers, conservation groups, and local communities create efficient mitigation plans and guarantee feasible land usage planning.

This study is important because it sheds light on how pastoral activities, settlement patterns, infrastructural development and the growth of farming operations affect human-wildlife conflict in Kajiado County, Kenya. The results may be especially helpful to land use planners and policymakers, who can use the data to balance development needs with wildlife conservation. By recognizing the connection between these land use changes and the rise in human-wildlife conflict, policymakers can create sustainable land use policies that may serve as a guide for future settlement expansion and infrastructure development, taking into account wildlife habitats and migration corridors, thereby reducing conflict.

The study may also be helpful to conservation organizations since it gives them important information on how human activities lead to habitat fragmentation and interactions between people and wildlife. With this information, conservation organizations may create more effective plans to save species and lessen conflicts, particularly in areas where land use is changing quickly. The results of the study might make it easier for these groups to work with local governments and communities to protect endangered species and advance biodiversity conservation.

The study will provide useful strategies for lowering human-wildlife conflict for the local communities in Kajiado County, especially for those engaged in farming, pastoralism, and other land-based livelihoods. The study may assist communities in implementing alternative practices that foster coexistence with wildlife by pinpointing the precise land use changes that intensify conflict. This may reduce economic losses due to livestock predation, crop destruction, and property damage, enhancing both community livelihoods and wildlife efforts for conservation.

By addressing current gaps in the literature on land use changes and human-wildlife conflict, the study may also benefit the academic and scientific community. While previous research has often focused on isolated variables, this study may provide a comprehensive knowledge of how various land use changes interact to effect conflict dynamics. This opened up possibilities for investigating integrated land use and conservation methods in other areas dealing with comparable issues and laid the groundwork for future research.

Finally, the study's conclusions may provide useful information to wildlife management organizations like the Kenya Wildlife Service (KWS). To develop more effective conservation and wildlife management plans, these authorities would benefit from a detailed analysis of how land use changes affect conflicts between people and wildlife. In order to foster peaceful coexistence between people and wildlife, the study backs initiatives to establish and preserve wildlife corridors, develop conflict mitigation plans, and interact with local population

Scope of the Study

This study's focus is on evaluating how land use changes in Kenya's Kajiado County affect conflict between people and wildlife. The study specifically looks at how four major land use changes—pasture activities, settlement patterns, agricultural expansion, and infrastructural development—affect human-wildlife conflict in the area. Because Kajiado County has a distinctive environment and a high frequency of human-wildlife interactions, it is the perfect place to investigate the dynamics of land use and wildlife. As a result, the research is restricted to this county.

1.7 Limitations of the Study

This major shortcomings are related to data collecting and generalizability. Over-reliance on self-reported data from local populations and stakeholders might bring potential biases, such as recollection errors and the propensity to give socially acceptable answers. Respondents may underreport or overestimate the level of human-wildlife conflict based on personal experiences or external influences. The study used triangulation to improve data reliability by comparing results with secondary data from governmental and conservation organizations as well as direct field observations. This method contributed

to a more thorough and accurate understanding of Kajiado County's human-wildlife interactions.

Another limitation is the study's geographical and thematic scope. By focusing exclusively on Kajiado County, the results might not apply entirely to other areas with distinct ecological and socioeconomic circumstances. Additionally, the study examines land use changes as the primary driver of human-wildlife conflict, leaving out other influential factors such as climate change, poverty, and governance. These limitations restrict the findings' wider applicability even though they enable a more concentrated study. The study offered a thorough contextual analysis, enabling policymakers and researchers to compare insights with other regions facing similar challenges. Future research can build on these findings by integrating additional environmental and socio-economic factors.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter provides an outline on theoretical overview, a conceptual framework, a description of the literature, research gaps, and an empirical review centered around the variables.

2.2 Empirical Review

2.2.1 Human-Wildlife Conflict

According to Esayas *et al.* (2024), human-animal conflict is defined as human-wildlife interactions that negatively impact either party and cause issues for both wildlife conservation and larger communities. The conflict often manifests as incidents where wildlife ventures into human areas, such as farms and grazing lands, damaging crops, raiding livestock, or even attacking people. These incidents are particularly common near wildlife habitats or along natural migration routes that intersect with farmlands. In regions like Kajiado County, Kenya, wildlife such as elephants and lions are frequently involved in such interactions, creating tensions that sometimes provoke retaliatory actions from the community.

A major component of human-wildlife conflict is economic loss, particularly in pastoral and agricultural communities where wildlife intrusions can cause catastrophic crop destruction or livestock loss (Kidane *et al.*, 2024). These losses are most noticeable in places where the sole source of income is livestock farming. Large carnivores like lions and hyenas have a substantial impact on household incomes and local economies through

their predation, which frequently leaves impacted families in unstable financial situations. Human safety is at risk as a result of human-wildlife conflict, with interactions occasionally leading to fatalities or severe injuries.

These incidents happen when people are in close proximity to potentially harmful wildlife while caring for crops or herding cattle. These events can have a lasting psychological effect, escalating tensions within the community and occasionally inspiring violent acts against wildlife populations.

In their 2003 study, Treves and Karanth looked at how the conflict between humans and carnivores including the perspectives on carnivore management in India and North America. Combining quantitative and qualitative procedures, direct field observations, secondary data analysis from wildlife management organizations, and structured interviews with local residents were all used in the data collection process. The researchers used theme analysis to understand the qualitative data and descriptive statistics to look at conflict tendencies. Human-carnivore conflict was found to be significantly influenced by habitat fragmentation and diminishing prey stocks. Furthermore, because retaliatory murders of large predators frequently occur in reaction to livestock predation, local attitudes of carnivores significantly influenced conservation efforts.

A 2009 study by Lamarque et al. examined the causes, consequences, and strategies for mitigating human-wildlife conflict in Sub-Saharan Africa, with a special emphasis on Tanzania, Botswana, and South Africa. The research gathered data from several places within the selected countries using a case study methodology. The researchers examined

official reports, examined records of wildlife attacks, and carried out structured questionnaires with impacted communities. The study included statistical analysis, including regression models, to examine the relationship between patterns of land use and conflict frequency and GIS mapping to identify high conflict locations. The study's conclusions showed that the main causes of conflict between humans and wildlife were the spread of agriculture, the growth of settlements, and the fluctuation of the climate. Baboons, lions, and elephants were the most troublesome animals.

Okello et al. (2014) conducted a study on land use changes and conflicts between humans and animals in Kenya's Amboseli National Park. Using a longitudinal survey approach, the researchers gathered information over a five-year period through focus groups, direct wildlife observations, and home surveys. Local Maasai communities and park administration officials provided feedback for the study. Descriptive and inferential statistics were used to identify trends in conflict events, and remote sensing was used to analyze changes in plant cover and land use. The results demonstrated that the primary drivers of HWC were the expansion of human settlements and livestock grazing inside wildlife corridors. While lions and hyenas preyed on cattle, elephants caused considerable damage to crops. The study concluded that the establishment of wildlife corridors and stricter enforcement of land-use regulations were essential in minimizing conflicts between humans and wildlife.

2.2.2 Changes in Pastoral Activities and Human-wildlife Conflict

Using data from 2001 to 2017, Mukeka *et al.* (2019) evaluated the intensity, origins, and effects of human-animal conflicts in Narok County, Kenya. According to their findings, there is a positive relationship between rising HWC and both the number of people and

livestock as well as land conversion to agriculture. This emphasizes the need for all-encompassing strategies that account for variations in conflict intensity between species, seasons, regions, and years. Nevertheless, their study mostly concentrated on population growth and agricultural expansion, ignoring the precise impact of pastoral activities on HWC, especially in other areas like Kajiado County. To close this gap, the current study looks at how modifications in pastoral activities, such as grazing practices and herd management, affect human-wildlife conflict in Kajiado County, thereby providing insights into the role of pastoralism in shaping HWC patterns.

In their evaluation of the variables influencing conflict between pastoralists and wildlife conservation authorities, Kiondo *et al.* (2019) determined that, among other kinds of conflict, pastoralist wildlife conservation conflict is the main one. According to their research, the main causes of this conflict were an abundance of livestock, a shortage of grazing space, cattle that graze in game reserves, and a lack of knowledge about conservation methods. However, their analysis ignored the wider effects of changes in pastoral activity on conflict between humans and wildlife, instead concentrating on the direct contacts between pastoralists and conservation authorities. By investigating how changes in pastoral practices, such as land use and herd management, impact human-wildlife interactions in Kajiado County, Kenya, this study aims at closing this gaps in knowledge and provide a thorough understanding of the dynamic linkages between wildlife conservation and pastoralism.

A new logic of production that significantly impacts pastoralism was discovered by Lesorogol and Lesorogol (2024) in their study on Kenyan pastoral areas and community-based wildlife conservation. According to their research, the establishment of buffer

zones and critical regions, along with new grazing practices that significantly diverge from traditional practices, have reduced pastoralists' access to essential rangeland resources. This restriction has forced pastoral communities to look for other pastures, which frequently leads to more competition for few resources and more conflict between pastoral lifestyles and wildlife conservation initiatives. To preserve the region's pastoral livelihoods and animal conservation, the results highlight the necessity of striking a compromise between conservation goals and pastoralists' rights to access essential grazing regions.

