INFLUENCE OF HUMAN ELEPHANT CONFLICT ON SOCIO-ECONOMIC DEVELOPMENT OF NAROK COUNTY, KENYA

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF THE DEGREE OF MASTER IN DEVELOPMENT STUDIES

OF

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DECLARATION AND APPROVAL

Declaration by Student

This research project is my original work and has not been presented for the award in any other University or for any other award.

Signature..... Date..... 9/7/25

PHILEMON KIPKORIR CHEBET

MDS/2014/79111

Approval by the Supervisor

I confirm that this project was carried out by the Candidate under my supervision

Signature..... Date..... 9/7/25

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DEDICATION

This proposal is dedicated to my late grandmother Kogo Teriki Tabarno Chelang'a for her memorable coaching and mentoring in my early childhood education journey that formed the pillar of my academia life. May her soul continue resting in peace.

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Secondly, I will thank Mount Kenya University for giving me a chance to undertake a master's degree in the institution. The opportunity is a long time investment in my academic world and I appreciate every effort the University made so that I complete the programme. My appreciation also goes to my colleagues in the Master of Arts in development studies class for your teamwork, solidarity and moral support since the start of the course till now. Besides, I thank my employer Kenya Wildlife service for granting off duty during weekends to study this course to its completion besides, the permission to further carry out this project study on the significance of human elephant conflict mitigation strategies in the reduction of elephant mortality in the Maasai Mara ecosystem; in Narok county.

Last but not least, I will recognize and appreciate the moral support and encouragement I got from my loving wife, the challenge from my lovely daughters who woke up very early to go to school and my mother Rael Chelang'a throughout the course. Finally, I will take this opportunity to acknowledge the Almighty God for taking me this far. It is through His grace that I was able to accomplish my coursework and project writing.

ABSTRACT

Narok County is one of the human-wildlife conflict (HWC) hotspots in the country with elephants identified as the most problematic wildlife species. KWS Narok station indicates that out of the 9,299 human wildlife conflict cases reported in the last 10 years, 5,052 (54 per cent) were attributed to elephants. The purpose of study was to establish the influence of Human Elephant Conflict on Socio-Development of the Community living in Narok County Kenya. The Research Objectives were to establish the influence of human elephant conflict on disease transmission and deaths for both human and livestock, to determine the influence of human elephant conflict on Livestock depredation, to assess the Property damage caused by human elephant conflict and to assess the Crop raiding caused by human elephant conflict in Narok County. The Political Ecology Theory was applied to this study. This was a mixed methods study conducted through ethnography study designs for qualitative data and survey design for quantitative data. This study was conducted among the indigenous pastoralist communities living in arid and semi-arid lands (ASAL) in Narok. The 384 sample size consisted of community members, Community Land Management Committees, county government staff from the department of livestock, department of agriculture and department of lands. This study employed purposive and convenience sampling techniques to select the sample. The instrument used in this study were interview schedule and questionnaires. Piloting was conducted on 10% of the sample size that was not included in the study. To establish validity, the instruments will be shared to the supervisors for input and to evaluate the relevance of each item in the instrument to the objectives. Reliability of instruments was tested using test re-test technique and Cronbach's alpha method of 0.75 was used to calculate the internal efficiency. Credibility of the data was tested using data triangulation through multiple analysis while dependability of data was assured through reporting data collection process in details. Qualitative data was analyzed in narrative form while quantitative data was coded and entered in to Statistical Package for Social Sciences (SPSS) version 23.0 to produce both descriptive and inferential statistics. Descriptive statistics were analyzed to find mean, mode and standard deviation while on the other hand inferential statistics was analyzed in form of correlation, regression and analysis of variance (ANOVA). The qualitative data will be grouped according to themes and compiled using narrative analysis technique and Qualitative data if any will be analyzed using descriptive statistics by use of measures of central tendencies. From the research findings and discussions, it was evident that the human elephant conflict has caused problems for the residents of Narok county. the government, forest service and lands management had to take action to reduce the HWC that is in existence.

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LIST OF ACRONYMS AND ABBREVIATIONS

SPSS- Statistical package for social sciences

KWS-Kenya Wildlife Services

HWC- Human Wildlife Conflict

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter will examine information that forms the basis for this research. This will include the Background to the Problem, Statement of the Problem, Purpose of the study, Objectives, Research Questions, Significance and Justification of the Study, Scope and Limitations and Definitions of Terms.

1.1 Background information

Increasing global population, coupled with greater resource demands, has resulted in significant limitations to conservation and development goals on the margins of protected areas, particularly in middle and low income countries. This has raised an increasingly fraught debate between conservation of dwindling biodiversity and the development of economically-marginalized communities. Typifying this disparity of ideals, conflict between protected fauna and developing communities through a variety of mechanisms is of increasing concern, through its ability to reduce support for conservation programmes and impose additional resource pressures upon communities. The role played by this human-wildlife conflict (HWC) in exacerbating the problematic conservation-versus-development debate thus requires urgent consideration.

Wildlife often interacts with humans in different ways, however, when such interactions adversely affect or are perceived to affect the lives and livelihoods of people, then conflicts occur (Woodroffe, Thirgood, & Rabinowitz, 2005). These negative interactions result in human-wildlife conflicts (HWC), the most common of which include: crop raiding, livestock depredation, and attacks on humans (Thouless, 1994; Woodroffe et al., 2005). Conflicts are

caused by different wildlife species and occur at different intensities in different countries or parts of the same country. The African (*Loxodonta africana*) and Asian (*Elephas maximus*) elephants are key conflict animals and are involved in crop raiding and attacks on humans in these two continents (Gadd, 2005; Sitati, Walpole, Smith, & Leader-Williams, 2003; Sarker & Røskaft, 2014). Carnivores such as lions *(Panthera leo*), tigers (*Panthera tigris*), brown bears (*Ursus arctos*) and wolves (*Canis lupus*) often attack, and injure or kill people and livestock in many countries (Kolowski & Holekamp, 2006, Woodroffe et al., 2005; Patterson, Kasiki, Selempo, & Kays, 2004; Löe & Røskaft, 2004).

Human-wildlife conflicts (HWC) occurred when human beings take negative actions on wildlife and vice-versa. Conover (2002) defined the term HWC as occurring whenever an action by human or wildlife has an adverse effect on each other. Such conflicts have been recorded thought the world in terrestrial, aquatic, and aerial environments and have involved a wide variety of animal taxa (Torres *et al.*,2018).

Primates and other wild animals are increasingly affected by habitat destructions and encroachments by human beings for various economic activities (Fourie *et al.,* 2015). When contradictory situation appears between people and wildlife in the form of crop raiding, livestock depredation, killing of people leads to HWC(Woodroffe *et al.,* 2005).The issue of HWC isnot a recent phenomenon. Human wildlife conflict has old as old as human civilization, yet currently the phenomenon poses a serious environmental challenge and has been escalated over the past few decades (Anand and Radhakrishna, 2017). Human-wildlife conflicts have been in existence as long as wild animals and people shared the same resources.

Sharing and completion for limited resources will leads to HWC. Crop-riding by wild animals is a common problem all over the world (Fenta, 2014; Gandiwa *et al.,* 2013; Gandiwa *et al.,* 2012;

Kate, 2012; Gusset *et al.*,(2009). This conflict is worsening in areas where humans and wild animal's requirements overlap (Gandiwa *et al.,* 2012). The conflict is occurring everywhere in the world. Although, the problem of HWC is exist everywhere, the situation is more severe for Africa continent where majority of the people depends on agriculture, which accelerates the conversion of wild habitat to agricultural fields (Kate, 2012). Crop damage is the most prevalent form of HWC across African continent (FAO, 2009).The expansion of human population into or near to areas inhabited by wildlife and modification of the natural environments for agricultural or other economic activities escalate HWC (Hockings and Humle, 2009; Knight (2000).

Natural forests are being cleared and the primates are facing great challenges. HWC mitigation is crucial for conservation of wildlife (Ogra and Badola, 2008).

Residential and commercial development, agriculture and aquaculture expansions into forest areas are the main challenges that affect the life of wildlife. Understanding drivers of HWC is a prerequisite for developing effective and cost efficient conservation strategies. The main factors driving human-wildlife conflicts include human population increase, changing land use, habitat loss, degradation and fragmentation, high livestock population density, low abundance and restricted distribution of wild prey, high wildlife population density, and climatic factors. Further, stochastic events such as fires and increasing interest in ecotourism and access to nature reserves also contribute to increased HWC (Distefano, 2005). These factors contribute to human-wildlife conflicts differentially in different regions of the world. For instance, in Kenya, human-elephant conflicts (HEC) are attributed to increasing human population and changes in land use (Hoare, 1999; Thouless, 1994), that has increased the interphase between people and wildlife.

Human-dominated areas are more likely to be settled by people who practice agriculture, a major pull factor for elephants as a source of alternative succulent and nutritious forage (Røskaft et al., 2014).

Kenya, like many other countries, is experiencing fast human population growth and the associated demand for more space for agriculture, human settlements, and other developments. Human population increase is accompanied with progressive habitat fragmentation and demand for space as people seek alternative livelihoods. Nevertheless, tourism is an important foreign exchange earner in Kenya (Kenya Government, 2005) and is based mainly on wildlife watching. As a result, wildlife conservation is given a high priority by the Kenyan Government. The Kenya Wildlife Service (KWS), created in 1989, has the aim of overseeing wildlife conservation in all protected and non-protected areas in Kenya, including wildlife parks, reserves, sanctuaries, and community conservancies.

Wildlife in Kenya faces many threats including poaching, habitat loss, competition for water and food with livestock and human-wildlife conflicts (HWC). KWS has been collecting data on HWC since the early 1990s for some of the areas under its jurisdiction, such as the Tsavo and Maasai Mara (Mara) regions. These two regions support most of the wildlife in Kenya (as described in details below), including the largest terrestrial mammal in the world (Ogutu et al., 2016), the African elephant, as well as some of the largest felid species, such as the lion (*Panthera leo*) and leopard (*Panthera pardus*).

Human-wildlife conflict in Narok County has been aggravated by rapid change in the lifestyle of local communities from pastoralism to crop farming and other incompatible land-use practices.

According to the Kenya Wildlife Service, such conflict in areas surrounding the Maasai Mara Game Reserve is mainly attributed to increased human population and loss of wildlife habitat due to uncontrolled human activities, especially crop farming, charcoal burning and human settlements. KWS Assistant Director Central Rift conservation area Mr Dickson Ritan said Narok County is currently designated as one of the human-wildlife conflict (HWC) hotspots in the country with elephants identified as the most problematic wildlife species.

Speaking during the launch of the five-day wildlife census in the Mara and Serengeti cosystems, Mr Ritan said KWS Narok station indicates that out of the 9,299 human wildlife conflict cases reported in the last 10 years, 5,052 (54 per cent) were attributed to elephants. The latest case was reported a week ago when an 88-year-old man was trampled by an elephant in Siana Conservancy near Maasai Mara Game Reserve.

