AN ASSESSMENT OF DYNAMICS OF LAND USE ON WILDLIFE AND THEIR DISPERSAL AREAS, A CASE STUDY OF NAIROBI NATIONAL PARK ANDTHE SURROUNDING AREAS

BY

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DECLARATION

I hereby declare to the best of my knowledge and belief, except for the literature cited, that this research report is my original work and has never been presented to any University or any other institution or higher learning for any academic award.

Student: KIPTOO FREDRICK SANG

Signature ....

Date ....30ᵀᴴ NOV 2011..........

APPROVAL

I, certify that the research report submitted by the candidate was done under my supervision. His work is ready for submission for award of the degree of Bachelor of Science in Environmental Management.

....

Mr. AMMON R. ORISHABA

Supervisor

Date ....

DEDICATION

I would like to dedicate this piece of work to my dear parents for their moral and financialsupportin my education during the period of my study at the Kampala International University.

I would also like to dedicate this piece of work to all my friends at Kampala international university and other well-wishers who supported me in one way or the other for successful completion of this work.

May God bless you all

ACKNOWLEDGEMENTS

LIST OF ACRONYMS

NNP- Nairobi National Park

CBNRM - Adoptionof the Community Based Natural Resource Management

KWS- Kenya Wildlife Service

GOK- Government of Kenya

EPZ- Export Processing Zone

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Summary, Conclusions and Recommendations

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DEFINITION OF TERMS

Wildlife- includes all non-domesticated plants, animals and other organisms

Dispersal areas/ Migratory corridors- this refers specifically to the geographic path an animal follows to get from home range to the other during dry and wet seasons. These paths can be continuous habitat or a network of suitable habitats in a stepping stone arrangement as in nectar corridors.

Biodiversity- The variety of living organisms considered at all levels, from genetics through species, to higher taxonomic levels, and including the variety of habitats and ecosystems.

Habitat conversion- The anthropogenic alteration of habitat from its natural state (e.g. elimination of natural habitat to create agricultural fields).

Habitat fragmentation- The disruption of extensive habitats into isolated and small patches resulting in a loss of total habitat area, and smaller, more isolated remaining habitat patches.

Wildlife migration -Wildlife migration is an instinctive movement that takes place daily due to water and pastureneeds or annually due to climatic changes.

Land tenure is the name given, particularly in common law systems, to the legal regime in which land is owned by an individual, who is said to "hold" the land.

Land use is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements. It has also been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it".

Conservation- is the preservation of the natural environment such as wildlife, forest, soil and water.

National Park- is an area which has been gazetted by the government and an act of parliament to conserve the wildlife against poachers and for recreational, viewing, scientific studies and income generation.

Ecosystem- is a biological community of interacting organism and their physical environment.

Habitat- is the home of any living creature.

Abstract

Wildlife and their dispersal areas are undergoing a severe stress currently due to combinations of land use changes that are practiced around their habitats. This has been due to increased human populations, development of the export processing zones, development of estates (housing Units), agricultural development and the development of road networks. These land use changes have had adverse effects on the behavior of animals and their survival rates.

This has increased the conflicts between the population living around the National Park and the wild animals. This has been seen as a result of the destruction of property and sometimes even cause of injury and death.

The researcher found out that these activities have creately reduced the space of the dispersal areas due to the practices that are practiced. This has made the animals to adapt to various mechanisms due to the changes such as grazing with the livestock; this ensures their survival techniques outside the national park.

CHAPTER ONE

INTRODUCTION

1.0 Background of the problem

The presence of dispersal areas and migration corridors around protected areas is critical in the maintenance of viable wildlife population around the world. This is due to the reasons that then wildlife dispersal areas are important for the reasons ofproviding forage and water resources, breeding grounds, and mating grounds for the wildlife during the different seasons.

Wildlife dispersal areas have been changed due to changes in the land use activities and this has been a threat to the existence in most species of wildlife across the world. Due to this problem many international organizations have been formed to address the issues of conservation concern with wildlife and their dispersal areas. These organizations advocate for the conservation of the natural areas in order to avoid the loss animal and plant species which are mostly endemic to an area.

The wildlife and their dispersal areas have generally been affected in most African countries which have led to decrease in animals such as the black rhino among other animals. East African pastoral and wildlife systems are currently undergoing severe stress due to a combination of trends including increased human population pressure, economic structural changes and privatization of land tenure. These are ecosystems with the richest large mammal biodiversity on earth. Most of this wildlife is outside parks in pastoral grazing areas. In Tanzanian parks, consequences of insularization of park have been local extinction of species, which have been higher in smaller parks than in larger parks.

Insularization of protected areas and habitat fragmentation lead to the extinction of species, directly reducing biodiversity. Isolation reduces the effective size of an area by limiting movement of species and causing faunal relaxation. If the protected areas have no dispersal areas, genetic drift and inbreeding may occur, leading to population instability, loss of ecological integrity and possibly local extinction. Isolation can be

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caused by various factors such as roads or fences, areas of agriculture or dense human population.