Nigatu and Duba (2017) set out to assess the conflict between humans and animals in Ethiopia's Oromia Regional State's protected Yabello District. Data was gathered using a combination of questionnaires, interviews, and secondary document research. Uncontrolled livestock pasture management, encroachment on nearby settlements, patterns of settlement within or close to the conservation area, a lack of barrier demarcation and zoning, and an increase in demand for goods found in the protected area are some of the main causes of human-wildlife conflict. These findings demonstrate how crucial it is to put effective land management plans into action and include the community in order to lessen disputes and promote harmony between local communities and animals.

2.2.3 Settlement Pattern Changes and Human-wildlife Conflict

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 Mustăţea 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—increased 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.

2.2.4 Agricultural Expansion and Human-wildlife Conflict

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.

2.2.5 Infrastructure Development and Human-Wildlife Conflict

Focusing on the interactions between visitors and macaques, Qingming *et al.* (2021) examined the increasing effects of wildlife tourism on human-animal conflict. According to the study, the macaque population grew quickly as a result of increasing tourist interactions and food supplies, which led to aggressive behaviors and habituation. In the end, this exacerbated human-macaque conflicts by increasing the frequency of macaque invasions into neighboring communities. Although the study emphasizes how tourism affects wildlife behavior and conflicts, it doesn't look into how other aspects of human development, including the growth of infrastructure, fuel these disputes. In order to shed light on how roads, buildings, and other infrastructure modifications affect the dynamics of human-wildlife interactions in the area, the current study looked at how infrastructure development affects conflict between humans and animals.

Patel and Kumar (2023) investigated how human-wildlife interactions are impacted by the construction of roads, railroads, and urban areas in India. According to their findings, these advancements significantly raise the likelihood of conflicts between wildlife and

humans. Particularly impacted were elephants and leopards, which regularly crossed roads and railroad tracks, resulting in both human accidents and wildlife deaths. According to the study, habitat fragmentation resulted from badly designed infrastructure that interfered with natural animal migration channels. To lessen conflicts and preserve biological connectedness, the researchers suggested designing infrastructure that is friendly to wildlife, such as underpasses and overpasses. Their research, however, concentrated on India, which has distinct dynamics from Kenya. Offering localized insights into how infrastructure changes impact human-wildlife interactions, the present research looked at how expansion of infrastructure affects on conflict between humans and wildlife in Kajiado County.

In their analysis of the impact of infrastructure projects on human-wildlife conflict in Vietnam, Nguyen et al. (2021) concentrated on the growth of roadways and hydropower dams. According to the study, these advances caused wildlife populations to be uprooted, bringing creatures like tigers, bears, and wild boars closer to human settlements, endangering both human safety and property. In order to reduce conflicts, it was suggested that buffer zones be established around important animal habitats and that environmental impact assessments be conducted prior to large infrastructure projects. The current study looked at how infrastructure development affects human-animal conflict in Kajiado County, offering localized insights into how infrastructure growth affects local wildlife and human interactions, while their work provided important insights for Vietnam.

Mariana, Bergen, and Pimm (2018) investigated the relationship between infrastructure development and human-wildlife conflict in the Amazon region of Brazil. They found

that pipelines and roads caused the jungle to become fragmented, which isolated wildlife populations and increased interactions between humans and wildlife. Conflict increased as a result of the frequent forays into neighboring fields by jaguars and capybaras in search of food. The researchers underlined that unplanned infrastructure development exacerbates these conflicts by limiting wildlife mobility and upsetting natural habitats. To lessen these problems, they suggested better infrastructure planning, which included establishing natural corridors and enforcing environmental laws more strictly. In order to provide region-specific insights and answers, the current study looked at how growth in infrastructure affects human-wildlife conflict in Kajiado County, Kenya, while also highlighting the difficulties in the Amazon.

2.3 Theoretical Review

2.3.1 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.

The theory is especially applicable in Kajiado County because of the area's transition from conventional communal land use regimes to more customized private ownership. In the past, Kajiado pastoralists relied on community property to graze their animals; but,

since private land ownership was introduced, grazing places have grown dispersed. Land usage has changed dramatically as a result of people prioritizing settlement growth or agricultural expansion above traditional pastoral methods. Because of the land fragmentation brought about by privatization, migratory routes and wildlife habitats have been disrupted, leading to an increase in human-wildlife conflicts when animals that have been uprooted from their native habitats enter farms and human settlements.

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.

Toulmin's work was extended by Bromley (2011), who focused on the socioeconomic effects of various land tenure systems. Land use in Kajiado has changed as a result of the transition from communal land rights to private ownership. Due to land fragmentation and privatization, pastoral groups that formerly shared grazing pasture as a resource are now in competition for access to dwindling amounts of land. As permanent settlements and agricultural practices encroach on wildlife areas, this rivalry has exacerbated human-wildlife conflicts and resulted in land disputes. Additionally, pastoralists are unable to

continue using traditional, sustainable grazing methods due to land fragmentation, which exacerbates land degradation and the loss of wildlife habitats.

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.

2.3.2 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).

By using this theory, important insights into the underlying reasons of these conflicts can be gained. Rapid urbanization, agricultural growth, and infrastructure development have resulted in habitat fragmentation, which limits wildlife's range and forces them closer to populated areas. When natural habitats for feeding, reproducing, and sheltering are lost, wildlife frequently moves into human-populated areas, increasing interactions (Fahrig, 2003). Elephants may assault crops in regions where their native habitat has been transformed into agricultural land because they wander vast distances in pursuit of food and water. Similar to this, when their normal diet becomes limited because of habitat destruction, predators like lions—which typically hunt wild herbivores—may resort to cattle (Cushman et al., 2010). Due to these behaviors, local people who depend on animals for their livelihood may suffer significant financial losses, which may lead to retaliatory animal deaths that intensify the conflict.

The idea shed light on how land-use changes, such as the expansion of agriculture, urbanization, and infrastructure, 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).

2.4 Summary of the Literature Review and Research Gaps

Table 2.1 Summary of Literature and Research Gap

Author	Study Variables	Main Findings	Gaps	Focus of current study
Bagheriyan et al. (2023)	Human-wildlife interaction, spatial-temporal patterns	Multiple species were responsible for high HWC incidents, especially near pastures and villages.	Limited to the spatial-temporal factors and lacks analysis on human-induced changes like infrastructure.	Examined how Kajiado County, Kenya's infrastructural development affected HWC
Buchholtz et al. (2024)	Landscape connectivity, barriers, crop raiding	Landscape barriers like rivers and fences influenced wildlife movement, leading to more HWC in areas with poor connectivity.	Focused primarily on landscape features, ignoring human activities like agricultural expansion.	The effect of settlement pattern changes on HWC in Kajiado County, Kenya.
Nigatu, & Duba (2017)	Land encroachment, settlement patterns, HWC causes	Uncontrolled grazing, encroachment, and lack of boundary demarcation led to increased HWC.	The study is limited to Ethiopia; lacks focus on how agricultural	Assesses the effect of agricultural expansion on HWC in

			changes affect HWC.	Kajiado County, Kenya.
Mariana, Bergen and Pimm (2018)	Infrastructure projects, habitat fragmentation, wildlife isolation	Roads and pipelines fragmented the Amazon rainforest, increasing human-wildlife conflicts, especially with jaguars and capybaras.	The focus is on Brazil's Amazon, not applicable to Kenya's pastoral communities.	Investigates the effect of infrastructure development on HWC in Kajiado County, Kenya.
Gemeda & Meles (2018)	the factors that motivate developing nations to create efficient conservation plans in the face of human-wildlife conflict	Crop loss and livestock depredation due to wildlife resulted in poverty and food insecurity.	Does not explore the role of agricultural expansion in HWC.	Assesses the effect of agricultural expansion on HWC in Kajiado County, Kenya.

Shaurabh and Sindhu (2017)	Conflict trends between people and wildlife: are these conflicts real or are they just a perception?	Expansion of agricultural land into forests increased human-wildlife conflicts, particularly with tigers and primates.	Focuses on Southeast Asia; lacks relevance to the pastoral and agricultural dynamics in Kenya.	Examines the effect of agricultural expansion on HWC in Kajiado County, Kenya.
Omed and Majale (2022)	Human-wildlife conflicts and gender dynamics in Kenya's Maasai Mara Game Reserve	Agricultural expansion in the Maasai Mara displaced wildlife, leading to more frequent encounters between elephants and local farmers.	Limited to the Maasai Mara region; lacks focus on other counties like Kajiado.	Investigates the effect of agricultural expansion on HWC in Kajiado County, Kenya.
Kiondo et al. (2019)	Pastoralist activities, conservation conflict, land use	Main conflicts stemmed from cattle grazing in game reserves and land scarcity for pastoralists.	Lacks focus on the changing dynamics of pastoralism in relation to HWC.	Examines the effect of settlement pattern changes on HWC in Kajiado County, Kenya.

Lesorogol & Lesorogol (2024)	Land management, grazing strategies, pastoralism	New grazing strategies reduced pastoralist access to rangelands, forcing them to seek pastures elsewhere.	No detailed assessment of the implications of these changes on HWC.	Investigates the effects of changes in pastoral activities on HWC in Kajiado County, Kenya.
Mukeka et al. (2019)	Wildlife species, seasons, regions, land use change	Human-wildlife conflict (HWC) increased with land conversion and human-livestock population growth. Effective strategies must consider species, regions, and seasons.	Does not assess the specific role of pastoral activities on HWC.	The effect of changes in pastoral activities on HWC in Kajiado County, Kenya.
Mustațea & Pătru (2021)	Landscape changes, forest ecosystems, HWC	Landscape changes in forest ecosystems influenced wildlife conservation and human infrastructure impacts.	Lacks a comprehensive view of how agricultural and pastoral changes affect HWC.	Examines the effect of agricultural expansion on HWC in Kajiado County, Kenya.