Women protest the invasion of their farms by wild animals. Narok County is one of the human-wildlife conflict (HWC) hotspots in the country with elephants identified as the most problematic wildlife species. (Photo/Suleiman Mbatiah Nation)

1.2 Problem statement

Narok County is one of the human-wildlife conflict (HWC) hotspots in the country with elephants identified as the most problematic wildlife species. KWS Narok station indicates that out of the 9,299 human wildlife conflict cases reported in the last 10 years, 5,052 (54 per cent) were attributed to elephants. KWS further indicated that long-term monitoring of elephant movements in the affected area through satellite tracking has established that about 200 elephants have been cut off from the greater Mara ecosystem and are currently considered a sub-population of the Mara. Reports from the common impacts of human elephant conflict include human deaths, human injuries, crop destruction, human threats/obstruction, other property destruction. Narok County executive for trade Tourism and Wildlife Allan Ole Twala said increased human wildlife conflict is occasioned by the human influence on the ecosystem, through demarcation of traditional wildlife areas and blocking of migratory routes.

1.3 Purpose of the study

The purpose of study was to establish the influence of Human Elephant Conflict on Socio-Development of the Community living in Narok County Kenya.

1.4. Research Objectives

1. To establish the influence of human elephant conflict on disease transmission and deaths for both human and livestock.
2. To determine the influence of human elephant conflict on Livestock depredation.
3. To assess the Property damage caused by human elephant conflict.

4. To assess the Crop raiding caused by human elephant conflict in Narok County.

1.5 Research questions

1. How has human elephant conflict influenced disease transmission and deaths of both wildlife and Human in Narok County?

1. How has influence of Human Elephant Conflict on Livestock depredation in Narok County?
2. How has conflict between human and elephant caused any Property damage in Narok County?
3. How has conflict between human and elephant Contributed to Crop raiding in Narok County?

1.6 Significance and Justification of the Study

Investigations and findings to be obtained are expected to add new knowledge to the existing pool of knowledge to the Ministry of Environment and Natural Resources who have an obligation to safeguard, promote and sustain the ecosystem in Kenya. The Ministry of Tourism which exists due to wildlife and other beautiful sceneries mainly found in the forest. The National Land Commission that has been faced by many challenges arising from forest invasion for human settlement and cultivation resulting to land conflicts between communities and the government.

The Kenya Forest Service which plays a key role in protecting forest against any form of destruction. The Kenya Wildlife Service (KWS) which has a responsibility to protect the wild animals over the wild animals. The local community within the forest who benefit directly from the forest resources on how they can ensure continuous co-existence of the forest. The local authority who acts as a link between the forest resources and other stakeholders dealing with proper ways of forest sustainability and development projects that enhances environmental conservation and management.

1.7. Scope and Limitations of the Study

The research study will focus specifically Mara Ecosystem which has faced many prolonged problems of destruction that has led to the extinction of some indigenous trees and wild animals. The region also has experienced drastic climate changes that have affected agricultural activities due to change in rainfall patterns. Other researchers have tried their best to come up with proper strategies to solve the problem without much achievement.

The researcher intends to intensify the cause of the problem basing on chronological occurrences and historical background of the destruction of Mara ecosystem as guided by the stated objectives of the study.

1.8 Limitations of the Study

The study will be confined within communities living in Narok County. This might have varied challenges thus making the results difficult to be used for generalizing purpose. The sampling technique might not give the general reflection of the targeted area. Therefore, the researcher will be forced to vary the sampling methods for accuracy of the information. Also the limited time to be used for data collection might become a challenge. However, the researcher will use interviewees, experts and archival data to collect and get accurate data desired.

1.8. Assumptions of the study

The study will be carried on the assumption that;

i. Land management committees are in and aware of the impact of human elephant conflict in Narok County
ii. The community will be willing to take part in the study and will be available to respond to the study questions.

iii. The county Government officials will be willing to give valuable information about the impact of human elephant conflict

iv. Limited between the period: March 2025- July 2025

1.9 Operational Definitions of Terms

Human-wildlife conflict (HWC): Occurs "when the needs and behaviour of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife"

Crop raiding: Is the loss of arable crops or plantations through wildlife foraging

Disease transmission: Transmission of zoonotic disease from wild species ranging outside of protected areas which can result in direct human mortality or significant loss through mandatory culls of livestock.

Livestock depredation: Carnivorous and omnivorous wildlife species (especially those wide-ranging and of larger body size) regularly predate upon livestock, resulting in significant financial loss

Property damage: Damage to property is a common cause of conflict between human populations and wildlife species,

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter will discuss literature related to the study objectives, theoretical framework and conceptual framework that will guide the study**.**

2.1. EMPIRICAL LITERATURE REVIEW

2.1.1 Defining human-wildlife conflict

Human-wildlife conflict (HWC) occurs "when the needs and behaviour of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife" (Madden, 2004, p.248). Labelling this as conflict has been contested, however, as it runs the risk of "constrain(ing) the way problems are defined and limits the array of potential solutions available" (Peterson *et al.*, 2010, p.79). The so-called terministic screen this creates is seen to limit the potential for resolution, by diverting attention away from underlying political and governance incongruities (Peterson *et al.*, 2002) and creating a problem where before there may have simply been an environmental pressure (Fall and Jackson, 2002; Priston, 2008). Regardless, the success of some conservation initiatives in recent decades, with growing human populations on the margins of protected areas (Wittemyer *et al.*, 2008), has led to an increase in reported interactions between wildlife and marginalised subsistence farmers. This is a growing concern when planning either human development actions or conservation management. In addition, as suitable habitat now increasingly exists within a mosaic of anthropogenic land-uses (Hartter *et al.*, 2011), losses as a result of interactions between society and wildlife species take increasingly varied forms.

2.1.2. Cause of Human-wildlife conflict

Habitat Destructions and Fragmentation: It is obvious that human beings are over-exploiting forests for development activities, such as road constructions, collecting timber and non-timber forest products which can reduce forest coverage and later on they can forced the primate species and other wild animals to move out of their range for resource completion and survival. The transformation of forests, savannah and other ecosystems into agrarian areas or urban centers as a consequence of the increasing demand for land, food, energy and raw materials, has led to a dramatic decrease in wildlife habitats (FAO, 2009).

Human wildlife conflict have become more frequent and severe over recent decades as a result of human population growth, extension of transport routes and expansion of agricultural and industrial activities which together have led to increased human encroachment on previously wild and uninhabited areas (FAO, 2009).

Global civilization and rapid population growth contributes for the destructions wildlife habitat that leads to competition for survival. As human population expands and natural habitats shrink, people and animals increasingly come into conflict over living space and people lose their crops, livestock, property and sometimes their lives (Mishra *et al.* 2014).

Habitat loss and anthropogenic altering of forest structures pose a threat to forest-dependent primate species (Singh *et al.*,2018). Kansky and Knight (2014) conclude that increasing pressures on biodiversity will increase the frequency and magnitude of HWC events.

Habitat simplification will decrease ecosystem vitality and services, increasing wildlife-human conflict and insecurities (Everard *et al.,* 2017). Habitat fragmentation specifically forest is inevitably a critical driver of human-wildlife conflicts, although the extent of effects varies depending on species specific habitat requirements (Acharya *et al.,* 2017). For instance,

Hippopotamuses can cause substantial damages while feeding at night while Baboons and vervet monkeys are raiding food crops (FAO, 2009).

2.1.3. Effect of human-wildlife conflict on development

Transmission of zoonotic disease from wild species ranging outside of protected areas can result in direct human mortality or significant loss through mandatory culls of livestock. For example, badgers (*Meles meles*) have been identified as a latent reservoir of bovine tuberculosis in both the developing and developed worlds, causing regular culling of entire cattle herds (Cosivi *et al.*, 1998; Donnelly *et al.*, 2003). Similarly, transmission of pathogens from wild bison (*Bison bison*) to cattle outside Yellowstone National Park continues to cause conflict between farmers and conservation initiatives (Kilpatrick *et al.*, 2009). From a conservation perspective disease transmission to protected species also generates conflict. For example, populations of giant panda (*Ailuropoda melanoleuca*) and mountain gorilla (*Gorilla berengei berengei*), both highly endangered and susceptible to human diseases, are put under increasing risk from transmission of disease from tourists carrying harmful foreign pathogens (Qiu and Mainka, 1993; Sandbrook and Semple, 2006; Palacios *et al.*, 2011).

Carnivorous and omnivorous wildlife species (especially those wide-ranging and of larger body size) regularly predate upon livestock, resulting in significant financial loss (e.g. Kissui, 2008). This ranges from developed world examples such as wolf depredation on ranched and free-ranging domestic animals (Boitani *et al.*, 2010; Lance *et al.*, 2010) to developing world depredation of pastoral livestock (Inskip and Zimmermann, 2009; Li *et al.*, 2013).

Furthermore, damage to property is a common cause of conflict between human populations and wildlife species, through damage to infrastructure such as buildings, boundaries and utilities (Thomassen *et al.*, 2001; Ogra, 2008; Thapa, 2010) or vehicle collisions (Found and Boyce, 2011;

Neumann *et al.*, 2012).

Death and Injury of human: Human injury and loss of life also occurs on a limited basis, usually through either exposure by guarding against other conflicts (Sitati *et al.*, 2003; Gubbi, 2012) or direct human depredation (Packer *et al.*, 2005), though the latter is rare.

Killings of wildlife*:* Because of limited access to cash and lack of compensated for crop losses, the local communities of Ethiopia is more suffered by crop damaged by wild animals. Study conducted by (Mojo *et al.*, 2014) in Checha district of Gurage Zones in Ethiopia, shows that grivet monkey is one of the major wild animals that frequently damage crops. Cropraiding undermines food security and tolerance of wildlife within neighboring human communities (Hill and Wallace, 2012). The inability to mitigate crop raiding and absence of composition for crop losses lead to killing of animals (Regmi *et al.*, 2013). One review article in India by Anand and Radhakrishna (2017) on the topic investigating trends in human wildlife conflict: is conflict escalation real or imagined? Clearly shows that the number of species involved in HWC doubled from 38 in 1976-1995 to 76 during 1996-2015.

The dominant category of human-wildlife interactions, however, is the loss of arable crops or plantations through wildlife foraging (Dickman, 2010). This presents particular pressures in those areas where dense human populations, land restrictions and costs prevent pastoral herding of livestock, making subsistence tillage the sole means of survival. This is further exacerbated in regions bordering protected areas which harbour significant populations of herbivorous and omnivorous species.

Factors dictating animals decisions to raid could be based on a paucity of resources within a protected area (Naughton-Treves *et al.*, 1998), or the carrying capacity for a species within that area being reached (Van Aarde and Jackson, 2007). Conversely, analysis of crop raiding in

Uganda (Tweheyo *et al.*, 2005) and Sumatra (Linkie *et al.*, 2007) suggested that decisions to raid crops were not based on reduced availability of forest forage but on the increased availability of preferred crops along the forest's margins. In other words, animals may simply prefer the forest agricultural boundary over areas deeper into a protected area, where natural forage may be more readily available than crops (Butynski, 1984).