The threat of biodiversity loss is an eminent one for East African protected areas as they become increasingly insularized by the growing human population in surrounding areas outside protected areas, human activities such as settlement, agricultural cultivation, and active elimination of wildlife on land adjacent to parks. In the Amboseli area, attributes associated with rapid population growth and land use changes threaten to completely isolate protected areas from each other. It is likely that protected areas will lose a significant proportion of their large mammal fauna if they become completely insularized. But the frequency of human wildlife conflict can be inversely related to human density and land use changes on lands adjacent to protected areas. Also human population density has been a major indicator and predictor of large mammal local extinctions. An increase in human population and human associated activities decreases wildlife population space and dispersal and leads to an increase in human-wildlife conflicts. These human-wildlife conflicts create frustration and animosity towards wildlife and may result in retaliation killings

Land use information is therefore an essential element for nearly all development. Changes in land use are to a large extent a reflection of how society responds to socio-economic, institutional and management practices (Adeniyi, 1980. UNECE (2004) defines land use as the manner in which land is used, including the nature of the vegetation upon it surface. Land use can therefore include activities that take place upon land such as cultivation, grazing of domestic animals, buildings (such as schools), and animal migration, among other activities. Adequate knowledge and information about land, such as its location, size and boundaries are important for its use and effective planning. For many years, classification and inventory of land use changes have been captured on topographical maps, air photos and satellite imagery. These methods had a deficiency in that it is difficult and time consuming to manually merge these data sets. These deficiencies have been overcome by the ability to digitize the data and combine it in a Geospatial Database for query and analysis.

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Most of the wildlife in Kenya and their dispersal areas are under great threat of extinction due to encroachment by human beings. This is as a result of land use changes in form of settlement, economic reasons and also due to environmental factors such as changes in the weather patterns.

The contraction of dispersal areas decreases the rate of migration of wildlife to and from protected areas, as many species are reluctant to use dispersal areas that have been altered by human settlement. The loss of dispersal areas limits the ability of a protected area to support viable, genetically diverse populations, rendering populations prone to inbreeding depression and local extinction due to stochastic events and competitive exclusion.

Research shows that wildlife and their dispersal areas have been greatly affected by the land use dynamics, which is attributed mainly to reasons such as political affluence, resettlement of populations, urbanization and environmental factors (Gyekye, 1996, Kireria 2000).

The human population in kitengela has more than doubled in the last 10 years, from 6548 in 1989 to 17,347 in 1999 (GOK1994a, GOK 1994b; GOK 2001a,GOK 2001). The same time the number of households increased nearly five-fold from 1989 to 1999 ((1044 to 5005) the high population growth rate experienced in this area has been attribute mainly, to in-migration, due, to kitengela's proximity to Nairobi and increasing urban development occurring in the proximity of the town.

The loss of dispersal areas around NNP is linked to recent changes in land tenure and land use in the Maasai land. The announcement of Kitengela and Ngong hills as conservation areas was never legalized and therefore the land is now privately owned and with Land tenure the land has changed considerably within these areas over the lasts 40years. Rapid subdivision of land in the area is purchased by the Non-Maasai and in turn the funds are used by the land owners to fence off the remaining tracts of land, for the purpose of defining individual boundaries or keeping the wildlife off their land.

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The threats arise from several factors including high population and settlement along the Mbagathi River and the development of Export Processing Zone (EPZ) in kitengela. The EPZ is an industrial park for the manufacture of export goods. Locating the EPZ within the dispersal area has created the following problems of settlement; Rapid expansion of Athi-River and Kitengela towns into the wildlife habitat as a result of development of subsidiary/ancillary industry and various types of infrastructure supporting the industrial zone, Rapid subdivision of land in the neighborhood-the land is purchased largely by non-Maasai, and in turn the funds are used by the old landowners to fence off the remaining tracts of land, for the purpose of defining individual boundaries or keeping wildlife off the land. Land sales have also provided capital for investment in business in nearby towns and led to settlement expansion, Expansion of stone quarrying activities within Kitengela, resulting in conversion of good grazing land into wasteland.

Larger number of animals and their dispersal areas has been lost due to poaching by the population of people living around and the persistent droughts in the park. In the early 1990's the animals were able to move freely within their home range but due to expansion of the town and settlement on the migratory corridors the animals have been restricted to just one home range, which has led to inbreeding and hence the production of less viable offspring that cannot survive the harsh conditions. Therefore, dispersal areas around NNP are important in limiting the effects of the park's small size.

1.1 The statement of the problem

Changes in land use dynamics have had a negative impact on wildlife and their dispersal areas due to the fact that it has disrupted the wildlife behavior in terms of feeding, breeding and in the process of migrating from one home range to the other as a result of establishment of their dispersal areas which have in turn led to a decline in the number of animals and loss of other species due to destruction of their habitats and loss of their migratory routes. It is a result of this that the researcher has decided to carry out a study in the dynamics of land use on the wildlife and their dispersal areas

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majorly in and around the Nairobi National Park, so as to ascertain the root courses of the problems and to come up with a management plan for the park and the surrounding dispersal areas.

1.2 Objectives
1.2.1 General objectives
The main objective of the study is to assess the relationship of land use changes and wildlife dispersal areas.

1.2.2 Specific objectives
- To find out the land use change in the areas surrounding the park Nairobi National Park over a period of time
- To assess the impacts of land use change on the wildlife and their dispersal areas.
- To identify the adaptation mechanisms of the animals to the changes.
- To propose the possible mitigation measures for the land use changes.

1.3 Research question
- What is the land use change activities practiced at the areas surrounding the park?
- What are the contribution of these activities on behavior of wildlife and their dispersal areas?
- What are the adaptation mechanisms of the animals to the changes that have occurred?
- What are the possible mitigation measures to the changes in land use?