Nguyen & Tran (2021)	Infrastructure projects, wildlife displacement, property damage	Infrastructure expansion forced wildlife into human settlements, resulting in property damage and human injuries.	Focuses on Vietnam; lacks analysis specific to Kenya's wildlife and infrastructure.	Evaluates how Kajiado County, Kenya's growth in infrastructure affects HWC.
Patel & Kumar (2023)	Infrastructure development, wildlife migration, human fatalities	Roads and railways disrupted wildlife corridors, causing frequent encounters with elephants and leopards.	Focused on India; lacks relevance to the pastoral dynamics of Kenya.	Examines how Kajiado County, Kenya's infrastructural development affects HWC.
Qingming et al. (2021)	Wildlife tourism, food provision, wildlife habituation	Tourist activities increased wildlife habituation, leading to more frequent human-wildlife conflicts.	Focuses on tourism-induced conflicts rather than infrastructure impacts.	Evaluates how growth in infrastructure in Kenya's Kajiado County affects HWC.
Gemeda (2018)	Agricultural expansion, wildlife displacement, biodiversity loss	Agricultural expansion led to wildlife displacement and more frequent human-wildlife encounters, particularly with large animals.	Focused on biodiversity impacts without region-specific conflict analysis.	Explores the effect of agricultural expansion on HWC in Kajiado County, Kenya.

Yunrui et al. (2024)	Forests, croplands, wildlife patterns	Wildlife conflicts were more frequent near protected areas and forests, peaking seasonally.	The study is limited to specific wildlife species and doesn't address agricultural impacts.	Investigates the effect of agricultural expansion on HWC in Kajiado County, Kenya.
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Source: Researcher (2025)

2.5 Conceptual Framework

A conceptual framework, as defined by Ravitch and Riggan (2022), is a comprehensive collection of concepts and ideas drawn from relevant fields of study that are used to organize a presentation that follows. The conceptual framework is depicted in Figure 2.1, which shows the relationship between changes in pastoral activities, changes in settlement patterns, the growth of agriculture and infrastructure, and conflicts between humans and wildlife.

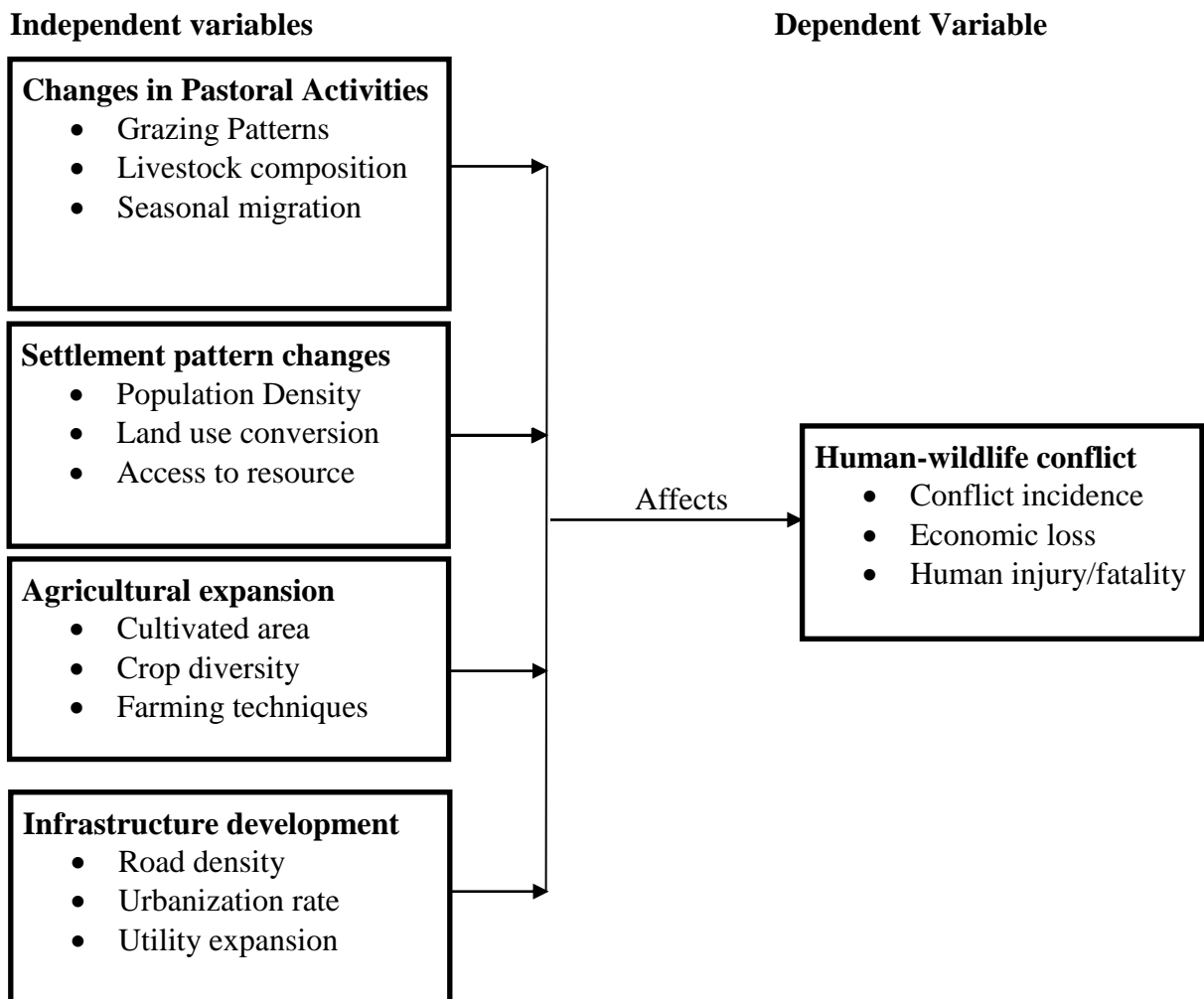


Figure 2.1: Conceptual Framework
Source: Researcher (2025)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the approach used to investigate how land use changes impact conflicts between people and wildlife in Kenya's Kajiado County. It offers a comprehensive description of the design of the study, the population under research, sampling techniques, sample size, research tools, a test run of the study in progress, checks for tool accuracy and consistency, data analysis techniques, model details, and ethical considerations. The chosen approaches offer an organized approach to addressing the research issues and are consistent with the study's goals.

3.2 Research Design

The study's research design was descriptive in nature. This sought to methodically observe and characterize how human-wildlife conflict in Kajiado County, Kenya, was impacted by changes in land use, including shifts in pastoral activities, settlement patterns, agricultural growth, and infrastructure development. The goal of the design is to accurately depict the features of a certain phenomena, addressing the "what" questions instead of the "why" (Mugenda & Mugenda, 2003). The descriptive design of this study included qualitative and quantitative approaches. The quantitative component involved distributing structured surveys to a sufficient number of local residents in order to collect numerical data that could be statistically analyzed to identify trends and links between documented instances of human-wildlife conflict and land use changes.

3.3 Operationalization of Study's Variables

Table 3.1 provides an overview of the operationalization of the study variables.

Table 3.1: Operationalization of the Variables

Variable Type	Variable	Indicators	Measurement Scale
Dependent Variable	Human-wildlife conflict	<ul style="list-style-type: none"> • Conflict incidence • Economic loss • Human injury/fatality 	Likert/Ordinal
Independent Variable	Changes in Pastoral Activities	<ul style="list-style-type: none"> • Grazing Patterns • Livestock composition • Seasonal migration 	Likert/ Ordinal
Independent Variable	Settlement pattern changes	<ul style="list-style-type: none"> • Population Density • Land use conversion • Access to resource 	Likert/ Ordinal
Independent Variable	Agricultural expansion	<ul style="list-style-type: none"> • Cultivated area • Crop diversity • Farming techniques 	Likert/ Ordinal
Independent Variable	Infrastructure development	<ul style="list-style-type: none"> • Road density • Urbanization rate • Utility expansion 	Likert/ Ordinal

Source: Researcher (2025)

3.4 Study Locale

Kajiado County was the most ideal location to investigate the relationship between land use changes and human-animal conflict since it is surrounded by important wildlife corridors and protected areas such as Amboseli National Park, Nairobi National Park, and Tsavo West National Park. These areas, along with the presence of significant animal

migratory corridors and dispersal zones, make the county a focal point for human-wildlife interactions. Kajiado has also experienced fast changes in land use, such as increased agricultural production, urbanization, and the development of infrastructure and communities. Conflicts between people and animals have become more frequent and severe as a result of these developments' increasing encroachment on wildlife habitats. The study's applicability is further highlighted by the county's predominately pastoralist populations, whose livelihoods rely heavily on communal grazing lands and natural resources. Conflicts have gotten worse as a result of increased rivalry between cattle and wildlife brought on by changes in land use, which has reduced the availability of these resources. Additionally, Kajiado is a crucial region for studying the effects of human-wildlife conflicts since it frequently witnesses incidents of human-wildlife conflict, including crop raiding, cattle predation, and human mortality.