There may also be an evolutionary propensity to raid based on body size and genetic fitness, as the energetic payoff could outweigh the risk associated with ranging outside natural habitat. Modelling of African elephant (*Loxodonta africana*) raiding, for example, found that males of similar ages that raided crops were significantly larger than those that did not (Chiyo *et al.*, 2011). As energy from crops leads to longer musth and greater body size, crop raiding becomes selective (Sukumar, 1991; Chiyo *et al.*, 2011). Similarly, chimpanzee (*Pan troglodytes*) raiding is seen as an adaptive response to a food source which is highly concentrated, predictable, nutrient-rich and is easily obtained (Tweheyo *et al.*, 2005).

Variation in crop raiding incidence and magnitude is dictated by a variety of factors. Foremost, levels of damage and associated financial loss can vary significantly between the species of animal raiding, though this may be on the same crop. Baboons (*Papio anubis*) around Budongo Forest, Uganda, for example, removed the entire plant when feeding on the pith and stem of maize (*Zea mays*), resulting in a complete loss of the crop (Hill, 2000), whereas antelope species browsing on the leaves of the same perennial plant resulted in much less financial loss. Differing group ecologies can further dictate whether groups of social animals raid (Strum, 2010), while some suggest that the decision to raid may be at the individual animal level (Hoare, 2000; Fall and Jackson, 2002; Gubbi, 2012). Though large and charismatic megafauna are predominantly blamed for damage, and may inflict greater damage per individual per visit, greater net damage

is often inflicted by smaller animals in larger numbers such as invertebrates, birds and rodents (Nchanji, 2002; Kagoro-Rugunda, 2004; Pérez and Pacheco, 2006). The difficulty in seeing and implicating smaller animals leads to larger, more noticeable species being disproportionately implicated. For example, cane rats (*Thryonomys spp.*) and birds were found to cause the greatest loss in rural villages of Cameroon, yet go largely unreported in studies (Nchanji, 2002). Similar biases were observed when comparing Peccary (*Tayassu spp.*) to bird damage in Bolivia (Pérez and Pacheco, 2006) and elephant to baboon damage in Uganda (Mackenzie, 2012). Some estimates of small animal raiding attribute up to 77% of damage to these seldom-implicated taxa (Pérez and Pacheco, 2006). The gender of fauna involved also plays a part in many megafauna raiding species, with significant gender differences found in elephants (Chiyo *et al.*, 2011) and buffalo (*Syncerus caffer*) (Hay *et al.*, 2008).

Proximity to an area supporting wildlife species defines the numbers of raiding individuals willing to risk raiding, in addition to the suite of species encountered as raiders (Naughton-Treves, 1998; Hill, 2000; Kagoro-Rugunda, 2004). Elephant and buffalo are known to raid greater than two kilometres outside of protected areas (Nchanji, 2002; Plumptre, 2002), while primate raiding is predominantly observed under 500m from cover (Hill, 2000; Tweheyo *et al.*, 2005; Mackenzie, 2012). Body size thus seems to be a useful metric for expected raiding distance. Similarly, Asian elephant (*Elephas maximus*) raiding around a southern Indian reserve was highest in those villages with the most protected area frontage (Gubbi, 2012), showing the effects of protected area shape in combination with proximity. Additionally, those living closer to protected areas tend to be more economically marginalised and therefore exposed to losses incurred through crop raiding (Plumptre *et al.*, 2004; Bush *et al.*, 2010).

Temporal variation is also important. For example, damage to crops is considered greatest during or just before harvest when crops are mature (Sukumar, 1989; Tweheyo *et al.*, 2005). Similarly, banana (*Musa spp.*) raiding by large mammals was significantly higher in the dry season at Lake Mburo NP, Uganda (Kagoro-Rugunda, 2004), where foraging of tuber crops was made easier in the soft, damp soil of the wet season. Wider investigations of seasonal rainfall have, however, shown both positive (Linkie *et al.*, 2007) and negative (Tweheyo *et al.*, 2005) correlations with crop raiding frequency, suggesting that the use of climate as a predictor of crop raiding should only be made where the seasonal ecologies of species involved are well understood. Diurnal variation has also been identified in several studies. For example, crop damage in Nepal by a suite of raiding species was perpetrated exclusively at night (Thapa, 2010) while primate raiding is more commonly observed during daylight hours (Hill *et al.*, 2002a).

The availability of appealing forage on the margins of protected areas is largely dictated by the land-use of these regions and may dictate the suite of raiding species (Karanth *et al.*, 2012). Pasture, for example, is of little benefit to foraging primates or ungulates, while forest browsers may be overexposed in an intense arable agriculture matrix (Naughton-Treves *et al.*, 1998).

Socio-demographic characteristics of human populations are perhaps the most important component of crop raiding variation; as Manfredo and Dayer note, “humans are the constant in HWC” (Manfredo and Dayer, 2004, p.318). Thus, the variation in human behaviour and attitudes across social groups can affect perceptions of HWC and influence support for conservation (Tweheyo *et al.*, 2005; Dickman, 2010). In some case studies, numbers reporting crop raiding were significantly related to ethnicity and wealth class (Harrter *et al.* 2011) while higher population densities have led to more intense agriculture and greater impact when raiding does occur (Tweheyo *et al.*, 2005). In addition, Newmark *et al.* (1994) showed that densely populated

areas experience greater proportions of raiding from smaller species than larger species. Conversely, lower human densities were found to facilitate less opposed entry into farmland (Kagoro- Rugunda, 2004) and allow deeper penetration into an agricultural matrix (Naughton-Treves, 1997).

2.2 Theoretical Framework

A theory is an attempt to explain the cause of things and the prediction of their outcomes. The Political Ecology Theory has been applied to this study. Political ecology theory is the study of the relationships between social forms and human organisation and the complexities surrounding the environment and development. It outlines the relationship between economics, politics and nature as well as the management of nature and the rights of people. In relation to Mara ecosystem, social-economic and political factors have contributed to the human wildlife conflict thereby affecting ecosystem and biodiversity within the region. This is so because Mara ecosystem has witnessed environmental degradation due to deforestation and therefore, there is need to formulate conservation measures in order to minimise human wildlife conflict due to its social-economic functioning (James et al, 1994).

2.7. Conceptual framework.

Independent variable. Intervening variables. Dependent variables

Socio-economic

Development

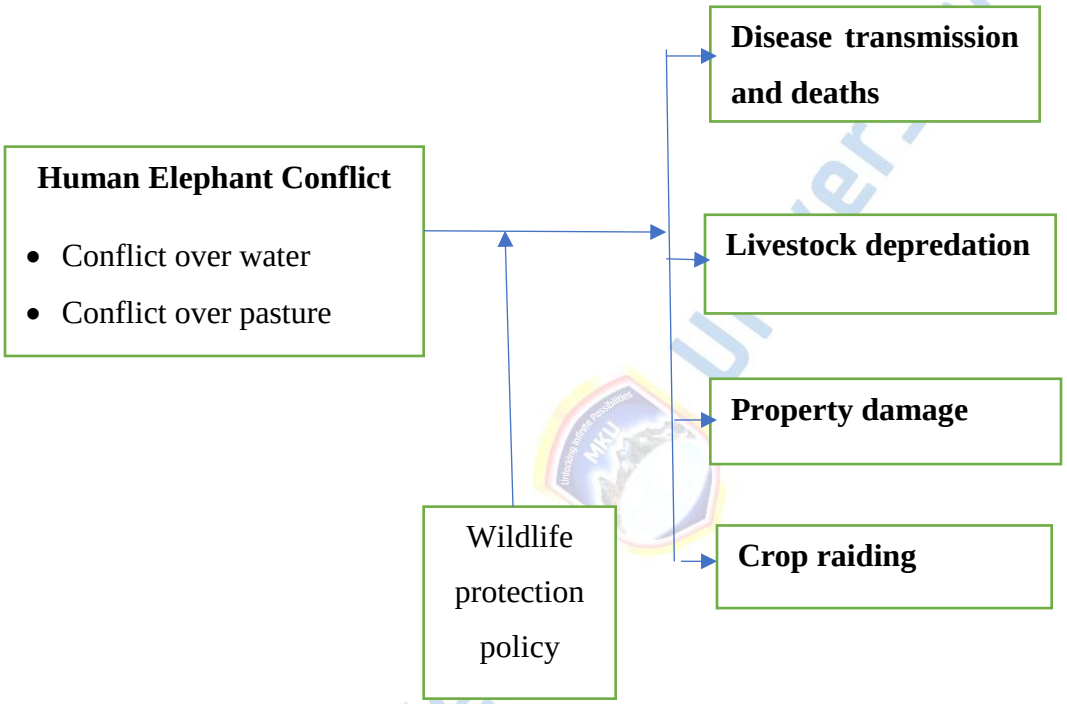

Figure 1. Conceptual framework for human elephant conflict and development

2.5 Research Gaps

Proximity to an area supporting wildlife species defines the numbers of raiding individuals willing to risk raiding, in addition to the suite of species encountered as raiders (Naughton-Treves, 1998; Hill, 2000; Kagoro-Rugunda, 2004). Elephant and buffalo are known to raid greater than two kilometres outside of protected areas (Nchanji, 2002; Plumptre, 2002), while primate raiding is predominantly observed under 500m from cover (Hill, 2000; Tweheyo *et al.*, 2005; Mackenzie,

2012). Body size thus seems to be a useful metric for expected raiding distance. Similarly, Asian elephant (*Elephas maximus*) raiding around a southern Indian reserve was highest in those villages with the most protected area frontage (Gubbi, 2012), showing the effects of protected area shape in combination with proximity. Additionally, those living closer to protected areas tend to be more economically marginalised and therefore exposed to losses incurred through crop raiding (Plumptre *et al.*, 2004; Bush *et al.*, 2010).

This research study will fill gap because much has been said about human wildlife conflict in other parts of the world but much has not been done in Mara ecosystem and superficially in Narok County yet it is one of the great ecosystem in Kenya because of its social-economic value in Kenya and the world. Also there is little knowledge from a historical perspective as far as human elephant conflict in Narok is concern. Therefore, this study will investigate the effect of human elephant conflict on socio-economic development of the community within Narok County.

2.6 Summary of Literature Review

Regardless, the success of some conservation initiatives in recent decades, with growing human populations on the margins of protected areas (Wittemyer *et al.*, 2008), has led to an increase in reported interactions between wildlife and marginalised subsistence farmers. This is a growing concern when planning either human development actions or conservation management. In addition, as suitable habitat now increasingly exists within a mosaic of anthropogenic land-uses (Hartter *et al.*, 2011), losses as a result of interactions between society and wildlife species take increasingly varied forms.