1.4 Significance of the study

Most of the conservationist in Kenya have been privatized and a few are vested under governments authority, therefore this study is important in the sense that it will assist in development of education and awareness-raising programmes concerning the promotion of sustainable development and the protection of the wildlife and their dispersal areas need to be introduced and strengthened at the local, the national and in all relevant sectors.

The findings of this study will help managers and students elaborate adequate studies for the better understanding of the relationship between development and environment for the promotion of sustainable development; promote a dialogue between government, developers and environment communities.

The findings will also help managers include planning and environment policies to be mutually supportive in favor of sustainable development existing natural resources around the national park.

AS part of the study the research is intending to seek a sustainable approach, which will accommodate the interest stakeholders such as KWS, land owners, local authority, central government and the local people.

The study will come out with new propositions and spatial planning which will take care of the interest of land use around the park; this will involve the stakeholders such as the local authority and the investors.

1.5 Conceptual framework
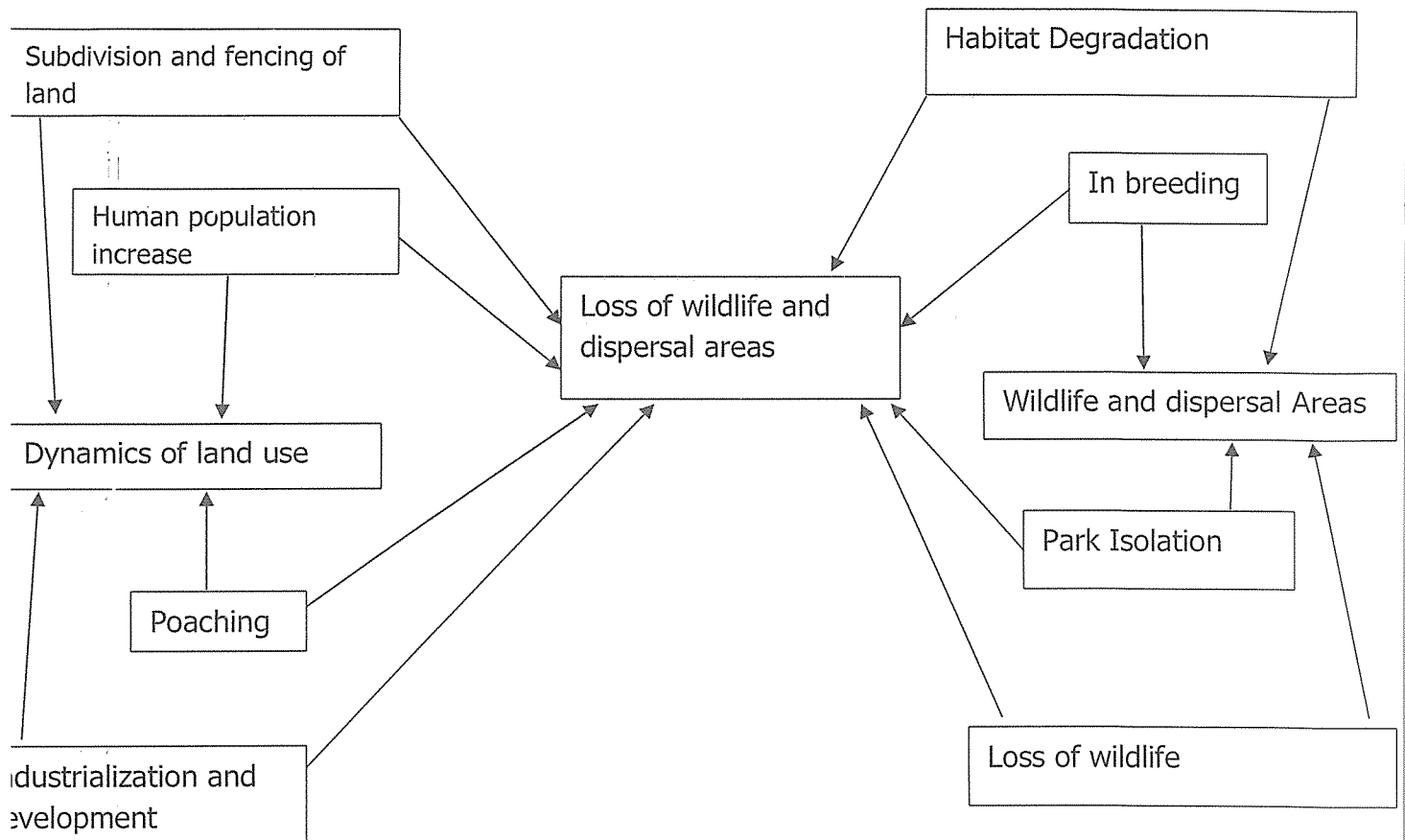
This research proposal adopts the framework that was developed by Wood *et al.*(1999), in analyzing the root and direct causes of biodiversity loss in Vietnam. According to wood forest degradation and loss were most important contributors to the loss of biodiversity in Vietnam. According to him, the rapid loss of biodiversity and habitats around the world is occurring at local levels as a result of farmers clearing new areas, settlements and timber companies opening new forests for logging.