3.5 Target Population

The study's target demographic consists of Kajiado County wildlife management officers, farmers, pastoralists, and members of the local community. 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. Among them were representatives of the local community, farmers and pastoralists, wildlife rangers and officers, community leaders, county and government officials, and organizations dedicated to wildlife conservation. The KNBS (2021) reports that the County's population is diversified, including both settlers engaged in agriculture and indigenous pastoral populations. This population is important because it is directly impacted by changes in land use and interactions between people and wildlife. The study

concentrated on particular sub-counties where conflicts between people and wildlife are common.

Table 3.2 Target population

Category	Population
Local Community Representatives	1,500
Farmers and Pastoralists	800
Wildlife Rangers and Officers	50
Community Leaders	30
Government and County Officials	30
Wildlife Conservation Organizations	9
Total	2419

Source: Kajiado County Government (2025)

3.6 Sampling Technique

To ensure that different subgroups within the target population, such as different land use patterns and demographic characteristics, are represented, stratified random sampling was used (Cohen et al., 2018). This approach makes it possible to accurately represent the variety of viewpoints found in Kajiado County. To obtain a representative sample, the population was first separated into strata according to the kind of land use (pastoralists, agriculturalists, and mixed-use), and then each stratum was randomly selected.

The sample size calculation formula developed by Cochran (Cochran, 1977) was used to find the sample size, which is suitable for surveys with a large population. There was a 5% margin of error and a 95% confidence level.

$$n = \frac{N}{1 + N(e^2)}$$

Where:

n = sample size

N = total population size

e = margin of error (expressed as a decimal)

Assuming a margin of error (e) of 5% (0.05):

$$n = \frac{2419}{1 + 2419(0.05)^2}$$

n=343

Table 3.3 Sample Size

Category	Population	Sample Size	Percentage
Local Community Representatives	1,500	213	62
Farmers and Pastoralists	800	114	33.1
Wildlife Rangers and Officers	50	7	2.1
Community Leaders	30	4	1.2
Government and County Officials	30	4	1.2
Wildlife Conservation Organizations	9	1	0.4
Total	2419	343	100%

Source: Researcher (2025)

3.7 Research Instruments

According to Bryman (2016), research instruments are tools used to gather data for a study. Their format and function may vary significantly, depending on the type of information needed and the nature of the study. Structured questionnaires and semi-structured interview guides were used to gather both qualitative and quantitative data for this study. This made it possible to fully comprehend how changes in land use impact human-wildlife conflict in Kajiado County.

A structured questionnaire was the main study tool used to gather quantitative data. This tool contained closed-ended questions intended to measure the correlations between variables, including land use practices, human-wildlife conflict occurrences, and respondent demographics. Because they make data analysis easier and allow for response

comparison, closed-ended questions have advantages (Kumar, 2011). The design of the questionnaire ensures that each respondent gives the same responses, enhancing the authenticity and dependability of the information gathered. To ensure that the questionnaire is understandable and relevant, a small sample of people pre-tested it before it was fully implemented.

Interview guidelines with a semi-structure were used to collect qualitative data through in-depth discussions. Community Leaders, County and Government Officials, and Wildlife Conservation Organizations were interviewed. By asking these guides open-ended questions, the participants were able to express their thoughts and experiences regarding changes in land use and how they affect human-wildlife interactions. Researchers can study the nuances and complexity of individual encounters and community perceptions by using this qualitative technique, which provides more context for the quantitative data (Kumar, 2011). The flexibility of the semi-structured style allows the interviewer to go deeper into intriguing topics that may come up throughout the conversation. The study's overall conclusions were enhanced and the collected data was enriched by this combination approach of combining semi-structured and structured instruments.

3.8 Pilot Study

Only a small portion of the target demographic took part in a pilot research. These were 34 people (10% of the sample total) from the same Kajiado County who evaluated the study tools for cultural appropriateness, relevance, and clarity. Respondents who took part in the pilot study were not included in the primary study sample. The instruments

were modified as needed based on feedback from the pilot research to make sure they successfully collected the desired data (Joppe, 2000).

3.8.1 Validity

An exacting procedure was used to guarantee the validity of the research instruments, which includes expert assessments by social science and animal conservation professionals. These experts evaluated the contents of the instruments to make sure the items were relevant and consistent with the study's objectives, demonstrating content validity (Wang & Zhang, 2021). This stage is essential because it guarantees that the instruments accurately capture the intricacies of humans versus wildlife conflict in response to land use alterations and reflect the constructs being measured. Additionally, a small sample of the target demographic participated in pilot testing to receive input on the items' appropriateness and intelligibility.

3.8.2 Reliability

The reliability of the study tools was assessed using Cronbach's alpha, a measure of how well scale components connect to one another. According to Tavakol and Dennick (2011), good reliability is indicated by an alpha score higher than 0.70. In order to determine if semi-structured interview guides and structured questionnaires consistently measure the same notion, this criterion was applied to both. Over time, this consistency contributes to the study's findings being more trustworthy and dependable. Before the primary data collection, the instruments were modified, for as by deleting or changing problematic items, to increase their overall consistency in the event that the reliability study shows a coefficient below the allowed threshold. The methodical process of evaluating and improving reliability adds to the strength of the study's conclusions.

3.9 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, including changes in pastoral activities, infrastructure development, agricultural expansion, and settlement patterns, 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:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y= human-wildlife conflict

β_0 = Constant

β_1 to β_4 =Coefficients

X_1 = Changes in Pastoral Activities

X_2 = Settlement Pattern Changes

X_3 = Agricultural Expansion

X_4 = Infrastructure Development

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). Transcribing the

interviews is the first step in this process, which is followed by getting acquainted with the data to become fully immersed in it. Significant sentences and phrases pertaining to changes in land use and conflicts between humans and wildlife were then highlighted using thematic coding. Codes were categorized into more general themes that represent how the community views and experiences these disputes. In Kajiado County, Kenya, the thematic analysis produced deep, contextual insights that complement the quantitative results and offer a better understanding of the connections between changes in land use and human-wildlife conflict. Ultimately, the study's conclusions were reinforced by the inclusion of both quantitative and qualitative data, which also offered comprehensive recommendations for resolving conflicts between local wildlife and humans.

3.10 Ethical Considerations

Research involving human subjects must take ethics into account, particularly when dealing with delicate subjects like conflict between people and nature. An Institutional Review Board (IRB) permission was obtained prior to data collection in order to ensure that the study complies with ethical guidelines. The goals of the study, the procedures, and the participants' freedom to withdraw at any time without facing consequences were explained to them. All individuals gave their consent, guaranteeing their full awareness and voluntary participation. All personal identities were removed from the data before analysis and results sharing, and the data was anonymized by coding it to protect the privacy of the participants. This approach fosters an atmosphere of trust, which motivates individuals to interact honestly and openly.

Furthermore, the possible effects of the study on nearby residents and wildlife populations must be taken into account. In order to recognize the cultural relevance of

animals to the people involved, researchers sought to conduct the study in a way that was considerate of local norms and practices. Participants were assured that the data they submitted would only be used for academic study and that the results would be disseminated to the public in order to raise knowledge and comprehension of the dynamics of conflict between humans and wildlife. The study also offered suggestions for enhancing the cohabitation of people and animals, which will help improve management techniques and policies that take local communities' needs and rights into account.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

A thorough summary of the study's findings based on the data analysis is provided in this chapter. Specifically, the chapter provides the background information of the respondents, followed by the inferential and descriptive statistical results of the study.

4.2 Response Rate

The study issued a total of 343 questionnaires to the target respondents comprising of Local Community Representatives, Farmers and Pastoralists, Wildlife Rangers and Officers, Community Leaders, Government and County Officials and Wildlife Conservation Organizations. The response rate outcomes are displayed in Figure 4.1.

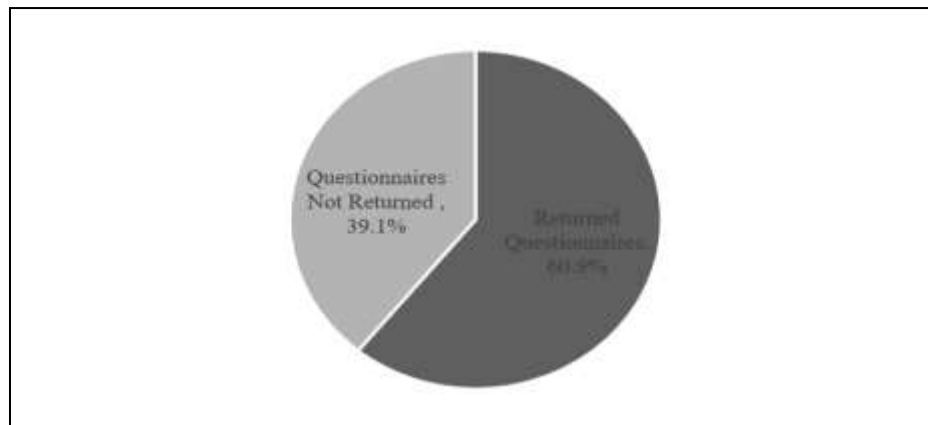


Figure 4.1: Response Rate

Source: Research Data (2025)

According to the findings, 209 questionnaires were completed, yielding a 60.9% response rate for the study. The response rate was thus deemed suitable and appropriate for analysis. Cooper and Schindler (2011) asserted that a response rate of 60% or above is

deemed adequate for analysis and drawing conclusions, which was consistent with this finding.