CHAPTER THREE

RESEARCH METHODOLOGY AND DESIGN

3.0. Introduction

This chapter will discuss; Research design, Study area, Population and Sampling, Data collection, Quality control, Data analysis and Ethical Considerations

3.1 Research Methodology

The study involved use of mixed methodology approach. Both qualitative and quantitative research methods was used during the study. A qualitative research method involved a study where answers to questions are sought by using well defined procedures to get evidence and findings which are not determined earlier. It was noted that qualitative research is most effective when dealing with intangible factors like; social norms, social economic status, gender roles, religion among others (Denzin & Lincoln, 2000). Quantitative research methods addressed an investigation that; seeks to confirm hypothesis about phenomena, use highly structured method such as; questionnaire, survey and structured observations (Denzin & Lincoln, 2000). Both qualitative and quantitative methods were combined so data collected and analysed statistically for quantitative data and through descriptive statements and explanation for qualitative data.

3.1. Research design

For qualitative data, the study was conducted through ethnography study designs. Ethnography is a research design which generates grounded theory, provides a complete picture of the environment being studied. This type study leads to new insights and generates hypothesis based on data. The absence of pre-formulated theory in this type of design eliminates bias (Oso&Onen, 2005). Ethnography design is ideally suitable for studies since it reveals what is happening as it

is lived and practiced by the people. The purpose of using this design is to identify the presence or absence of attributes rather than disapprove them. Using this type of design, the researcher was able to investigate little understood phenomena like land rights and climate change and the effect of human elephant conflict on socio-economic development of the people of Narok County.

For quantitative data, the researcher used survey design to be able to have a clear picture about the situation of Narok County by use of Questionnaires.

3.3 Location of Study

Narok County (17,944 km2) is situated between longitudes 34_ 340 E _ 36_ 230 E and latitudes 0_ 270 S - 2_ 70 S in southwestern Kenya. It borders the Serengeti National Park and the Loliondo Game Controlled Area in Tanzania to the south. Southern Narok is the northern-most section of the Greater Mara-Serengeti Ecosystem (GMSE) (Mukeka et al., 2018a). Maasai Mara National Reserve (MMNR), famous for its rich biodiversity, including the great wildebeest (Connochaetes taurinus) and zebra (Equus quagga) migration from the Serengeti in Tanzania to Maasai Mara in Narok County in Kenya (Ogutu et al., 2008). Rainfall in Narok is bimodal, with the wet season spanning November-June and the dry season covering July-October. The annual rainfall in the County is strongly determined by topographic relief and Lake Victoria and increases from south to north, east to west and southeast to northwest, and ranges between 500mm in the Loita Plains to the east to about 1400mmin the high altitude Mau ranges in the north (Campbell and Hofer, 1995; Norton-Griffiths et al., 1975; Fig. S 3).

As well, temperatures range from a low of 7.3^0C to a high of 28.5^0C. Both the minimum and maximum temperature components increased throughout Narok County by an average of 2.5 ^{0}C between 1965 and 2015 (Fig. S 4). However, a trend of decreasing annual rainfall (Bartzke et al.,

2018) and rising temperatures (Ogutu et al. 2008, 2016) in the region have been associated with recurrent severe droughts and flush floods.

A rich diversity and abundance of large mammalian herbivores are found within the MMNR, wildlife conservancies and community areas in Narok County (Broten and Said, 1995; Ottichilo et al., 2000). The common resident large herbivores include the African elephant (Loxodonta africana), the Maasai giraffe (Giraffa cameleopardalis), the cape buffalo (Syncerus caffer) and hippo (Hippotamus amphibius). Furthermore, the migratory wildebeest, Thomson's gazelle (Gazella thomsoni), Burchell's zebra and the eland (Tragelaphus oryx) are common in Narok. The spotted hyena, lion, leopard and cheetah (Acinonyx jubatus) constitute the common large carnivores in Narok. Further details on large mammals found in Narok can be found elsewhere (e.g., Broten and Said, 1995; Bhola et al., 2012).

Vegetation in Narok County comprises mostly grasslands in the MMNR, wildlife conservancies and community areas in southern Narok and on the Loita Plains in Narok North. Woodlands dominate Narok South while forests dominate the northern part of Narok North, which encompasses the Mau Forest range. Riverine vegetation fringes the major rivers and drainage lines in the region. Elephants and human-induced fires are the key drivers of vegetation dynamics in the region (Dublin, 1995; Guldemond and Van Aarde, 2008).

We can partition Narok County into five regions using major land use, land management and physical landforms. The first region, the MMNR is a protected area within which all human activities except wildlife conservation and tourism are prohibited. The second region is the area falling within a 50 km radius of the MMNR boundary to the north and east, which we designate as a conservancy because it is predominantly occupied by wildlife conservancies. These conservancies were set aside for wildlife conservation and tourism from 2005 onwards after land

subdivision and privatization of land tenure in former Maasai group ranches (Lamprey and Reid, 2004; Norton-Griffiths et al., 2008). The wildlife conservancies support many wildlife species and also serve as important dispersal areas for the MMNR. Pastoralism, agro-pastoralism and human settlements are the major land uses on community areas bordering the conservancies (Bedelian and Ogutu, 2017).

The third region, Trans Mara, is separated from the rest of Narok County by the Siria escarpment and the Mara river. Intensive agriculture, pastoralism, settlements and wildlife conservation in a few wildlife conservancies are the major land uses in Trans Mara. The fourth region, Narok South, includes the Loita Hills, which is covered with forests and woodlands. The last region, Narok North, is characterized by small and large-scale wheat and maize farming, and dense settlement around urban and markets centers. Narok North encompasses the Mau forest range, which is severely threatened by human encroachment, charcoal burning, logging, and general habitat destruction. The Mau forest range is also an important wildlife habitat. The high rainfall in the Mau uplands makes it the major water catchment and source of water for wildlife in the low lands of the MMNR and the Serengeti National Park in Tanzania. Also, the Conservancy and Narok North regions are cooler than the other three regions of Narok County. Narok County is still undergoing land privatization and associated land subdivision and fencing.

Drainage in Narok County is by two major rivers; the Mara and Southern Ewaso Ng'iro. The Mara river drains into Lake Victoria through the MMNR and the Serengeti National Park whereas the Ewaso Ng'iro drains into Lake Magadi in the adjoining Kajiado County of Kenya to the east.

3.4. Target population

This study will be conducted among the indigenous pastoralist communities living in arid and semi-arid lands (ASAL) in Narok. These population is chosen because these are the communities whose Community land which has been historically managed and “owned” by local communities,

is under siege by wildlife, multinational companies, local elites, and the Kenyan government. These are communities who experience human wildlife conflict, drought, floods, unpredictable rainfall patterns, privatization and subdivision of community land, and changing ecosystems have presented indigenous pastoral communities with an existential threat not just to their land rights, but to their survival as a pastoralist people. In the face of this threat, the pastoralist livelihood system can often adapt to a changing climate easier than other livelihoods systems as long as interventions also focus on other issues such as land tenure insecurity and strengthening local land and natural resource governance.

Table 1: ***Target population***

Target population	**Total number**
Community Members	9812
Community Land Mgt Committees	859
County Government Staff	234
TOTAL	**10905**

3.5 Sample size

The sample size will be determined using the Fisher et al., (1998) formulae; -

$$n=\frac{z^2pq}{d^2}$$

Where;n=the desired sample size (when population is greater 10,000)

Z= the standard normal deviate, set at 1.96, which corresponds to 95% confidence level.

p= the proportion was set at 50% since the were no studies on the adherence rates

q= 1.0 – 0.5 = (1 – 0.5) = 0.5

d= degree of accuracy desired, here set at 0.05 corresponding to the 1.96 z – statistic used in the numerator

In substitution,

n= 384

The sample will consist of community members, Community Land Management Committees, county government staff from the department of livestock, department of agriculture and department of lands.

3.5.1. Sampling techniques

This study will employ purposive and convenience sampling techniques to select the sample. Purposive sampling technique will be used to select county government staff from the fore mentioned departments. Purposive sampling technique is a technique that selects typical and useful respondents only and will be used to collect focused information only. The researcher will decide who to include in the sample based on their typicality.

The researcher will employ convenience sampling technique to select Land Management Committees who happen to have been selected already. The researcher decides to use this technique because of the nomadic nature of the pastoralist community making it not possible to determine the sample frame. The researcher will be able to collect data at the spur of the moment without rigidity of procedure.

Table 2: ***Size frame***

Sample population	Total number
Community Members	230
Community Land Mgt Committees	78
County Government Staff	72
TOTAL	**384**

3.6. Research Instruments

In this study, the researcher considered data as anything given or admitted as a fact on which a researcher inference was based. It will be anything actual, or assumed, used as a basis for reckoning. This research is empirical and reality referent. Much deduction may precede its application but data will be the end result of this research procedure.

3.6.1. Interview Schedule

The instrument to be used in this study will be interview schedule. This will involve person to person verbal communication in which the Land Management Committees and identified staff of the county from the fore mentioned departments will be asked questions by the research team intended to elicit information or opinion. The purpose of interview schedule is to collect information that cannot be directly observed or are difficult to put down in writing as it is assumed that many members of the Land Management Committees may be illiterate. Interview schedule will allow the researcher obtain information that cannot be directly observed, obtain historical information and the researcher will be able to control the line of questioning.

3.6.2 Questionnaires

Researcher used questionnaires for the above mentioned respondents because researcher intended to collect a lot of information from many respondents over short period of time. It was also easy

to administer questionnaires to the respondents. The questionnaires contained both closed and open ended questions which were followed by a likert scale in each section to elicit the intended information each as per the objective. Data collected was statements which was measured using scale ranging from strongly agree- 1, agree 2, neutral 3, disagree 4 and strongly agree 5. Each objective had its own open ended questions followed by likert scale where each objective in the questionnaires was treated as an independent section of the questionnaire.

3.8 Piloting of the research instruments

A pilot test of the instrument was carried within Narok County on 10% of the sample size. But were not included in the final study. Respondents who were used during piloting did not form part of the final sample size though from the same target group. The reason for pilot study was for testing instruments' accuracy and appropriateness as well as improve on clarity and comprehensiveness of instruments. The test- retest method was employed to ensure that the instruments are sound. Researcher endeavored to attain validity and reliability of at least 0.7 or 70% which is acceptable in research (Oso & Onen, 2009).

3.7.1 Validity of the Instruments

To enhance validity of instrument, pilot study was done using respondents from target population who did not form part of the responded during actual carrying of the study. Content validity was used to determine content validity index where all objectives were assessed for the clarity of instrument to be checked so that item found not be effectively presented to be discarded or modified in order to improve the quality of item to be used during the study. New modification and items were added in the questionnaires. The questions' appropriateness and relevance to the objectives was validated by the supervisors to judge their stability, correctness and appropriateness.

3.7.2 Reliability of the instruments

Reliability of instruments is a measure of the degree to which a research instruments yields same results on repeated trials (Mugenda & Mugenda, 2003). Reliability of instruments was tested using test re test technique where cronbach's alpha method was used. Cronbach's alpha test aimed to attain high internal reliability at pilot stage. Reliability was expected to consist of at least a co-efficiency of internal consistency of 0.7 or 70%. This was acceptable in research (Kothari, 2004). The instrument was scored separately after being tested. The correlation coefficient was calculated from the scores on each test which fall between 0.0 and 1.0, with the closer to 1.0 being the more reliable the instrument. The internal consistency of the instruments was calculated taking into account changes in time and circumstances.