The explanation for these activities, however, is often found in socio-economic forces that arise at national and international levels, which shape the decisions made at local level on the resource use patterns. The socio-economic forces referred to include; macro-economic policies, demographic changes, development biases, public policies, poverty and inequality. The changes in the resource use patterns resulting from the above mentioned forces are also associated with infrastructure construction, forest exploitation, in-migration, pollution and land use changes. These activities, together cause habitat destruction and ultimately biodiversity loss. The focus of this research is on wildlife and their dispersal areas. So the framework is modified to fit the situation.

The study focused on the land use changes industrialization and settlement which seems to be the important factors for land use changes around the wildlife dispersal areas around the Nairobi National Park. These factors are closely interlinked and their inter-relationships among them are complex and they tend to support each other. These factors lead to change in resource use patterns and hence leading to land use and cover changes in the dispersal areas which in turn affect the wildlife behavior. The result of all these will be blockage of the wildlife corridor and habitat destruction thereby causing park isolation and loss of biodiversity.

1.6 Scope of the study

The Park lies within the city of Nairobi, separated from built-up areas by an electrified fence. It is in the tropical grasslands and savannas biome at an altitude of between 1,540 and 1,780 m. Open grass plains with scattered acacia shrubs are predominant, with part of the area covered by highland dry forest. Permanent River with a riverine forest and the Athi-Kapiti Plains and Kitengela migration corridor which are important wildlife dispersal areas during the rain season.

CHAPTER TWO

Literature review

2.0 INTRODUCTION

This chapter is an analysis of some of the major issues of the existing literature on dynamics in land use on wildlife and their dispersal areas and its impacts on the same, which have been studied and explored by different scholars. It is worth noting that the greatest part of this literature is as a result of studies which were carried out in other protected areas, thus the literature review is drawn from empirical survey of land use change practices, journals and textbooks dealing with conservation.

2.1 Land-use changes in Kitengela

Land tenure policies have changed considerably within Kenyan pastoral areas over the last 40 years. Until the mid-1960's, land in the pastoral systems was held communally. After Kenya achieved independence from colonial rule, the government encouraged private land ownership in pastoral systems, with the aim of intensifying and commercializing livestock production (Galaty 1994; Homewood 1995). The first major step in privatization was the introduction of the Group Lands Representatives Act in 1968, which provided for the adjudication of group ranches (Thompson et al. 2000). Under the Kenya Livestock Development Project (Phase I) funded by the World Bank, each large communally owned piece of Maasai land was adjudicated into several group ranches (Grandin 1989).

Group ranches were seen as a compromise between the Government's preference for individual tenure and the production requirements of a semi-arid zone that necessitates greater mobility of animals than can be attained under a tenure system that is entirely private. Communal land tenure of large territories and a group ranch approach allowed wildlife to coexist freely with the livestock. However, as a result of inefficiencies and failures in the operation of the group ranches, the Maasai started pressing for subdivision.

Transitions in land tenure have led to changes in land-use activities in the Kitengela ecosystem. This ecosystem acts as a wildlife dispersal area and migratory corridor for Nairobi National Park. Maasai pastoralists in this area have diversified into economic activities other than traditional livestock production. In addition, its close proximity to the city of Nairobi has attracted non-Maasai and increased the pressure for land for permanent settlement, industrialization and speculation. This area is threatened with increasing human population, permanent settlement and fences, social pressures on traditional Maasai lifestyles and industrialization of the Athi-River and Kitengela townships. These new developments interfere with the seasonal wildlife migratory routes and reduce wildlife ranges and available habitats. These changes in socio-economic conditions and land-use activities appear to be contributing to escalating conflicts between landowners and wildlife in the area neighboring Nairobi National Park (Western 1982, Ellis et al. 1999)

The Kitengela conservation area covers approximately 390 km2 (GOK 2001b). When Nairobi National Park was established in 1946 under the National Parks Ordinance of 1945, it was immediately recognized that it was too small to meet the ecological requirements for existing migratory wildlife species. Kitengela plains and the Ngong Hills were therefore declared conservation areas. However, the status of Kitengela was never legalized and although referred to as a Game Conservation area, the land is now privately owned. The Kitengela area therefore presents a great challenge to conservation. The threats arise from several factors, including increasing human population and settlement along the Mbagathi River by the richwho pay high prices to live within view of Nairobi National Park and the development of the Export Processing Zone (EPZ) in Kitengela town. The EPZ is an industrial park for the manufacture of export goods.

Land use changes in the different areas surrounding national parks and reserves have had impacts on the size of the corridor and natural habitat. The size of the corridor between Kitengela and upper kapiti plains which was approximately over 20 km in the 1960's, has been reduced to a narrow strip of approximately 5 km2. Apart from

reduction of the size of the corridor, the new types of land use particularly settlements and agriculture, which have emerged in the area, have led to massive destruction of natural vegetation and reduction of the area available for wild animals grazing, migration and dispersal. Although the area has been reduced, it remains significant as a grazing area and migratory route of wild animals KWS 1991. This have led to blockage of routes outside the main corridors and hence led to decrease in the movement of animals in the former migratory corridors. Land use changes have led to habitat changes in the traditional routes followed by the wildlife and hence having an impediment to the movement of animals. Animals are threatened by the existence of farms and new structures like houses in their routes. For example, Grimshaw and Forley, (1990) that before the establishment of farms and settlements there was high movement of animals between the two habitats during the drought and rainy seasons.