4.3 Demographic Characteristics Results

The demographic findings from the study are shown in this section. Age, gender, occupation, years in Kajiado County, Japan, land use, and the resident's sub-county were among the demographic aspects taken into account in the study.

4.3.1: Age

Figure 4.2 outlines the outcomes on the respondent's ages.

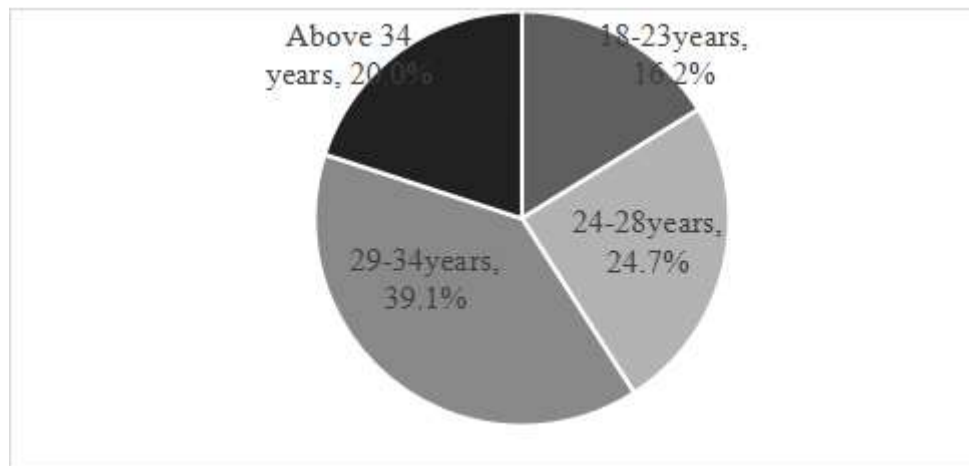


Figure 4.2: Age

Source: Research Data (2025)

According to the results, respondents with age bracket of 18 and 23 years were 16.2%, 24 and 28 years were 24.7%, 29 and 34 years were 39.1% while those with more than 34 years were 20.0%. The results shows that majority of the respondents were aged between 29 and 34 years. However, all the respondents had attained the adult age of 18 years and thus could be involved in the study.

4.3.2: Gender

Figure 4.3 outlines the outcomes on the respondent's gender. This was aimed at assessing the representation nature of men and women in the study.

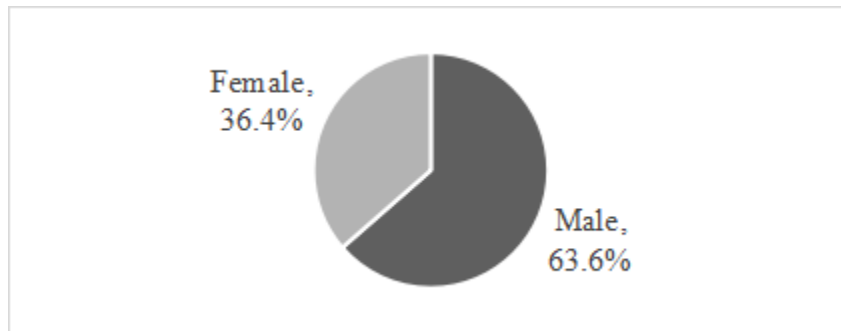


Figure 4.3: Gender

Source: Research Data (2025)

The results on the gender shows that Male respondents were 63.6% while female accounted for Female 36.4%. The data showed that men made up the vast majority of the respondents. This is attributed to the fact that Kajiado County, being a Maasai dominated region, is deeply rooted on culture where male usually carries the leadership role compared to female.

4.3.3: Highest Level of Education

Figure 4.4 provides an outline of respondent's education level. The purpose of this was to determine whether the respondents had received enough education to comprehend the questionnaire's contents and provide suitable answers. The results are shown in Figure 4.4.

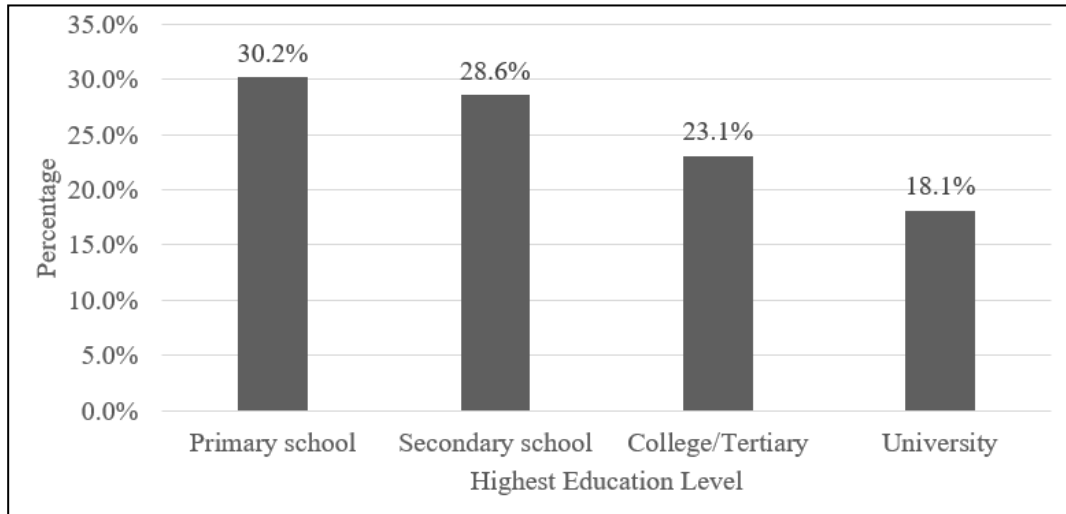


Figure 4.4: Highest Education Level

Source: Research Data (2025)

The results shows that respondents with Primary school education level were 30.2%, Secondary school level were 28.6%, College/Tertiary were 23.1% while University level were 18.1%. The results shows that majority of the respondents had acquired primary school level of education. This can be explained by the fact that the pastoral community that predominates in the area may value pastoralism over schooling.

4.3.4: Occupation

The study aimed to determine the respondents' occupation. The objective was to determine the activities that the participants engaged in. The findings are displayed in Figure 4.5.

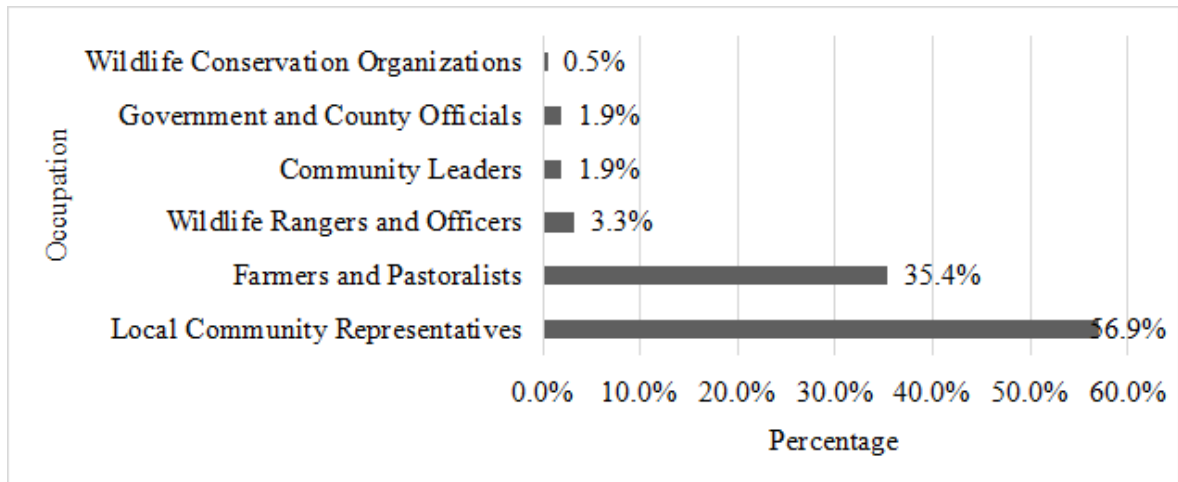


Figure 4.5: Occupation

Source: Research Data (2025)

The results shows that Local Community Representatives were 56.9%, Farmers and Pastoralists were 35.4%, Wildlife Rangers and Officers were 3.3%, Community Leaders were 1.9%, Government and County Officials 1.9% while Wildlife Conservation Organizations were 0.5%. However, all the targeted respondents were well represented in the study, enriching the findings due to different perspectives acquired from different occupations (Patton, 2018).

4.3.5: Years in Kajiado County

The research also established how long the respondents had lived in Kajiado County. This wanted to find out if they had seen changes in land usage and how these affected conflicts between people and animals. The findings of the analysis are shown in Figure 4.6.