3.7.3 Credibility of the data

Credibility of data is determined by establishing if the results of the study are believable and if the data that can be trusted especially in qualitative data. It depends more on the quality of the data collected not quantity collected. Data triangulation was used to determine credibility of the data through multiple analysis. Creswell (2003) noted that when there is credibility of data it helps in establishing trustworthiness of the data. Members' checks was used to promote confidence.

3.7.4 Dependability of the data

Dependability of the data ensured that the research findings were consistent and when repeated using the same procedure. This was measured by the standard of which the study was conducted, analysed and presented. To guarantee dependability of data each qualitative data collection process was reported in details to enable the any other researcher to repeat the inquiry and achieve similar results.

3.10 Data Collection procedures

Questionnaires was administered personally by researcher who sought assistance from an informed research assistant in administering the questionnaires. Questionnaires were administered through dropping and picking them immediately after being filled to minimize loss of the questionnaires. Researcher and research gave instruction and guide the respondents before filling the questionnaire on the type of data required and how they should fill the data.

For interview researcher conducted the interviews personally. Researcher booked the interviewee in advance in their offices where he made a formal appointment. Interviews were done in respondent's office by the researcher. Interviews were done on working days in any of the day between Monday and Friday in the morning hours. If scheduled interview fail researcher rebooked the interviewee at his or her convenient time. The data was recorded using note taking.

3.9 Data Analysis Procedures

Collected data was grouped according to research questions. Each question was addressing the relations between an aspect of children government which was the independent variable and management of public primary school which was the dependent variable. Qualitative data was grouped by conceptualizing, coding and categorizing data. Researcher then explained the qualitative data in narrative form indicating insights from the data collected clearly and explicitly. Quantitative data was coded and entered into the SPSS version 22.0 to generate both descriptive and inferential statistics that shown the statistical relationships. Descriptive statistics involved analysing data using mean, mode and standard deviation. Inferential statistics involved analysing data using correlation, regression and ANOVA to determine statistical relationship, association and compare the impact of independent variable (children government) and management of public

primary schools (Dependent variable). Two-way ANOVA techniques was used. Data was analysed at 0.05 level of significance. Researcher used the $\alpha = 0.05$ which meant findings was at 95% confidence that the difference noticed was due to children government and not by chance so out of 100 possible cases only 5 of such difference could be out of chance.

3.10Ethical considerations

The study had the following ethical consideration: The researcher sought authority to carry out study in the area of the study from the NACOSTI after approval of their project proposal by the university school of post graduate studies. After getting permit from the NACOSTI to carry out the study.

The researcher sought the respondent's informed consent before allowing them to be respondents in the research. This entailed informing the respondents what is expected of them during the study and how important is the research.

The researcher assured the participants of confidentiality of the data they gave. He assured them that the data collected was for academic purposes only. The researcher further informed the respondents that they had freedom to participate or withdraw at any stage of the study was allowed as no one was forced to participate in the study.

CHAPTER FOUR:

RESEARCH FINDINGS AND DISCUSSIONS

4.0 Introduction

This chapter focuses on the presentation of data collected from the field and interpretation of the results thereof. Data analysis was done in accordance with the objectives of the study which were establishing the influence of human elephant conflict on disease transmission and deaths for both humans and livestock, determining the influence of human elephant conflict on livestock depredation, assessing the property damaged caused by human elephant conflict, and assessing the crop raiding caused by human elephant conflict in Narok county.

4.1 Response Rate

The study had a sample size of 384 respondents. All were given the questionnaire and which they filled and the researcher picked after one week. At the end of the given period only 292 respondents had filled in the questionnaire giving a response rate of 76.2%. The researcher made efforts to call other respondents to fill the questionnaires but was not successful. Due to the constraint of time, the researcher continued with the analysis since according to Best and Khan, (2006) a response rate of 50% is considered adequate, 60% good and above 70% very good. Therefore, in view of this, the response rate was considered very good and exceeded the threshold postulated by Best and Khan. On the basis of this, the researcher went ahead to analyses data as presented in the following sections.

Table 3: Response Rate

Sample Size		Participants		Non-participants		Response Rate	
Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
384	100	292	76.2	92	23.8	292	76.2

Source: The Researcher, 2025

4.2 Demographic factors

These were categorized into gender and occupation.

4.2.1 Gender

The findings obtained were shown in the table below.

Table 4: Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid					
	Male	218	74.4	74.4	74.7
	Female	75	25.3	25.3	100.0
	Total	293	100.0	100.0	

Source: The researcher, 2025

From the table above, 74.7% of the respondents were male. 25.3% of the respondents were female. Majority of the respondents were male.

4.2.2 Occupation

The findings obtained were shown in the table below.

Table 5: Occupation

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Community Member	211	72.3	72.3	72.3
	Land Management Committee	45	15.4	15.4	87.7
	County Government Staff	36	12.3	12.3	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 72.3% of the respondents were community members, 15.4% of the respondents worked for the land management committee and 12.3% of the respondents worked for the county government. Majority of the respondents were community members.

4.3. Establish the influence of human elephant conflict on disease transmission and deaths for both humans and livestock in Narok county.

The first objective of the study aimed at establishing the influence of human elephant conflict on disease transmission and death for both humans and livestock in Narok county.

4.3.1 Descriptive statistics

Quantitative analysis was conducted on the data obtained. The findings obtained were presented in the subheadings that follow.

4.3.1.1 The spread of zoonotic diseases from elephants and other wildlife species has led to the mortality of livestock.

The findings obtained were shown in the table below.

Table 6: ***R01 Zoonotic Diseases Led to Livestock Death***

R01 Zoonotic Diseases Led to Livestock Death

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	231	79.1	79.1	79.1
	Strongly Agree	61	20.9	20.9	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, all the respondents agreed that zoonotic diseases from elephants led to the death of livestock. None of the respondents disagreed that zoonotic diseases led to the death of elephants. According to (Donnelly, 2003), some wild animals have been identified as latent reservoirs of bovine tuberculosis in developing and developed worlds, causing the culling of entire cattle herds. Though it may be challenging to control the cessation of wild animals' movement, scheduled vaccination must be carried on animals that are known to break their banks especially elephants.

4.3.1.2 There is human mortality that has been caused by disease transmission from wildlife species to human beings

The findings obtained were shown in the table below.

Table 7: ***Disease transmission from elephants led to human mortality***

Disease transmission from elephants led to human mortality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	27	9.2	9.2	9.2
	Disagree	110	37.7	37.7	46.9
	Agree	155	53.1	53.1	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 46.9% of the respondents disagreed that disease transmission from elephants led to human mortality. 53.1% of the respondents agreed that disease transmission from elephants led to human mortality. Majority of the respondents agreed that disease transmission from elephants led to human mortality. According to (Cosivi et al, 1998), transmission of zoonotic disease from wild species ranging outside of protected areas can result in direct human mortality. The Kenya Wildlife Service, must conduct a thorough research of the various diseases that can be transmitted from wild animals and ensure that humans are given vaccines as a pre-cautionary measure that will prevent disease transmission.

4.3.1.3 Elephants have been highly endangered and are highly susceptible to human diseases transmitted by tourists carrying foreign pathogens

The findings obtained were shown in the table below.

Table 8: ***Elephants are highly susceptible to human diseases transmitted by human pathogens***

Elephants are highly susceptible to human diseases transmitted by human pathogens

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	40	13.7	13.7	13.7
	Disagree	122	41.8	41.8	55.5
	Undecided	36	12.3	12.3	67.8
	Agree	94	32.2	32.2	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 55.5% of the respondents disagreed that elephants are highly susceptible to human diseases transmitted by human pathogens. 32.2% of the respondents agreed that elephants are highly susceptible to human diseases transmitted by human pathogens. 12.3% of the respondents were undecided on whether elephants are highly susceptible to human diseases transmitted by human pathogens. Majority of the respondents were undecided on whether elephants are highly susceptible to human diseases transmitted by human pathogens. According to Semple (2006) and Palacios (2011), elephants are both highly endangered and susceptible to human diseases and under an increasing risk of contamination from tourists carrying foreign pathogens. The residents may be a bit naïve about transmission of diseases from humans to wild animals but it is wildlife service's responsibility to ensure that both tourists and animals in general are not prone to any diseases are as a result of any form of interaction between these two species.

4.3.2 Inferential statistics

Advanced quantitative analysis was conducted on the data obtained. The techniques used were correlation and linear regression.

4.3.2.1 Correlation

The findings obtained were shown in the table below.

Table 9: Correlation

Correlations

		R01 Zoonotic Diseases Led To Livestock Death	R01 Disease transmission led to human mortality	R01 Elephants are highly susceptible to human diseases transmitted by human pathogens
R01 Zoonotic Diseases Led To Livestock Death	Pearson Correlation	1	.469**	-.027
	Sig. (2-tailed)		.000	.646
	N	292	292	292
R01 Disease transmission led to human mortality	Pearson Correlation	.469**	1	.381**
	Sig. (2-tailed)	.000		.000
	N	292	292	292
R01 Elephants are highly susceptible to human diseases transmitted by human pathogens	Pearson Correlation	-.027	.381**	1
	Sig. (2-tailed)	.646	.000	
	N	292	292	292

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

Source: The researcher, 2025

From the table above, there were viable correlations whose concurrent implementations could reduce the human-elephant conflict and improve the socio-development of Narok county. they are as follows:

- Dealing with the human mortality caused by disease transmission from wildlife species to humans and controlling the spread of zoonotic diseases from wildlife species to livestock. This had a correlation co-efficient of .469**.
- Dealing with the endangerment of elephants by pathogens from foreign tourists and reducing the human mortality caused by disease transmission from wildlife species to humans. This had a correlation co-efficient of .381**.

4.3.2.2 Linear regression

The findings obtained were shown in the table below.

Table 10: Linear regression

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.420	.267		5.325	.000
	R01 Zoonotic Diseases Led To Livestock Death	-.183	.066	-.162	-2.755	.006
	R01 Disease transmission led to human mortality	.032	.026	.079	1.245	.214
	R01 Elephants are highly susceptible to human diseases transmitted by human pathogens	.200	.024	.467	8.315	.000

a. Dependent Variable: Human Elephant Conflict DV

Source: The researcher, 2025

From the table above, controlling the transmission of zoonotic diseases from wild animals to livestock and controlling the transmission disease causing pathogens from tourists to wild animals were the variables that were significant predictors of reducing the human-elephant conflict. They

have a significance level of less than .05 which meant that there was a 95% chance that dealing with these two issues would reduce the human elephant conflict. The constant variable was also a significant predictor of reducing human elephant conflict.