Population increase

Rapidly increasing human population and changing socio-economic lifestyles (leading to greater natural resource exploitation) have been identified as the greatest threats to wildlife conservation within rangelands the world over (WRI 1997; Ellis et al. 1999; Foran and Howden 1999). Within East Africa, changes in land policies, high human population growth rates, and rapid changes in people's expectations over the past few decades have resulted in the expansion of cultivation, growth in the number of permanent settlements, urbanization and diversification of land-use activities around conservation areas. All of these factors have contributed to unprecedented human–wildlife conflicts (Western 1982; Ellis et al. 1999).

According to population census done by the government, the population of people around these areas has been increasing enormously. This has been accelerated by the large number of population of people migrating to urban centres searching for jobs in the city and other social amenities which are present in the urban areas.The large population requires housing facilities which has seen the protected areas being encroached in order to create room for housing the populations in the urban centre, (GOK 1994)

The human population in kitengela has more than doubled in the last 10 years, from 6548 in 1989 to 17,347 in 1999 (GOK1994a, GOK 1994b; GOK 2001a,GOK 2001). The same time the number of households increased nearly five-fold from 1989 to 1999 ((1044 to 5005) the high population growth rate experienced in this area has been attribute mainly, to in-migration, due, to kitengela's proximity to Nairobi and increasing.

Industrialization and development of infrastructure

According to Rodriguez *et. al* 2005 the land has been mainly subdivided to accommodate the establishment of industries in the area.The land use changes have made the migration of animals from one area to another difficult.

The establishment of industries around these areas has caused lots of distraction of the animals in the process of migration. The industries has also caused the change in behavior in reproductive way of the animal and this has caused the ever reduction in the species of animals.

Subdivision and fencing of land

Land tenure policies relates to the systems of laws, rules, regulations and practices that govern the rights of land owner for optional use of available land. The study indicates that Kenya has no comprehensive policy on land use; instead it has 77 statutes each of which was enacted independently. The study concludes that comprehensive land use policy is necessary for proper planning of the land use. Lack of this policy has led to uncoordinated and unsustainable land use, conflicts, environmental degradation, increasing inequality in land distribution, loss of migratory corridors and hence loss of biological diversity.

Cultivation of crops

Farming is not a major economic activity in Kitengela, although 80% of the households engaged in some cultivation. Land under crop cultivation was relatively small and represented less than 2% of the total landholdings. The major crops grown in this area were maize, beans, potatoes and sometimes cowpeas, mainly for subsistence.

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2.2 Impacts of land use change on wildlife and their corridors

The research focuses on the needs of the wildlife, which are on protected land when in the Park, but on private land when in the dispersal area; and the needs of the people which are excluded from the Park but are exercising their rights as landowners to settle and cultivate, or develop industry on their land making up the dispersal area.

The settlement of populations in the suburban and the dispersal area threatens the already strained water supply and play a role in the mortality of numerous birds and animals. Increased human populations in areas surrounding the park are leading to intensified human/wildlife conflicts, including disease, predation, and destruction of property by migrating wildlife. The inevitable encroachment on Nairobi National Park, this has led to the wildlife being trapped inside the park.

2.3 The adaptation mechanisms of the animals to the changes

The occupation of the dispersal areas or change in the land use activities in these areas has led to the mammals in the NNP to changing their behavior in order to suit the situations. Some of the browsing animals like the Zebras, Impalas, and the warthogs among others are always seen to graze with the livestock in the dispersal areas remaining.

The large mammals have been force to move through their previous areas causing havoc among the farmers practicing cultivation in these areas. This has seen the rise in Human-wildlife conflicts around the dispersal area and the Nairobi National Park. (Gichohi 1993, Ellis et al. 1999)

2.4 Possible mitigation measures

Conservation and management of wildlife in areas outside the park

To realize this approach KWS is required to enlist community participation. This is because the protected areas are becoming more and more enclosed due to population pressure. Due to this the park has been experiencing high density which has led to habitat degradation and loss of wildlife and their dispersal areas. Therefore, there is need to convert other forms of land use into wildlife conservation and at the same time share revenue with the local people.

The problem can also be addressed by purchase of the corridor land, involving local communities in leaving the nature intact for the sake of wildlife.

Adoption of the Community Based Natural Resource Management (CBNRM).

Community Based Natural Resource Management (CBNRM) is a variant of what Adams and Hulme labeled community conservation. Which they defined as those principles and practices, which argues that conservation goals should be pursued by strategies that emphasize the role of local residents in decision- making about natural resources (Adams and Hulme 2001).

They argue that CBNRM has ecological impacts which are conservation legitimate and attractive form of land use. It says that by placing a value on wildlife and increasing the benefits to landholders, wildlife will be able to compete favorably with other forms of land use. (Adams and Hulme 2001).

The adoption of sustainable use as a conservation paradigm policy

In its broadest philosophical context, the policy is strongly linked to theories of sustainable use of resources. In contrast to preservationist theories of conservation, sustainable use theory suggests that the main threat to wild habitats and resources is not over use but the conversion of land for agriculture and other activities. (KWS, 2009)

The policy suggests that biodiversity conservation primary depends not on technical and scientific interventions to prohibit or limit use, but in providing the right incentives to land uses that do not lead to environmental degradation, loss of migratory corridors and the loss wildlife.