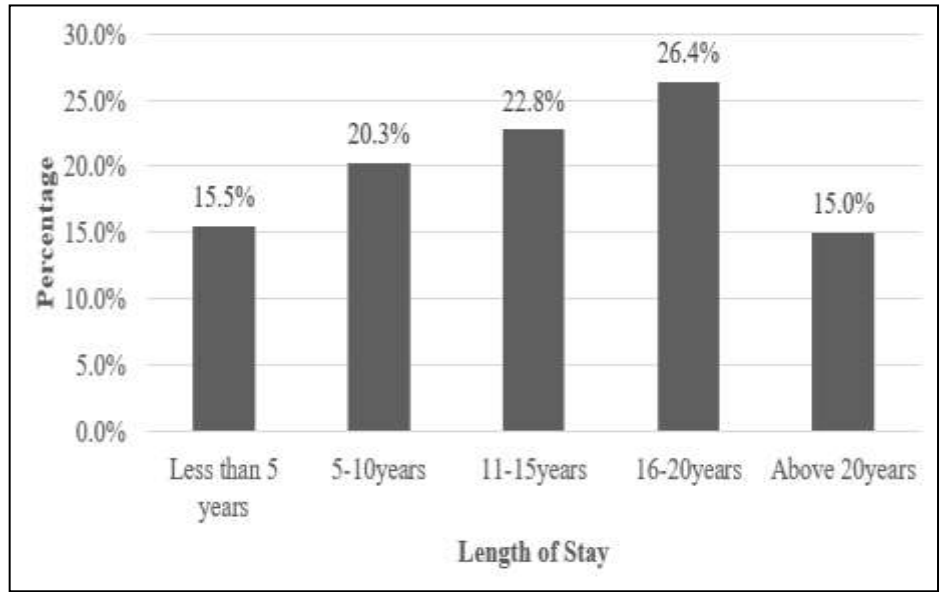


Figure 4.6: Length of Stay in Kajiado County

Source: Research Data (2025)

According to the findings, 15.5% of people have lived in the county for not more than five years, between 5 and 10 years were 20.3%, between 11 and 15 years were 22.8%, between 16 and 20 years were 26.4% while those with more than 20 years were 15.0%. The majority of respondents, according to the results, had lived in the county for more than ten years. This suggests that they had been there for sufficiently long to observe the effects of changing land use on conflicts between people and wildlife.

4.3.6: Land Use

The study sought to establish the nature of land use in the region. This was aimed at determining how land was being utilized in the region. Figure 4.7 outlines the results.

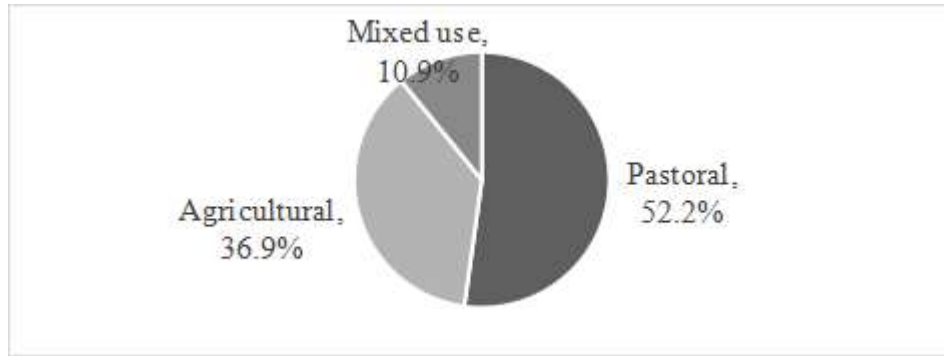


Figure 4.7: Land Use

Source: Research Data (2025)

The results showed that respondents who used land for pastoral activities were 52.2%, agriculture were 36.9% while those with mixed uses were 10.9%. The results shows that majority of the land in the region was used for both pastoral and agricultural activities. This could explain the sources of human-wildlife conflicts.

4.3.7: Respondents Sub Counties

Figure 4.8 provides an outline of respondent’s sub-counties. This was aimed at ensuring existence of representations from the various sub-counties that makes up the larger Kajiado County.

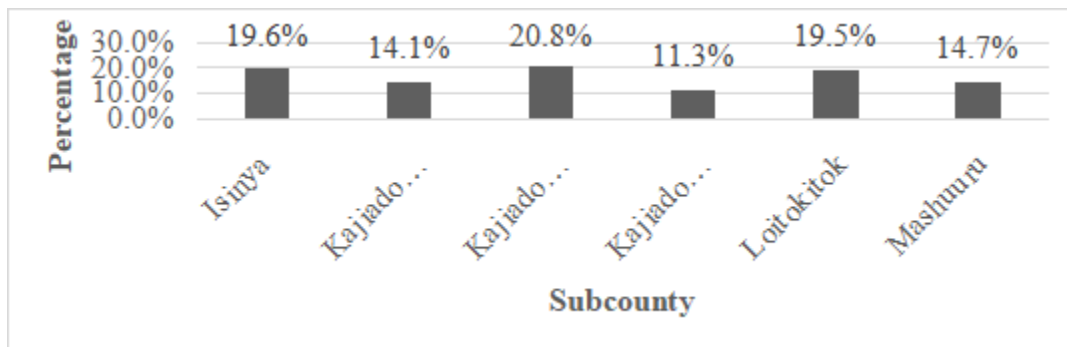


Figure 4.8: Respondents Sub-County

Source: Research Data(2025)

According to the outcomes, 19.6% of respondents came from the Isinya sub-county, Kajiado Central were 14.1%, Kajiado North were 20.8%, Kajiado West were 11.3%, Loitokitok were 19.5% while Mashuuru were 14.7%. The results shows that there was representation from the various sub-counties in the study with Isinya, Kajiado North and Loitokitok having the highest representation.

4.4 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.

4.4.1 Changes in Pastoral Activities

Table 4.1 presents the descriptive analysis results on changes in pastoral activities.

Table 4.1: Changes in Pastoral Activities

Statements	Mean	Std.Dev
Pastoral activities have decreased in my area.	3.723	0.994
The availability of grazing land has diminished over the years.	3.812	0.796
There is increased competition for resources between wildlife and livestock.	3.527	0.703
Traditional grazing practices are being abandoned.	3.838	0.816
I have noticed changes in wildlife behavior due to pastoral changes.	3.177	1.093
Pastoralists are increasingly engaging in agricultural practices.	3.619	0.784
Conflicts with wildlife have increased as pastoral practices change.	3.906	0.588
Livestock health has been affected by changes in pastoral activities.	3.129	0.988
Composite	3.591	0.845

Source: Research Data (2025)

According to the data, respondents agreed, as indicated by the composite mean of 3.591 with the statements on changes in pastoral activities and its impact on human-wildlife conflicts. The overall standard deviation, which was 0.845, indicated that there were differences in the respondents' answers. Additionally, the findings showed that respondents concurred with the assertions that pastoral activities had declined in their region (mean= 3.723, std.dev=0.994), that the availability of grazing land had diminished over the years (mean=3.812, std.dev=0.796), that there is increased competition for resources between wildlife and livestock (mean=3.527, std.dev=0.703) and that traditional grazing practices were being abandoned (Mean=3.838, std.dev=0.816). Respondents further agreed with the statements that pastoralists were increasingly engaging in agricultural practices (mean=3.619, std.dev=0.784) and that conflicts with wildlife had increased as pastoral practices change (mean=3.906, std.dev=0.588). However, respondents' opinions on the assertions that they had noticed changes in

wildlife behavior due to pastoral changes (mean=3.177, std.dev=1.093) and that livestock health had been affected by changes in pastoral activities (mean=3.129, std.dev=0.988) were neutral.

The outcomes are consistent with those of Primi *et al.* (2024), who found that changes in pastoral activities significantly impact wildlife by altering their access to grazing lands and water sources. Land use changes driven by agricultural expansion and infrastructure development further constrain wildlife movement, increasing the frequency of encounters with humans and livestock. These shifts lead to heightened conflict over dwindling resources, particularly during dry seasons when both livestock and wildlife compete for water and pasture.

4.4.2 Settlement Pattern Changes

Table 4.2 presents the descriptive results on settlement pattern changes

Table 4.2: 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 new 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.

4.4.3 Agricultural Expansion

Table 4.3 presents the descriptive results on agricultural expansion

Table 4.3: 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 Gameda (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.

4.4.4 Infrastructure Development

Table 4.4 presents the descriptive statistics on infrastructure development.

Table 4.4: Infrastructure Development

Infrastructure Development	Mean	Std.Dev
Infrastructure projects have increased in my area recently.	4.049	0.304
Roads and highways have fragmented wildlife habitats.	3.923	0.576
Wildlife crossings (overpasses/underpasses) are adequate in my area.	3.809	0.507
Human-wildlife conflicts have increased due to infrastructure.	3.715	0.893
Community engagement in infrastructure planning is sufficient.	3.013	1.134
There are policies to mitigate the impact of infrastructure on wildlife.	3.581	0.904
Wildlife fatalities due to infrastructure are reported in my area.	3.448	0.817
The local government prioritizes wildlife conservation in development plans.	3.319	0.783
Composite	3.607	0.73

Source: Research Data (2025)

According to the findings, the composite mean was 3.607, which suggests that participants agreed with the assertions regarding infrastructure development and its impact on human wildlife conflict. The composite standard deviation was 0.73 implying existence of moderate variability in the nature of responses amongst respondents. The findings also indicate that respondents concurred with the assertions that infrastructure projects had increased in the area recently (mean=4.049, std.dev=0.304), that roads and highways had fragmented wildlife habitats (mean=3.923, std.dev=0.576), that wildlife crossings (overpasses/underpasses) were adequate in the area (mean=3.809, std.dev=0.507), that human-wildlife conflicts had increased due to infrastructure (mean=3.715, std.dev=0.893) and that there were policies to mitigate the impact of infrastructure on wildlife (mean=3.581, std.dev=0.904). Respondents however were

neutral with the statements that community engagement in infrastructure planning was sufficient (mean=3.013, std.dev=1.134), that wildlife fatalities due to infrastructure were reported in the area (mean=3.448, std.dev=0.817) and that the local government prioritized wildlife conservation in development plans (mean=3.319, std.dev=0.783).