4.3.3 Qualitative responses from interviews.

A representative of the lands' management committee was quoted saying the following:

> "*Dealing with mortality of elephants and wildlife in general, livestock and humans is very important. Humans visiting the tourist attraction centers must be vaccinated with the respective preventatives to ensure they do not spread or contract diseases. Wildlife creatures must also be treated to ensure in case they migrate past their boundaries, they do not spread any diseases affecting human beings. The livelihood of the wildlife must be preserved to ensure that the tourism centers provided the expected scenery anticipated by the visitors.*"

4.3.4 Mixing and interpretation of data

Though it may be challenging to control the cessation of wild animals' movement, scheduled vaccination must be carried on animals that are known to break their banks especially elephants. The Kenya Wildlife Service, must conduct a thorough research of the various diseases that can be transmitted from wild animals and ensure that humans are given vaccines as a pre-cautionary measure that will prevent disease transmission. The residents may be a bit naïve about transmission of diseases from humans to wild animals but it is wildlife service's responsibility to ensure that both tourists and animals in general are not prone to any diseases are as a result of any form of interaction between these two species.

4.4. Determine the influence of human elephant conflict on livestock depredation in Narok county.

The second objective aimed at determining the influence of human elephant conflict on livestock depredation in Narok county.

4.4.1 Descriptive statistics

Quantitative analysis was conducted on the data obtained. The findings obtained were presented in the subheadings that follow.

4.4.1.1 Large bodied wild animals like elephants have caused the death of livestock

The findings obtained were shown in the table below.

Table 11: ***Large Bodied animals like elephants have led to death of livestock***

Large Bodied animals like elephants have led to death of livestock

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	36	12.3	12.3	12.3
	Agree	178	61.0	61.0	73.3
	Strongly Agree	78	26.7	26.7	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 12.3% of the respondents disagreed that large bodied animals like elephants have led to the death of livestock. 87.7% of the respondents agreed that large bodied animals like elephants have led to the death of livestock. Majority of the respondents agreed that large bodied animals like elephants have led to the death of livestock. According to Boitani et al (2010) and Lance et al (2010), animals especially carnivorous and omnivorous ones, are more strong and pounce of domestic animals. They end up hurting and in severe cases killing livestock. The

boundaries of wildlife centers must be reinforced with high voltage electric fences and even walls to fully contain these wild creatures, thus avoiding any injuries and loss of domestic animals.

4.4.1.2 Predation by wild animals has resulted to significant financial loss in the investment made by farmers on livestock

The findings obtained were shown in the table below.

Table 12: ***Predation by wild animals has resulted to significant financial loss in livestock investment***

Predation by wild animals has resulted to significant financial loss in livestock investment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undecided	71	24.3	24.3	24.3
	Agree	181	62.0	62.0	86.3
	Strongly Agree	40	13.7	13.7	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 75.7% of the respondents agreed that predation by wild animals has resulted to significant financial loss in the investment made by farmers on livestock. 24.3% of the respondents were undecided on whether predation by wild animals has resulted to significant financial loss in the investment made by farmers on livestock. None of the respondents disagreed that predation by wild animals has resulted to significant financial loss in the investment made by farmers on livestock. Majority of the respondents agreed that predation by wild animals has resulted to significant financial loss in the investment made by farmers on livestock. According to Kissui (2008), wildlife species predate upon livestock resulting in significant financial loss. Due to competition of resources between humans and wildlife, conflict will arise and the principle of survival for the fitness will apply. To avoid loss of financial investment made by residents on

their livestock, clear zoning must be set to ensure there is not conflict between livestock and wild creatures.

4.4.1.3 Farmers have taken action in defending their livestock by employing any means necessary.

The findings obtained were shown in the table below.

Table 13: ***Farmers have taken action to defend their livestock by any means necessary***

Farmers have taken action to defend their livestock by any means necessary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	225	77.1	77.1	77.1
	Strongly Agree	67	22.9	22.9	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, all the respondents agreed that, farmers have taken action to defend their livestock by any means necessary. Inskip and Zimmermann (2013) asserted due to depredation of pastoral livestock, farmers get frustrated especially when the government fails to aid in compensation or control of the matter. The government should find measures to control the issue of losses caused by depredation because it gets to a point where residents will even kill or poison the wild animals due to the losses and frustration they are experiencing. To maintain the growth of wildlife sceneries and avoidance of loss of domestic animals a solution must be found and be deployed.

4.4.2 Inferential statistics

Advanced quantitative analysis was conducted on the data obtained. The techniques used were correlation and linear regression.

4.4.2.1 Correlation

The findings obtained were shown in the table below.

Table 14: Correlation

Correlations

		R02 Large Bodied animals like elephants have led to death of livestock	R02 Predation by wild animals has resulted to significant financial loss in livestock investment	R02 Farmers have taken action to defend their livestock by any means necessary
Large Bodied animals like elephants have led to death of livestock	Pearson Correlation	1	-.080	-.686**
	Sig. (2-tailed)		.173	.000
	N	292	292	292
R02 Predation by wild animals has resulted to significant financial loss in livestock investment	Pearson Correlation	-.080	1	.095
	Sig. (2-tailed)	.173		.104
	N	292	292	292
R02 Farmers have taken action to defend their livestock by any means necessary	Pearson Correlation	-.686**	.095	1
	Sig. (2-tailed)	.000	.104	
	N	292	292	292

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

Source: The researcher, 2025

From the table above, there was one major correlation whose implementation will positively impact the reduction of human-elephant conflict and the human -wildlife conflict. Finding mechanisms to avoid the death of livestock caused by wild animals and ensuring farmers do not take matters in to own hands in dealing with their losses had correlation co-efficient of -.686**.

4.4.2.2 Linear regression

The findings obtained were shown in the table below.

Table 15: ***Coefficients***

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.564	.248		-10.350	.000
	R02 Large bodied animals like elephants have led to death of livestock	-.023	.020	-.044	-1.176	.240
	R02 Predation by wild animals has resulted to significant financial loss in livestock investment	-.005	.021	-.007	-.241	.810
	R02 Farmers have taken action to defend their livestock by any means necessary	.933	.041	.854	22.618	.000

a. Dependent Variable: Human Elephant Conflict DV

Source: The researcher, 2025

From the table above, ensuring farmers do not take matters in to own hands in dealing with their losses was the only independent variable that could significantly reduce the human-elephant conflict in Narok county. it had a significance level of .0005 which meant that its implementation will definitely reduce the human-wildlife conflict. The constant variable was also a significant predictor or reducing the previously conflict.

4.4.3 Qualitative responses from interviews

One of the community members asserted the following:

> "*We as farmers have gotten to a point of no return. We are facing significant loss of animal lives and in some cases, humans have also lost their lives. If the government cannot relocate us to different area and or control the movement of livestock, we will have to protect ourselves. It either us or them. One has to be victor and we are definitely not losing.*"

4.4.4 Mixing and interpretation of data

The boundaries of wildlife centers must be reinforced with high voltage electric fences and even walls to fully contain these wild creatures, thus avoiding any injuries and loss of domestic animals. Due to competition of resources between humans and wildlife, conflict will arise and the principle of survival for the fitness will apply. To avoid loss of financial investment made by residents on their livestock, clear zoning must be set to ensure there is not conflict between livestock and wild creatures. The government should find measures to control the issue of losses caused by depredation because it gets to a point where residents will even kill or poison the wild animals due to the losses and frustration they are experiencing. To maintain the growth of wildlife sceneries and avoidance of loss of domestic animals a solution must be found and be deployed.

4.5 Assess the property damaged caused by human elephant conflict in Narok county.

The third objective of the study aimed at assessing the property damaged by human elephant conflict in Narok county.

4.5.1 Descriptive statistics

Quantitative analysis was conducted on the data obtained. The findings obtained were presented in the subheadings that follow.

4.5.1.1 Some farmers have lost their livestock sheds due to the invasion of in elephants in farmers' property.

The findings obtained were presented in the table below.

Table 16: ***Farmers have lost livestock sheds due to the invasion by elephants***

Farmers have lost livestock sheds due to the invasion by elephants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	39	13.4	13.4	13.4
	Undecided	69	23.6	23.6	37.0
	Agree	156	53.4	53.4	90.4
	Strongly Agree	28	9.6	9.6	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 63% of the respondents agreed that farmers have lost their sheds due to invasion by elephants. 13.4% of the respondents disagreed that farmers have lost their sheds due to invasion by elephants. 23.6% of the respondents were undecided on whether farmers have lost their sheds due to invasion by elephants. Majority of the respondents agreed that farmers have lost their sheds due to invasion by elephants. According to Ogra (2008), due to the conflict that exists between humans and wildlife species, there is damage of property and buildings. The wildlife should conduct an analysis to determine the cause of wildlife species migrating to residential areas and implement measures that will contain these species in their environments.

4.5.1.2 Vehicle collisions have occurred when wild animals broke their boundaries and entered human territory.

The findings obtained were shown in the table below.

Table 17: ***Vehicle collisions have occurred when wild animals broke their banks and entered human territory***

Vehicle collisions have occurred when wild animals broke their banks and entered human territory					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	37	12.7	12.7	12.7
	Undecided	67	22.9	22.9	35.6
	Agree	188	64.4	64.4	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 64.4% of the respondents agreed that vehicle collisions have occurred when wild animals broke their banks and entered residential property. 22.9% of the respondents were undecided on whether vehicle collisions have occurred when wild animals broke their banks and entered residential property. 12.7% of the respondents disagreed that vehicle collisions have occurred when wild animals broke their banks and entered residential property. Majority of the respondents agreed that vehicle collisions have occurred when wild animals broke their banks and entered residential property. According Neumann et al (2008), elephants have often caused accidents during the night. These creatures would abruptly cross the road forcing drivers to try their best to avoid colliding with them. The wildlife service in collaboration with ministry of roads and public works must install traffics signs and where necessary put speed bumps that will ensure they minimize and eventually avoid these road accidents.

4.5.1.3 Humans have taken precautionary measures that may have resulted to the death of wildlife in an attempt to avoid further property damage.

The findings obtained were shown in the table below.

Table 18: ***R03 Humans have taken precautionary measures that led to death of wildlife in attempting to avoid further property damage***

R03 Humans have taken precautionary measures that led to death of wildlife in attempting to avoid further property damage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	104	35.6	35.6	35.6
	Agree	134	45.9	45.9	81.5
	Strongly Agree	54	18.5	18.5	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, 35.6% of the respondents disagreed that humans have taken precautionary measures that led to death of wildlife in attempting to avoid further property damage. 64.4% of the respondents agreed that humans have taken precautionary measures that led to death of wildlife in attempting to avoid further property damage. Majority of the respondents agreed that humans have taken precautionary measures that led to death of wildlife in attempting to avoid further property damage. According to Thapa (2010), after a couple of engagements by the community members with the tourism office in the county government and even being on TV, no attempts were made to remedy the situation faced by farmers and pastoralists in Narok county. It is important for the tourism ministry to note that the measures being taken by the residents affected by the human wildlife conflict are not limited to killing of wild animals. The death of wild creatures will affect the revenue generated which is part of what is expected to take care of the government expenditure.