Other possible solutions are community participation initiatives and programs that help involve communities in wildlife conservation. This can begin with educating the local communities about wildlife management and ecotourism ventures. In the case of NNP, natural resource management techniques within urban settings would also be a useful educational tool.

Involving the local communities allows for a more integrated, bottom-up approach to wildlife conservation without isolating the very people that are forced to co-exist with these animals. It further allows these communities to benefit from wildlife, as opposed to suffering with it. Initiatives such as this have already began, as is exemplified by the Kitengala Landowners Association. This is a group of landowners in the Kitengala area that have joined together in a resolve to preserve their land for wildlife (Western, 1997).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 INTRODUCTION

For this research to be effective the researcher shall have to be employ various methods of collecting data and analyzing them and the methods shall include;-

3.1 Research design

This is a model that the research shall be followed in order to achieve the objectives of the study. It is a benchmark for measuring the variables used in the study. According to Martin E. Amin, 2005, a research design is a plan which the research follows.

3.2 Research area

The research will be carried out in areas surrounding the NNP Kenya, Kitengela areas and around the Athi-kapiti areas. The areas surround Nairobicity, the closest at about 11 Kilometers away from the city centre.

3.3 Research population

A population is the aggregate or totality objects or individuals, having one or more similar characteristics that are of interest to the researcher and where inferences are to be made.The population that will be used for this research involves the park warden, the director, the investors and the owners of the dispersal area.

3.4 Sampling method

Random sampling

Random sampling is the purest form of probability sampling. Each member of the population has an equal and known chance of being selected. When there are very large populations, it is often difficult or impossible to identify every member of the population, so the pool of available subjects becomes biased.

This is the process of selecting elements from the population in such a way that tthe sample elements represent the population.

3.4.1 Sample size

According to **Krejcie, R.V & Morgan D. W** "The size of the population and amount of error determines the size of a randomly selected sample" with 20% certainly the resulting total sample was 24 respondents from the population of 120 people. Assuming the entire population of the area under study was considered then the sample size was calculated as shown below:

Table 3.4.1 : Respondents from the sampled population

Age.	Population	Calculation	Sample size
24 years and below	14	14*20%	3
25-30	18	18*20%	4
31-36	24	24*20%	5
37-42	10	10*20%	2
43-48	34	34*20%	7
49 years and above	20	20*20%	4
Total Sample	**120**		**25**

3.5 Research instruments

These are the techniques used by the researcher to collect the necessary information for the study. They include the following discussed ways:-

3.5.1 Discussions

The discussion is focused the owners of the land and the park management who can provide information about the land use changes and their impacts on the wildlife and their migratory corridors and species diversity over the past years.

3.5.2 Informal interviews

Interviews shall be conducted on individual basis. Specifically, the technique will be used to derive information about dynamics in land use in the study area, vegetation, animal movements, their numbers and types in the past years.

3.5.3 Questionnaire interviews

The questionnaire shall be used to countercheck the information gathered through the informal interviews and covered information about the dynamics in land use activities in relation to the wildlife and their dispersal areas and the way these activities have affected the wildlife behavior and migration.

3.5.4 Primary and the Secondary data

For successive collection of data the researcher shall adopt the qualitative techniques like informal interviews with the park authority, field observations and focus on group discussions to enhance the validity and consistence of data.

The secondary data will be gathered from the various documentaries and document reviews, magazines and other journals.

3.6 Data analysis and presentation

Data that shall be collected from the different sources shall be summarized and presented using charts and tables. Descriptive analysis shall also be used to analyze information
collected from informal interviews and information captured through observation and discussions.

4.0 INTRODUCTION

This chapter explains the analysis, interpretation and presentation of the research findings. It mainly summarizes key issues from the theoretical and empirical literature and compares the findings' systematic and possible relationships in the process of fulfilling the objectives of the study. The study was set to assess the dynamics of land use changes on wildlife and their dispersal areas.

4.1 Demographic characteristics

This section of the study sought to find out from the respondents about their gender, occupations and their knowledge on the subject of study around the NNP. The figure below shows the representations of gender in the area.

Table 4.1.1 The gender of the respondents

Respondents	Frequency	Percentages
Male	18	75%
Female	6	25%
Total	24	100%

From the table above, it can be seen that the majority of the respondents are male constituting 18 respondents(75%) of the total number of respondents and 6 respondents are female representing 25% of the respondents.

Table 4.1.2 Age of the respondents

Age.	No. Respondents	Population
24 years and below	14	14%
25-30	18	18%
31-36	24	24%
37-42	10	10%
43-48	34	34%
49 years and above	20	20%
Total	120	100%

4.2 Factors that promoted the development of the wildlife dispersal areas

Some of the responds had no knowledge about the area being a dispersal area due to the reasons that they were just the third party in the transactions that had taken place in the ownership of land in these areas. Most of the respondents notably maintained that the area was not part of the gazetted areas that had been put in place to promote the sustainability of the wildlife populations in the area. This could be partially supported by the fact that in the previous studies done around this place and documentations the government in the year 1945, declared the area a dispersal area but never gazetted it.

Due to lack of government initiative to gazette the area as a dispersal area it has saw serious development of the estates and population around this area to support the surging population of the city.

Most of the respondents have their land almost close to the NNP and due to this reason they have been in regular conflicts with the animals as they try to move from the park to the Athi plains during the dry seasons as they migrate in search of food.