The results are in tandem with Patel and Kumar (2023) who established that infrastructural developments, particularly roads, railways, and urban expansion, increases the frequency of human-wildlife conflicts by disrupting natural migration corridors and leading to habitat fragmentation. Road networks in wildlife-rich areas contribute to habitat loss and restrict animal movement, leading to increased encounters between wildlife and humans. Expanding infrastructure, such as fencing, settlements, and highways, not only reduces the availability of grazing land for herbivores but also forces predators into closer proximity to human settlements in search of food. This intensifies cases of livestock predation, crop destruction, and even direct attacks on humans.

4.4.5 Human-Wildlife Conflict

Table 4.5 outlines the descriptive results on human-wildlife conflict

Table 4.5: 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. Traditionally, the Maasai community practiced seasonal grazing, allowing pastures to regenerate, and wildlife to coexist with livestock. However,

the shift towards more sedentary lifestyles, land privatization, and increased fencing of grazing areas has disrupted wildlife migration routes. Human versus wildlife conflict has increased as a consequence of animals being forced into urban areas in search of food and water.

On the ways in which reduced grazing land had contributed to human-wildlife conflicts, the analysis established that as communal lands shrink due to private ownership, agricultural expansion, and infrastructure development, both livestock and wildlife are competing for limited pasture and water resources. This has resulted in increased cases of herbivores such as elephants and zebras encroaching on farmlands, causing destruction to crops and triggering retaliatory actions from farmers. Additionally, carnivores like lions and hyenas, facing a decline in their natural prey, have increasingly attacked livestock, leading to economic losses for herders and heightening tensions between communities and conservationists.

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.

On how infrastructure development, such as roads or buildings, had affected wildlife habitats and behavior, respondents mentioned that roads cutting through wildlife corridors have increased the number of animal-vehicle collisions, leading to fatalities for both humans and animals. Large-scale developments such as towns and commercial buildings have further reduced the availability of natural habitats, forcing wildlife into confined areas. Noise pollution, human activities, and artificial lighting have also disrupted nocturnal wildlife behavior, altering their feeding and migration patterns.

On the strategies that can be implemented to reduce human-wildlife conflicts resulting from infrastructure development, respondents mentioned that one approach is integrating wildlife corridors into urban planning to allow safe passage for migrating animals. The construction of wildlife overpasses or underpasses on major roads can help reduce roadkill incidents. Additionally, policies that regulate land use and promote coexistence, such as zoning laws that prevent settlements in critical wildlife areas, can be enforced. Public awareness campaigns and community participation in conservation efforts are also crucial in fostering a harmonious relationship between humans and wildlife.

4.5 Inferential Statistics

The study assessed the connection between the independent variables (Changes in Pastoral Activities, Settlement Pattern Changes, Agricultural Expansion, and Infrastructure Development) and the dependent variable (Human-wildlife Conflict). To

evaluate the correlation, Pearson's correlation was employed. To assess the nature of the relationship between study variables, regression analysis was utilized.

4.5.1 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 changes in pastoral activities, settlement patterns, agricultural expansion, and infrastructure development with the occurrence of human-wildlife conflict. Table 4.6 outlines the results.

Table 4.6 Correlation Analysis

		Changes in Pastoral Activities	Settlement Pattern Changes	Agricultural Expansion	Infrastructure Development	Human- wildlife Conflict
Changes in Pastoral Activities	Pearson Correlation Sig. (2-tailed)	1				
Settlement Pattern Changes	Pearson Correlation Sig. (2- tailed)	.061** 0.093	1			
Agricultural Expansion	Pearson Correlation Sig. (2- tailed)	.262** 0.016	.326** 0.019	1		
Infrastructure Development	Pearson Correlation Sig. (2- tailed)	.324** 0.002	.347** 0	.234** 0	1	
Human- wildlife Conflict	Pearson Correlation Sig. (2- tailed)	.195** 0.009	.539** 0	.403** 0	.246** 0.006	1
	N	209	209	209	209	209

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Source: Research Data (2025)

Changes in pastoral activities bear positive significant correlation with human-wildlife conflict in Kajiado County, according to the results of the correlation analysis. A correlation value of 0.195 and a significant value of 0.009, below 0.05, illustrate this. The findings indicate a small but statistically significant correlation, indicating that human-wildlife conflict tends to rise in tandem with changes in pastoral activity. These results align with those of Mukeka et al. (2019), who found a positive relationship between rising HWC and both more people and livestock as well as land conversion to agriculture.

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 Gameda (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.

The results also revealed that infrastructure development bears a positive and significant correlation with Human-wildlife Conflict in Kajiado County. This is depicted by a correlation value of 0.246 and a significant value 0.006 which is less than 0.05. The results imply that infrastructure development, such as the expansion of roads, urban areas, or agricultural projects, may be encroaching on wildlife habitats or migration routes in Kajiado County. This could lead to more frequent interactions between humans and wildlife, escalating conflicts. The results are in tandem with Patel and Kumar (2023) who established that infrastructural developments, particularly roads, railways, and urban expansion, increases the frequency of human-wildlife conflicts by disrupting natural migration corridors and leading to habitat fragmentation.

4.6.2 Multiple Regression Analysis

The study used multiple regression analysis to look at the connections between the variables, using a 95% confidence level.

4.6.2.1 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 4.7.

Table 4.7: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.786a	0.618	0.544	0.21965
a. Predictors: (Constant), Changes in Pastoral Activities, Settlement Pattern Changes, Agricultural Expansion and Infrastructure Development			

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 pastoral activities, changes in settlement patterns, agricultural expansion, and infrastructural development. This is demonstrated by the 0.786 R-value. According to the coefficient of determination represented by R-square=0.618, changes in pastoral activities, changes in settlement patterns, agricultural expansion, and infrastructure development can account for 61.8% of the variances in human-wildlife conflicts in Kajiado County.

4.6.2.2 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 4.8 displays the results.

Table 4.8: 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), Changes in Pastoral Activities, Settlement Pattern Changes, Agricultural Expansion and Infrastructure Development

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.

4.6.2.3: Regression Coefficients

The study used a regression coefficient to evaluate how changes in the independent variables affect the dependent variable. Table 4.9 presents the findings.

Table 4.9: Model Coefficients

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	T	
(Constant)	0.719	0.633		1.1359	0.000
Changes in Pastoral Activities	0.213	0.141	0.176	1.5106	0.009
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
Infrastructure Development	0.329	0.132	0.284	2.4924	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) +0.329 (Infrastructure Development) + 0.213 (Changes in Pastoral Activities)

The findings indicate that human-wildlife conflicts in Kajiado County, Kenya, are positively and significantly affected by changes in pastoral activity as demonstrated by a beta value of 0.231 and significance value of $0.009 < 0.05$. The result implies that for every unit increase in the measure of changes in pastoral activities, human-wildlife conflict increases by 0.231 units, holding other variables constant. The results tallies with findings from Nigatu and Duba (2017) who established that the unregulated management of livestock pastures, encroachment on nearby communities, settlement patterns within or near the protected region, a lack of zoning and boundary separation, and an increase in demand for products that occur within the conservation area are some of the primary reasons why people and animals clash.

The findings also demonstrated 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.

The results further revealed that infrastructure development bears a positive and significant effect on human wildlife conflicts in Kajiado County Kenya. This is shown by a beta value of 0. 0.329 and significance value of $0.000 < 0.05$. The result implies that for every unit increase in the measure of infrastructure development, human-wildlife conflict increases by 0. 0.329 units, holding other variables constant. According to Burudi, Krisztián and Tormáné (2023), infrastructure expansion, particularly roads and railways, disrupts ecological connectivity, forcing wildlife into human-occupied areas where conflicts arise due to competition for space and resources.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

An overview of the study's results utilising both descriptive and inferential statistics is given in this chapter. A summary of the findings was provided for every single variable that was employed in the research. This chapter lists other research areas in addition to the study's conclusions and recommendations.

5.2 Summary of the Findings

The study aimed at establishing the effects of land use changes and human-wildlife conflict in Kajiado County, Kenya. The main land use changes focused in the study comprised of changes in pastoral activities, settlement pattern changes, agricultural expansion and infrastructure development and their effect on human wildlife conflict. The study employed a descriptive research design and targeted 2419 individuals comprising of local community representatives, farmers and pastoralists, wildlife rangers and officers, community leaders government and county officials and wildlife conservation organizations. The subsequent sections presents the summaries of each of the objective.

5.2.1 Changes in Pastoral Activities

The descriptive analysis results established that all respondents agreed with the statements on changes in pastoral activities and their effects on human wildlife conflicts in Kajiado County. Consequently, the regression results revealed that changes in pastoral activities positively and significantly correlates with human wildlife conflict in the

county. The regression results additionally revealed that changes in pastoral activities positively and significantly affect human wildlife conflicts in Kajiado County ($p=0.0009<0.005$). These findings demonstrate that human versus wildlife conflicts in Kajiado County rise in tandem with changes in pastoral activity.