4.5.2 Inferential statistics

Advanced quantitative analysis was conducted on the data obtained. The techniques used were correlation and linear regression.

4.5.2.1 Correlation

The findings obtained were shown in the table below.

Table 19: ***Correlations***

Correlations

		R03 Farmers have lost livestock sheds due to the invasion by elephants	R03 Vehicle collisions have occured when wild animals broke their banks and entered human territory	R03 Humans have taken precautionary measures that led result to death of wildlife in attempting to avoid further property damage
R03 Farmers have lost livestock sheds due to the invasion by elephants	Pearson Correlation	1	.084	.423**
	Sig. (2-tailed)		.153	.000
	N	292	292	292
R03 Vehicle collisions have occured when wild animals broke their banks and entered human territory	Pearson Correlation	.084	1	-.127*
	Sig. (2-tailed)	.153		.030
	N	292	292	292
R03 Humans have taken precautionary measures that led result to death of wildlife in attempting to avoid further property damage	Pearson Correlation	.423**	-.127*	1
	Sig. (2-tailed)	.000	.030	
	N	292	292	292

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

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

Source: The researcher, 2025

From the table above, there are only one key correlation whose immediate implementation would have significantly reduced the human elephant conflict on socio-development in Narok county. Finding ways to reduce the destruction of livestock sheds by elephants' invasion and ensuring the human population does not take matters into their own hands in dealing with the property damages had a correlation co-efficient of .423**.

4.5.2.2 Linear regression

The findings obtained were shown in the table below.

Table 20: Linear regression

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.080	.117		.681	.497
	R03 Farmers have lost livestock sheds due to the invasion by elephants	-.001	.028	-.002	-.035	.972
	R03 Vehicle collisions have occured when wild animals broke their banks and entered human territory	.090	.021	.195	4.261	.000
	R03 Humans have taken precautionary measures that led result to death of wildlife in attempting to avoid further property damage	.256	.020	.644	12.777	.000

a. Dependent Variable: Human Elephant Conflict

Source: The researcher, 2025

From the table above, there were two independent variables which were significant predictors of reducing human elephant conflict. Dealing with the vehicle collisions challenge and ensuring humans do not take matters into their own hands in dealing with their property losses had a significance level of .0005 which meant that there was at least a 99% that implementation of these two variables would reduce the human elephant conflict. The constant variable was not a significant predictor of reducing the afore mention conflict.

4.5.3 Qualitative responses from interviews

One of the county government representatives stated the following:

> "*It is high time for the tourism department to implement measures that will continually work in reducing the challenges faced in property and other challenges in general. If the affected residents decide to take matters into their own hands, they will be acting in self-defense which means any loss wildlife will be government's problem and the country's liability.*"

4.5.4 Mixing and interpretation of data

The wildlife should conduct an analysis to determine the cause of wildlife species migrating to residential areas and implement measures that will contain these species in their environments. The wildlife service in collaboration with ministry of roads and public works must install traffics signs and where necessary put speed bumps that will ensure they minimize and eventually avoid these road accidents. It is important for the tourism ministry to note that the measures being taken by the residents affected by the human wildlife conflict are not limited to killing of wild animals. The death of wild creatures will affect the revenue generated which is part of what is expected to take care of the government expenditure.

4.6 Assessing the crop raiding caused by human elephant conflict in Narok county.

The final objective of the study aimed at assessing the crop raiding caused by human elephant conflict in Narok county.

4.6.1 Descriptive statistics

Quantitative analysis was conducted on the data obtained. The findings obtained were presented in the subheadings that follow.

4.6.1.1 Wildlife animals specifically elephants are known to cause significant destruction of food crops as a result of habitat fragmentation

The findings obtained were shown in the table below.

Table 21: ***Wild animals (Elephants) are known to cause significant destruction of food crops as a result of habitat fragmentation***

Wild animals (Elephants) are known to cause significant destruction of food crops as a result of habitat fragmentation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	236	80.8	80.8	80.8
	Strongly Agree	56	19.2	19.2	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, all respondents agreed that elephants and wild animals in general are known to cause significant destruction of food crops as a result of habitat fragmentation. According to a research by FAO (2009), elephants, hippopotamuses and baboons are known to cause substantial damages while feeding at night which is a characteristic of crop raiding. The human population should not grow their crops in areas that are easily accessible by the crop destroyers.

4.6.1.2 Elephants are known to raid crops as a matter of preference and taste but not due to lack of forest forage

The findings obtained were shown in the table below.

Table 22: ***Elephants are known to raid crops as a matter of preference and taste. They still have enough forest forage***

Elephants are known to raid crops as a matter of preference and taste. They still have enough forest forage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	58	19.9	19.9	19.9
	Undecided	144	49.3	49.3	69.2
	Agree	85	29.1	29.1	98.3
	Strongly Agree	5	1.7	1.7	100.0
	Total	292	100.0	100.0	

Source: the researcher, 2025

From the table above, 19.9% of the respondents disagreed that elephants are known to raid crops as a matter of preference and taste. 30.8% of the respondents agreed that elephants are known to raid crops as a matter of preference and taste. 49.3% of the respondents were undecided on whether elephants are known to raid crops as a matter of preference and taste. Majority of the respondents were undecided on whether elephants are known to raid crops as a matter of preference and taste. According to Chiyo et al (2011), as energy from crops leads to musth and greater body size, crop raiding becomes selective. The forest service should focus in segregating their animals based on what they consume. Herbivores like elephants must be placed in areas that have a lot of forage.

4.6.1.3 Wild animals are known to raid crops due to the availability and proximity of crops as compared to the source wild forage

The findings obtained were shown in the table below.

Table 23: ***Wild animals raid crops due to proximity and availability.***

Wild animals raid crops due to proximity and availability. They do not lack forage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	243	83.2	83.2	83.2
	Strongly Agree	49	16.8	16.8	100.0
	Total	292	100.0	100.0	

Source: The researcher, 2025

From the table above, all the respondents agreed that wild animals raid crops due and proximity and availability but not lack of forage. According to Linkie et al (2007) crop raiding decisions was not based on reduced availability of forest forage but on the increased availability of preferred crops along the forest's margin. Digging of trenches and using LED lights will discourage elephants from encroaching civilians' properties. These will force to go back to into the forest to get forage that will sustain their needs.

4.6.2 Inferential statistics

Advanced quantitative analysis was conducted on the data obtained. The techniques used were correlation and linear regression.

4.6.2.1 Correlation

The findings obtained were shown in the table below.

Table 24: Correlation

Correlations

		R04 Wild animals (Elephants) are known to cause significant destruction of food crops as a result of habitat fragmentation	R04 Elephants are known to raid crops as a matter of preference and taste. They still have enough forest forage	R04 Wild animals raid crops due to proximity and availability. They do not lack forage
R04 Wild animals (Elephants) are known to cause significant destruction of food crops as a result of habitat fragmentation	Pearson Correlation	1	-.084	-.219**
	Sig. (2-tailed)		.153	.000
	N	292	292	292
R04 Elephants are known to raid crops as a matter of preference and taste. They still have enough forest forage	Pearson Correlation	-.084	1	-.687**
	Sig. (2-tailed)	.153		.000
	N	292	292	292
R04 Wild animals raid crops due to proximity and availability. They do not lack forage	Pearson Correlation	-.219**	-.687**	1
	Sig. (2-tailed)	.000	.000	
	N	292	292	292

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

Source: The researcher 2025

From the table above there were two significant correlations that could positively impact in the reduction of human elephant conflict in Narok county. they are as follows:

- Wild animals are known to raid crops due to the availability and proximity of crops but not due to lack of forage and elephants are known to raid crops as a matter of preference and taste but not due to lack of forage. This had a correlation co-efficient of -.687**.
- Wild animals are known to raid crops due to the availability and proximity of crops but not due to lack of forage and wildlife animals specifically elephants are known to cause significant destruction of food crops as a result of habitat fragmentation. This had correlation co-efficient of -.219**.

4.6.2.2 Linear regression

The findings obtained were shown in the table below.

Table 25: Linear regression

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1.336	.508		-2.630	.009
	R04 Wild animals (Elephants) are known to cause significant destruction of food crops as a result of habitat fragmentation	-.170	.050	-.145	-3.405	.001
	R04 Elephants are known to raid crops as a matter of preference and taste. They still have enough forest forage	-.031	.036	-.050	-.878	.381

R04 Wild animals raid crops due to proximity and availability. They do not lack forage	.820	.072	.667	11.391	.000

a. Dependent Variable: Human Elephant Conflict DV

Source: The researcher, 2025

From the table above, Wild animals are known to raid crops due to the availability and proximity of crops but not due to lack of forage and elephants are known to raid crops as a matter of preference and taste but not due to lack of forage were the independent variables that could significantly predict the reduction of human elephant conflict in Narok County. they had a significance level of less than 0.001 which meant that there was at least 95% confidence level that they could significantly reduce the human elephant conflict in Narok county.

4.6.3 Qualitative responses from interviews

One of the community members stated the following:

> "*Crop raiding is something that is easier to control as compared to other challenges discussed. Trenches can be dug to limit the movement of elephants. A more advanced way of controlling movement is by using strong lighting especially during the night. This will limit the view of the animal thus making it halt.*"

4.6.4 Mixing and interpretation of data

The human population should not grow their crops in areas that are easily accessible by the crop destroyers. The forest service should focus in segregating their animals based on what they consume. Herbivores like elephants must be placed in areas that have a lot of forage. Digging of trenches and using LED lights will discourage elephants from encroaching civilians' properties. These will force to go back to into the forest to get forage that will sustain their needs.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarized the findings of the study, drew conclusions from them and made recommendations.

5.2 Summary of findings

5.2.1 Establish the influence of human elephant conflict on disease transmission and deaths for both humans and livestock in Narok county.

Though it may be challenging to control the cessation of wild animals' movement, scheduled vaccination must be carried on animals that are known to break their banks especially elephants. The Kenya Wildlife Service, must conduct a thorough research of the various diseases that can be transmitted from wild animals and ensure that humans are given vaccines as a pre-cautionary measure that will prevent disease transmission. The residents may be a bit naïve about transmission of diseases from humans to wild animals but it is wildlife service's responsibility to ensure that both tourists and animals in general are not prone to any diseases are as a result of any form of interaction between these two species.

5.2.2 Determine the influence of human elephant conflict on livestock depredation in Narok county.

The boundaries of wildlife centers must be reinforced with high voltage electric fences and even walls to fully contain these wild creatures, thus avoiding any injuries and loss of domestic animals. Due to competition of resources between humans and wildlife, conflict will arise and the principle of survival for the fitness will apply. To avoid loss of financial investment made by residents on their livestock, clear zoning must be set to ensure there is not conflict between livestock and wild creatures. The government should find measures to control the issue of losses

caused by depredation because it gets to a point where residents will even kill or poison the wild animals due to the losses and frustration they are experiencing. To maintain the growth of wildlife sceneries and avoidance of loss of domestic animals a solution must be found and be deployed.