Most activities practiced in the area are not suitable to accommodate the dispersal of wildlife and at the same time the inhabitation by the human population. This is because the wildlife has been inconvenienced and hence resulting into constant conflicts between the wildlife and the public. This is due to the fact that the animals destroy some of the property as they try to transverse through this area in search of food. This has seen some of the public being injured in the process.

The respondents gave the reasons for the growth of this area as being demand for more housing to hosts the ever increasing population of Nairobi and also due to the lucrative business that arise in the process of trying to meet the needs of the people.

Most of the activities that are carried in this area have also caused a lot of inconveniences to the wildlife as they try to move from one home range to the other. Such activities which include quarrying and some small farming activities amongst the development of the export processing zone are part of the activities that are determinant in this area.

4.3 Implications of settling in the dispersal areas

Most of the respondents who are investors are really worried of the losses they incur due to destruction of their property by the wildlife. The respondents maintained that the losses could usually amount to thousands of Money that they lose in the process of re-establishing their properties. In terms of trying to defend themselves most of the residence in this area have resorted to crude ways of handling the situation and this include killing of these animals, poaching, ensnaring the animals to stop them from destroying their property. This is due to the reasons that the human/wildlife conflict within NNP and its dispersal areas is a serious and prevalent issue. And that it is they

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(local people) who suffer the economic and personal losses associated with wildlife damage--losses which happen often. Some respondents argue that the government cares for wildlife more than people due to their apparent inaction in dealing with this reoccurring conflict.

This has also had an immense impact on the population of the animals in the park as this has led to reduction in the population of animal species due to lack of breeding places and also due to poaching for their products in the areas surrounding the park.

The table below shows some responds the use of poached products and those who have ever involved themselves in the poaching activities.

From the table below it can be noted that the incidences that is mainly occur around this area is injuries and this has been mainly due to the reasons of animals trying to cross the established dispersal area and in the process of trying to control the animals they get injured as a result of bites, and death where big animals are involved such as Buffaloes and Leopards.

Table 4.1.3 Various implications as a result of Wildlife invasions

Cases	Reported Cases	Compensated Cases	Incidences reported each year
Damages reported as a result of wildlife invasions	70	15	Regular
Injuries that have occurred due to wildlife conflicts	100	20	Regular
Deaths that have occurred as a result of wildlife conflicts	20	NIL	Regular

4.4 Findings on the changes in the land use in the areas around NNP

The populations in the area seem not to have known the importance of wildlife and their dispersal areas and they attributed this to the fact that most authorities concerned with the conservation of the wildlife, doesn't usually take consideration of their interests but the interests of the wildlife and these areas. This has always led to retaliation from the population in order to console them and justify the activities they are carrying out to be right. The respondents claimed that most of the authorities that deal with the conservation activities in the country doesn't involve them in the conservation and in creation of awareness about the need for the preservation and conservation of these areas and the wildlife at large as this could have help in building the morale among the public to know the importance and value of the areas and the animals. It was until recently that the communities were involved in the management and conservation of these areas and the wildlife and this has greatly improved the relations between the community and the wildlife management in these areas. The creation of awareness

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amongst the people by the major leading conservation authority KWS and other major stakeholders has yielded fruits as most of the people are trying to search for alternatives in the activities in which they practice in these areas.

Table 4.1.4 The most practiced activities

Activity	Frequency	Percentages
Poaching	18	75%
Selling of the poached products	20	83%
Quarrying	6	25%
Farming	12	50%

According to the findings done by the researcher it conquers with the research done by ILRI that the activities that are practiced around the NNP and the dispersal areas, the activities in the areas keep rising every year and this could be due to lack of other sources of income, for the families that live in the urban areas and lack of employment to supplement the activities that they are doing.

According to the results found out by the researcher type of activities that are carried out in the area seems to be supporting the families around so much in terms of income earning as compared to the benefits they get from the conservation of the wildlife. They argue that the benefits accrued from the National park only benefits the conservation of the park and meager benefits are send to them in terms of building roads, schools and dispensaries yet the community want to be awarded with cash.

The respondents said that they are they have lost much of their properties as a result of direct causes of wildlife or indirect causes for example diseases, snake bites and

accidents. The findings by the researcher are in line with the findings by the African Conservation Centre (ACC).

Table 4.1.5 Implications of settling in dispersal areas

Causes of Losses	Cattle and Sheep	Crops	Human beings
Diseases	55%	80%	40%
Snake bite	10%	-	50%
Accidents from animals like buffaloes And destruction of properties	2%	49%	76%
Carnivores	84%	-	46%

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introductions

This chapter presents a summary, conclusions and recommendations made based on the study of the findings. They were made basing on the research questions. It also suggests areas of further study.

5.1 Summary

This section presents the summary of the findings based on the research questions.

Major challenges in the conservation of wildlife and their dispersal areas

The study established that indeed there are many challenges facing conservation of wildlife and their dispersal areas as this was proved by the responses received from the questionnaires. Most conservation agencies use Top down conservation approach which seems to impose orders on the community in the conservation model, and this could be the hindrances to sustainable conservation of wildlife and their dispersal areas. This is due to the fact that the community feels they are not part and parcel of the stakeholders involved in the conservation and that could be the reason for lack of acceptance or responsibilities in the conservation process.