5.2.2 Settlement Pattern Changes

According to the findings of the descriptive analysis, respondent agreed with the assertions on changes in settlement patterns and their effects on human wildlife conflicts in Kajiado County. Consequently, the regression results revealed that settlement pattern changes positively and significantly correlates with human wildlife conflict in the county. The regression results additionally revealed that settlement pattern changes positively and significantly affect human wildlife conflicts in Kajiado County ($p=0.000<0.05$). These results depicts that increasing settlement pattern increases the levels of human wildlife conflicts in Kajiado County.

5.2.3 Agricultural Expansion

The findings of the descriptive analysis revealed that all respondents had a neutral opinion on the assertions regarding agricultural expansion and its effects on human wildlife conflicts in Kajiado County. Consequently, the regression results revealed that agricultural expansion positively and significantly correlates with human wildlife conflict in the county. The regression results additionally revealed that agricultural expansion positively and significantly affect human wildlife conflicts in Kajiado County ($p=0.000<0.05$). The results suggests that increasing in the levels of agricultural expansion increases the levels of human wildlife conflicts in Kajiado County.

5.2.4 Infrastructure Development

The descriptive analysis's outcomes showed that every respondent agreed with the contentions made on infrastructure development and its effect on human wildlife conflicts in Kajiado County. Consequently, Infrastructure development has a positive significant correlation with human-wildlife conflict in the county, according to the regression results. The regression results additionally revealed that infrastructure development positively and significantly affect human wildlife conflicts in Kajiado County ($p=0.000<0.05$). The results demonstrates that increasing the levels of infrastructure development increases the levels of human wildlife conflicts in Kajiado County.

5.3 Conclusion

Changes in pastoral activities significantly contribute to the escalation of human-wildlife conflict in Kajiado County. The unanimous agreement among respondents, coupled with the positive and significant correlation and effect revealed by regression analysis, indicates that shifts in pastoral practices such as increased livestock grazing and changes in herding patterns disrupts wildlife habitats. This leads to heightened conflict and while these activities intensify, they worsen interactions between humans, livestock, and wildlife.

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.

Infrastructure development significantly aggravates human-wildlife conflict in Kajiado County. The agreement among respondents, reinforced by the positive and significant correlation and effect in regression analysis, indicates that the construction of roads, buildings, and other infrastructure disrupts wildlife habitats and migration routes, leading to more frequent conflicts. As infrastructure projects expand, they intensify the pressure on wildlife populations.

This research contributes to existing knowledge by offering up-to-date data on the particular land use changes that have a major impact on the frequency of conflict between humans and wildlife in Kajiado County. The study offers an elaborate perspective on how human actions disturb and intrude on wildlife habitats, which intensifies conflict. The findings not only improve theoretical understanding of land use dynamics and wildlife conservation, but they also provide policymakers, conservationists, and local communities with targeted strategies to reduce conflict between humans and wildlife. This can be attained through adoption of sustainable land use planning and conflict-sensitive development practices.

5.4 Recommendations

The study provided recommendations on the needs to address the impact of changes in pastoral activities, sustainable grazing practices such as rotational grazing and controlled livestock movement should be promoted to minimize habitat degradation. Establishing designated grazing zones can help reduce competition between livestock and wildlife, while community-based conservation initiatives can encourage pastoralist communities to adopt wildlife-friendly grazing practices. Additionally, education and awareness campaigns should be implemented to train pastoralists on sustainable herding techniques that minimize direct interactions with wildlife.

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.

The study recommends integration of wildlife considerations into development plans. Infrastructure projects should incorporate wildlife corridors and underpasses to ensure minimal disruption to migration routes. Conducting mandatory environmental impact assessments before approving any major infrastructure project in wildlife-prone areas helped mitigate adverse effects on wildlife. Strengthening the enforcement of land-use policies is necessary to ensure that infrastructure development balances economic growth with conservation efforts. Additionally, engaging stakeholders such as local communities, conservation organizations, and policymakers in decision-making processes may ensure that infrastructure development takes wildlife protection into account.

5.5 Areas of Further Studies

The study was centered in Kajiado County. The study thus provides a recommendation of another similar study but in a different county for a comparative analysis of results. From the regression analysis, the study established that land use changes comprising of changes in pastoral activities, settlement pattern changes, agricultural expansion and infrastructure development accounts for 61.8% of variations on human wildlife conflict in Kajiado County. The other 38.2% is accounted by other indicators of land use changes not included in the study. The study thus recommends another study focusing on the other indicators of land use changes.

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APPENDICES

Appendix: I Questionnaire Introduction

Dear Respondent,

As a Masters student, I am obligated to conduct a research using the attached questionnaire on Land Use Changes and Human-Wildlife Conflict in Kajiado County. This questionnaire aims to gather valuable information regarding the dynamics between various land use changes such as alterations in pastoral activities, settlement patterns, agricultural expansion, and infrastructure development and their impact on human-wildlife conflict in your area. Your insights are essential in understanding these relationships and will contribute to developing strategies that promote coexistence between humans and wildlife.

Six sections make up the questionnaire, each of which focusses on specific aspects of land use change and interaction between humans and wildlife. Please provide the most truthful and accurate response you can to the questions. Your answers will be kept private and utilised exclusively for study purposes.

Appendix II: Questionnaire

Section A: Personal Information

1. What is your age?
(Please specify in years)

2. What is your sex? Male Female
3. What is your highest level of education?
(Please select one)
 Primary school
 Secondary school
 College/Tertiary
 University
 Other (Please specify): _____
4. What is your occupation?
(Please specify)
5. How long have you lived in Kajiado County?
(Please specify in years) _____
6. What type of land use is predominant in your area?
(Please select one)
 Pastoral
 Agricultural
 Mixed use
 Other (Please specify): _____
7. Which sub-county in Kajiado County do you live in?
(Please specify)
8. If applicable, how many livestock do you currently own?
(Please specify the number) _____

Section B: Changes in Pastoral Activities

9. To what extent do you agree with the following statements regarding changes in pastoral activities using the scale below:

Statement	5	4	3	2	1
Pastoral activities have decreased in my area.					
The availability of grazing land has diminished over the years.					
There is increased competition for resources between wildlife and livestock.					
Traditional grazing practices are being abandoned.					
I have noticed changes in wildlife behavior due to pastoral changes.					
Pastoralists are increasingly engaging in agricultural practices.					
Conflicts with wildlife have increased as pastoral practices change.					
Livestock health has been affected by changes in pastoral activities.					

Section C: Settlement Pattern Changes

10. Please indicate your level of agreement with the following statements regarding changes in settlement patterns using the scale below:

Use the Key 5 - Strongly Agree, 4 - Agree, 3 - Neutral, 2 - Disagree and 1 - Strongly Disagree

Statement	5	4	3	2	1
Settlement density in my area has increased over the past few years.					
New settlements have encroached on wildlife habitats.					
Human-wildlife encounters have risen due to settlement changes.					

Wildlife migration routes have been disrupted by settlements.					
The community's tolerance for wildlife has decreased with increased settlements.					
Settlements have changed the availability of resources for wildlife.					
Local authorities have addressed settlement-related wildlife issues effectively.					
There are adequate buffer zones between human settlements and wildlife areas.					

Section D: Agricultural Expansion

11. Please use the following scale to indicate how much you agree or disagree with the following statements on agricultural expansion:

Statement	5	4	3	2	1
Agricultural land has increased significantly in my area.					
The expansion of farms has reduced wildlife habitats.					
Crop raiding by wildlife has become a common issue.					
Farmers have changed their practices to adapt to wildlife conflicts.					
Agricultural chemicals have impacted local wildlife.					
The community is aware of the effects of agricultural practices on wildlife.					
Compensation for wildlife damages is sufficient to support farmers.					
Collaboration between farmers and wildlife agencies is effective.					

Section E: Infrastructure Development

12. Please use the following scale to indicate how much you agree or disagree with the following statements on infrastructure development:

Statement	5	4	3	2	1
Infrastructure projects have increased in my area recently.					
Roads and highways have fragmented wildlife habitats.					
Wildlife crossings (overpasses/underpasses) are adequate in my area.					
Human-wildlife conflicts have increased due to infrastructure.					
Community engagement in infrastructure planning is sufficient.					
There are policies to mitigate the impact of infrastructure on wildlife.					
Wildlife fatalities due to infrastructure are reported in my area.					
The local government prioritizes wildlife conservation in development plans.					

Section F: Human-Wildlife Conflict

13. Please indicate your level of agreement with the following statements regarding human-wildlife conflict using the scale below:


Statement	5	4	3	2	1
Human-wildlife conflict is a significant issue in my community.					
I feel threatened by wildlife in my area.					
Wildlife damages to property are common in my community.					
I believe wildlife conservation is important despite conflicts.					


Education on wildlife conservation is accessible in my community.					
Local authorities effectively manage human-wildlife conflicts.					

Appendix III: Interview Guide

1. How have changes in traditional pastoral practices affected the interactions between humans and wildlife in your community?
2. In what ways do you think reduced grazing land has contributed to human-wildlife conflicts?
3. How have changes in settlement patterns impacted wildlife movements and encounters with humans in your area?
4. What challenges have you experienced with wildlife as human settlements have expanded?
5. How has the expansion of agricultural land in your community influenced human-wildlife conflicts?
6. What measures have been taken to manage conflicts between wildlife and farming activities?
7. How has infrastructure development, such as roads or buildings, affected wildlife habitats and behavior in your area?
8. What strategies do you think can be implemented to reduce human-wildlife conflicts resulting from infrastructure development?


Appendix IV: NACOSTI Permit


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