5.2.3 Assess the property damaged caused by human elephant conflict in Narok county.

The wildlife should conduct an analysis to determine the cause of wildlife species migrating to residential areas and implement measures that will contain these species in their environments. The wildlife service in collaboration with ministry of roads and public works must install traffics signs and where necessary put speed bumps that will ensure they minimize and eventually avoid these road accidents. It is important for the tourism ministry to note that the measures being taken by the residents affected by the human wildlife conflict are not limited to killing of wild animals. The death of wild creatures will affect the revenue generated which is part of what is expected to take care of the government expenditure.

5.2.4 Assessing the crop raiding caused by human elephant conflict in Narok county.

The human population should not grow their crops in areas that are easily accessible by the crop destroyers. The forest service should focus in segregating their animals based on what they consume. Herbivores like elephants must be placed in areas that have a lot of forage. Digging of trenches and using LED lights will discourage elephants from encroaching civilians' properties. These will force to go back to into the forest to get forage that will sustain their needs.

5.3 Conclusion of the study

In establishing the influence of human elephant conflict on disease transmission and deaths for both humans and livestock in Narok county, though it may be challenging to control the cessation of wild animals' movement, scheduled vaccination must be carried on animals that are known to break their banks especially elephants. The Kenya Wildlife Service, must conduct a thorough

research of the various diseases that can be transmitted from wild animals and ensure that humans are given vaccines as a pre-cautionary measure that will prevent disease transmission. The residents may be a bit naïve about transmission of diseases from humans to wild animals but it is wildlife service's responsibility to ensure that both tourists and animals in general are not prone to any diseases are as a result of any form of interaction between these two species.

In determining the influence of human elephant conflict on livestock depredation in Narok county, the boundaries of wildlife centers must be reinforced with high voltage electric fences and even walls to fully contain these wild creatures, thus avoiding any injuries and loss of domestic animals. Due to competition of resources between humans and wildlife, conflict will arise and the principle of survival for the fitness will apply. To avoid loss of financial investment made by residents on their livestock, clear zoning must be set to ensure there is not conflict between livestock and wild creatures. The government should find measures to control the issue of losses caused by depredation because it gets to a point where residents will even kill or poison the wild animals due to the losses and frustration they are experiencing. To maintain the growth of wildlife sceneries and avoidance of loss of domestic animals a solution must be found and be deployed.

In assessing the property damaged caused by human elephant conflict in Narok county, the wildlife should conduct an analysis to determine the cause of wildlife species migrating to residential areas and implement measures that will contain these species in their environments. The wildlife service in collaboration with ministry of roads and public works must install traffics signs and where necessary put speed bumps that will ensure they minimize and eventually avoid these road accidents. It is important for the tourism ministry to note that the measures being taken by the residents affected by the human wildlife conflict are not limited to killing of wild animals.

The death of wild creatures will affect the revenue generated which is part of what is expected to take care of the government expenditure.

In assessing the crop raiding caused by human elephant conflict in Narok county, the human population should not grow their crops in areas that are easily accessible by the crop destroyers. The forest service should focus in segregating their animals based on what they consume. Herbivores like elephants must be placed in areas that have a lot of forage. Digging of trenches and using LED lights will discourage elephants from encroaching civilians' properties. These will force to go back to into the forest to get forage that will sustain their needs.

5.4. Recommendations for further study

1. To avoid conflicting over land, the government should relocate the people who are believed to be at risk from attack by wildlife creatures.
2. To ensure the tourism market is still able to sustain itself, the forest service must implement measures to ensure that wild creatures do not cross in to residential zones.

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APPENDIX I: QUESTIONAIRRE

A. Personal information

1. How many people are in your family?

2. What wealth category are you classified under?

3. How many children do you have?

4. How long have you lived here?

5. Observations on wealth status.

- Construction of main dwelling

- Mud brick

- Wattle and daub

- Volcanic stone

- Wood plank

- Hedge present around house – Y/N
- Outside cooking house – Y/N
- No. of permanent buildings
- Cattle owned – Y/N

B. Agriculture and Land Tenure

1. Do you own your land or do you work on someone else's land?

a. If own land,

i. How big is your land?

ii. What crops do you grow?

iii. Do you grow them together or apart?

b. If collective land,

i. How many people work this land?

ii. How big is this land?

iii. What is grown?

2. Do you choose what to grow on your land?

a. If no,

i. Who chooses?

ii. Why, in your opinion do they tell you what to grow?

iii. Do you agree with this?

3. Do you grow pyrethrum?

a. If yes,

i. How much of your land is taken up by this?

ii. Who's choice was this?

iii. Is growing pyrethrum a good thing or a bad thing?

iv. Do you gain money or lose money from growing this?

b. If no, why not?

4. Do you sell your crops in the market?

a. If yes,

i. How do you get your crops to the market?

ii. Which crops do you send to the market?

b. If no, how do you obtain other food and items?

5. Do you intercrop on your farm?

6. Can you estimate the total value of all your crops?

7. Where do you collect water during the dry season?

a. How far is this from your house?

8. Where do you collect water during the wet season?

a. How far is this from your house?

C. Human-wildlife conflict

1. Do animals ever visit your land?

. Where do these animals come from?

3. Which animals come?

4. Do they damage crops?

a. If yes,

i. Which crops are damaged/lost?

ii. Can you estimate how much money you lose because of this every time it happens?

5. Do gorillas ever come onto your land?

a. If yes, do they damage anything?

6. How often do these animals visit your land?

a. In the last year, how many times has this occurred?

b. In the last 10 years, how many times has this occurred?

7. In the past which animals came?

8. Is this the same today? What animals come nowadays if it is different?

9. When was the last visit?

10. Is anything done to stop this?

a. If yes, what is done?

b. If no, why not?

11. Do you guard your land?

a. If yes,

i. Who does this guarding?

ii. How is this done?

iii. How much time/money do you spend doing this?

12. Do you think you can do anything to solve this problem?

D. Conservation and responsibility

1. Why do you think animals come out of the park?

2. What does the park give you?

3. What do you give the park?

4. What does RDB do to protect the park and the people who live around it?

5. Are they doing enough?

6. What do you do to protect the park?

a. Why do you do this?

7. Are you a member of any cooperatives?

a. If yes, does this amatsinda receive revenue sharing from RDB?

b. If no, why does it not receive RS?

8. How would you use revenue sharing from the park, if you could decide?

9. Who is responsible for protection of the forest?

10. Do you use the forest for anything in your day to day life?

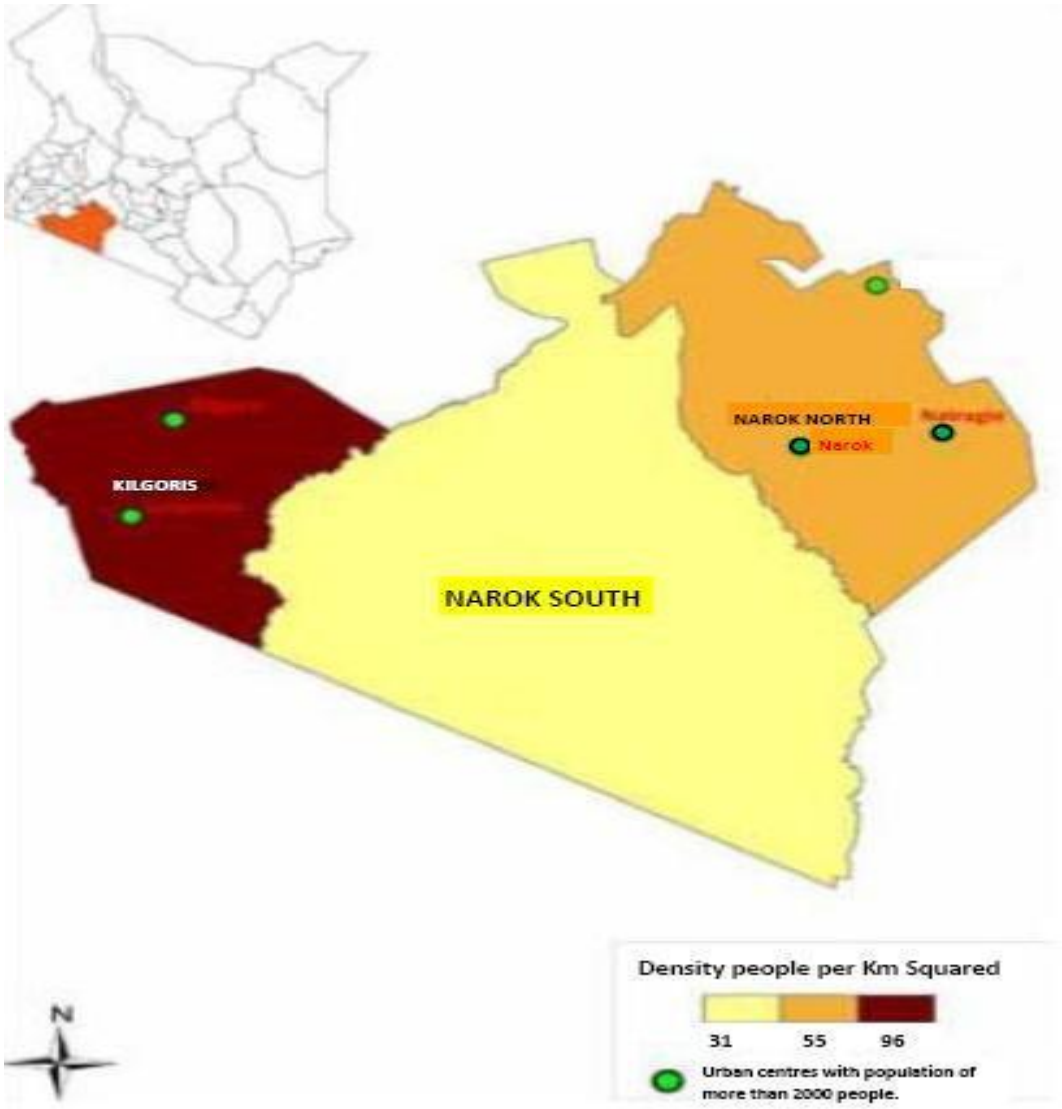
Where do you collect water during the wet season

APPENDIX II: INTERVIEW GUIDE

1. Do you own your land or do you work on someone else's land
2. How would you use revenue sharing from the park, if you could decide?
3. Who is responsible for protection of the forest?
4. Do you use the forest for anything in your day to day life?
5. What does RDB do to protect the park and the people who live around it
6. Do you think you can do anything to solve this problem
7. How often do these animals visit your land
8. Do you use the forest for anything in your day to day life?
9. Where do you collect water during the wet season

APPENDIX III: MAP OF THE STUDY AREA

A map of Narok County



INFLUENCE OF HUMAN ELEPHANT CONFLICT ON SOCIO-ECONOMIC DEVELOPMENT OF NAROK COUNTY, KENYA

by Margaret Ongale

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