Most of the challenges that was established were growing human populations near wildlife protected areas. Which has resulted in the conflicts that arise between the humans and the animals themselves. As in the case of NNP, these conflicts increase proportionately with human encroachment. To agriculturalists and pastoralists, migrating wildlife are viewed as a real nuisance. They destroy crops, destroy structures, and carry diseases that are passed to livestock. Wild predators will kill livestock and even pose a threat to humans.

Management practices in place for the protection of wildlife and their dispersal areas

The study established that the leading agency in conservation of wildlife and dispersal areas KWS has come various ways of tackling these problems with other stakeholders such as the CBNRM. Which focus on the involvement of the community in the conservation of the wildlife and their dispersal areas.

This has assisted in the improved management and protection of wildlife in the recent years.

Most common activities that have led to loss of the dispersal areas

The study found out that the land use changes in the area has changed from the range lands which were in existences in the 1960s to establishment of export processing zones, growth of estates, businesses, farming activities and quarrying. These activities have had an immense effect on the behavior of the animals and the loss of their dispersal areas.

5.2 Conclusions

It was clearly established that there are several challenges that face the conservation of wildlife and their dispersal areas in and areas around the Nairobi National Parkand that these problems need to be resolved to enhance the efficient and effective management of the wildlife and their dispersal areas.

It is important also that some of the management activities that concerns the management of the wildlife and their dispersal areas need to be participatory in nature to allow the views of the communities living around the NNP to be more responsible and hence this will enhance the sustainable conservation and may be change of the present land use practices to accommodate wildlife and their dispersal areas.

5.3 Recommendations

In an attempt to improve in the conservation of the wildlife and their dispersal areas, the researcher made the following recommendations arising from the findings:

Kenya Wildlife Services should find alternatives measures and ways of handling the land use changes around the Park, by compensating the investors and the owners of the land around the conservation area this will help in reducing the conflicts between the communities and the wildlife. The areas that have not been established should be gazetted by the government as wildlife dispersal areas to prevent further development of these areas.

The policy management of these areas should be inclusive in nature that is to mean that all the necessary stakeholders involved in the management of the wildlife and their dispersal areas should be participated in the policy process. This will aim at creating responsibility among these stakeholders as this will make them feel appreciated and know that they are the owners of the natural resources existing.

5.4 FURTHER AREAS OF STUDY

The researcher identified the following areas;

- Wildlife conservation and policy reforms on land use changes
- Population increase and wildlife conservation

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APPENDIX I: QUESTIONNAIRE

Dear respondent,

The questionnaire is designed to obtain data on the wildlife and their dispersal areas which is being carried out as a partial fulfillment for the award of Bachelors Science in Environmental Managementat Kampala International University. The information obtain is for educational purposes.

Thank you in advance

1. Age

   a) Below 24 years   ☐

   b) 25-30 years   ☐

   c) 31-36 years   ☐

   d) 37-42 years   ☐

   e) 43-48 years   ☐

   f) 49 and above   ☐

2. Sex

   a) Male   ☐

   b) Female   ☐

3. Marital Status

   a) Married   ☐

   ☐

b) Single

c) Divorced/ Separated ☐

d) Widow/ Widower ☐

4. Education Level

   a) Not educated ☐

   b) Primary education ☐

   c) Secondary Education ☐

   d) Tertiary Education

5. Occupation

   a) Businessman/ Woman ☐

   b) Employed ☐

   c) Other (specify)...

Section I

Factors that promote development or establishment of wildlife dispersal areas

What are some of the activities that you practice in this area?

1. What is a dispersal area?

2. Do you know the implications of settling in a dispersal area?

3. What factors have led to the growth of estates in this area?

   a) Its close proximity to the city ☐

   b) Demand for Housing ☐

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c) Other (Specify)...

4. Do you own any plot around this area, if yes how much in terms of area

   a) ¼ of an acre   ☐

   b) ½ of an acre   ☐

   c) 1 acre   ☐

   d) More   ☐

5. Is your plot (s) situated in the wildlife dispersal area?

   a) Yes   ☐

   b) No   ☐

6. What activities do you practice in this area?

a) Farming   ☐

b) Quarrying   ☐

c) Investments   ☐

d) Poaching   ☐

7. Have you ever practice poaching or do you know of anyone practicing it in this area?

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Section II

Effects of settling dispersal areas

1. Do you know of any effects associated with settling in a dispersal area?

   a) Yes   ☐

   b) No   ☐

If yes, what are the effects?

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2. How has the dispersal of wildlife through this area affected the relations between the wildlife and the community?

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3. Are there any associated illnesses that have risen from consuming wildlife products that have been experienced in this area?

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Appendix II

Dear respondent,

The questionnaire is designed to obtain data on the wildlife and their dispersal areas which is being carried out as a partial fulfillment for the award of Bachelors Science in Environmental Managementat Kampala International University. The information obtain is for educational purposes only and it mainly targets the managers of the natural resources.

Thank you in advance

1. What are the major challenges you face in the conservation of wildlife and their dispersal areas?

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2. What are some of the management objectives that you have come up with for the protection of the wildlife dispersal areas?

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3. What are the most common activities that have led to the loss of these areas?

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4. Do you have laws and regulations in place that protects these areas from development?

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5. What are some of the activities that are carried out that threatens the existence of the wildlife and their dispersal areas?

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