

**AN ASSESSMENT OF HUMAN - WILDLIFE CONFLICT: A CASE
OF
OL DONYO SABUK NATIONAL PARK, MACHAKOS COUNTY**

ESIROMO ELIZABETH

**UNIVERSITY OF NAIROBI
KIKUYU LIBRARY
P. O. Box 92
KIKUYU**

**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
THE DEGREE OF MASTER OF ARTS IN PROJECT PLANNING
AND MANAGEMENT - UNIVERSITY OF NAIROBI**

2012

DECLARATION

This research project report is my original work and has not been submitted for any academic examination in any other University

Signature Esiromo

Date 19-11-2010

ESIROMO ELIZABETH

L50/64687/2010

This report has been submitted for defense with my approval as a University Supervisor

Signature K. J. Omoke

Date 19/11/2012

DR. K. J. OMOKE

LECTURER

DEPARTMENT OF GEOGRAPHY

DEDICATION

This research project report is dedicated to my parents Silas and Yuniah Esiromo, and my dear sisters Lillian, Martha and Marian who have consistently supported me throughout my academic and professional endeavours.

To my loving husband, Eddie Rioba and daughter Stella for their love, understanding, care and support as I pursued this Masters degree.

ACKNOWLEDGEMENT

My sincere gratitude goes to my supervisor Dr. Kennedy J. Omoke who constantly and patiently dedicated his time, intellectual contribution and guidance to ensure that quality work is accomplished and documented.

I am grateful to my lecturers who taught me project planning and management course with dedication, from which this work is heavily grounded. I am also indebted to my colleagues and Kenya Wildlife Services staff for their encouragement.

TABLE OF CONTENT

	PAGE
DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENT.....	v
LIST OF FIGURES	viii
LIST OF TABLE	ix
ABBREVIATIONS AND ACRONYMS.....	x
ABSTRACT.....	xi
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Background	1
1.2 Statement of the Problem	3
1.3 Purpose.....	6
1.4. Objectives of the study	6
1.5 Research Questions	6
1.6 Significance of the Study	7
1.7 Scope of the study	8
1.8 Delimitation of the study.....	8
1.9 Limitations of the study.....	8
1.10 Assumption.....	9
1.11 Definition of significant term.....	9
CHAPTER TWO:.....	10
LITERATURE REVIEW	10
2.0 Introduction	10
2.1 Rise in Human Population.....	10

2.2 Land Use Patterns adjacent to the Protected Area	11
2.3 Research Perspectives of the impact of wildlife species on human livelihoods ...	13
2.4 Wildlife Policies and Human Wildlife Conflicts	15
2.5 Theoretical Framework	16
2.6 Conceptual framework	18
CHAPTER THREE:.....	21
RESEARCH DESIGN AND METHODOLOGY	21
3.0 Introduction	21
3.1 Research Design	21
3.2 Description of sampling area.....	21
3.3 Target population	21
3.4 Sampling Procedure	22
3.5 Method of data collection.....	22
3.6 Validity and Reliability	23
3.7 Data analysis Techniques.....	24
4.1 Introduction	29
4.2 Response Rate	29
4.3 Demographic Information.....	29
4.4 Human Population.....	34
4.5 Land Use Pattern	38
4.6 Wildlife Species	41
4.7 Current Mitigation Measures	45
CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS	50
5.1 Introduction	50
5.2 Summary of Findings.....	50

5.3 Discussions.....	52
5.4 Conclusions.....	54
5.5 Recommendations	55
REFERENCES.....	57
APPENDICES	
APPENDIX I: QUESTIONNAIRE FOR COMMUNITIES	60
APPENDIX II: QUESTIONNAIRES FOR AUTHORITIES/INSTITUTIONS.....	66
APPENDIX III RESEARCH TIME FRAME	70
APPENDIX IV: RESEARCH BUDGET	71
APPENDIX V: MAP OF STUDY AREA.....	72
APPENDIX VI: PHOTOGRAPHS.....	73

LIST OF FIGURES

FIGURE 1. CONCEPTUAL FRAMEWORK

FIGURE 2. OPERATIONALIZATION OF VARIABLES

LIST OF TABLE

TABLE 4.1 RESPONSE RATE OF THE COMMUNITY	29
TABLE 4.2 GENDER OF COMMUNITY	30
TABLE 4.3 GENDER OF AUTHORITIES	30
TABLE 4.5 AGE OF THE COMMUNITY	31
TABLE 4.6 AGE OF THE AUTHORITY	31
TABLE 4.7 EDUCATION LEVEL OF COMMUNITY	32
TABLE 4.8 EDUCATION LEVELS OF AUTHORITIES	32
TABLE 4.9 MARITAL STATUS OF COMMUNITY	33
TABLE 4.10 MARITAL STATUSES OF AUTHORITIES	33
TABLE 4.11 OCCUPATION OF COMMUNITY	34
TABLE 4.12 ACTIVITY CARRIED OUT	34
TABLE 4.13 LEVEL OF AGREEMENT	35
TABLE 4.14 WALLING	37
TABLE 4.15 ROOFING	37
TABLE 4.16 ECONOMIC ACTIVITY	38
TABLE 4.17 SOURCE OF WATER	38
TABLE 4.18 EXTENT OF AGREEMENT	39
TABLE 4.19 ECONOMIC ACTIVITY	40
TABLE 4.20 WILDLIFE CONFLICTS	41
TABLE 4.21 TYPE OF CONFLICT	41
TABLE 4.22 COMPENSATION	42
TABLE 4.23 CROPS	42
TABLE 4.24 LIVESTOCK KEEPING	43
TABLE 4.25 FREQUENCY OF WILDLIFE CONFLICT	43
TABLE 4.26 TREND OF HUMAN WILDLIFE CONFLICT	44
TABLE 4.27 DETAILS OF REPORTED CASES OF HUMAN WILDLIFE CONFLICT	45
TABLE 4.28 RESPONSES TO WILDLIFE INVASION	45
TABLE 4.29 ENVIRONMENTAL CHANGE	46
TABLE 4.30 MAINTENANCE OF THE PARK HABITAT	46
TABLE 4.31 STRATEGIES ADOPTED BY KWS TO DEAL WITH HWC	47
TABLE 4.32 COMPENSATION	48
TABLE 4.33 TREND OF HUMAN WILDLIFE CONFLICT	49

ABBREVIATIONS AND ACRONYMS

CBO	Community Based Organization
COBRA	Conservation of Biodiversity Resource Areas Project
CWS	Community Wildlife Service
GOK	Government of Kenya
IUCN	International Union for the Conservation of Nature
KWS	Kenya Wildlife Service
HH	Household
HWC	Human-Wildlife Conflict
ODSNP	Oldonyo Sabuk National Park
UN	United Nations

ABSTRACT

The purpose of this research was to provide a better understanding of the causes of human-wildlife conflict and propose aiding development of a program for integrating wildlife conservation with human development needs at Oldonyo Sabuk National Park. The study was carried out under the following objectives; to establish if human population increase adjacent to the park influence human wildlife conflict, to establish if land use pattern adjacent to the park influences human wildlife conflict, to establish which wildlife species mainly cause human conflict, to establish the current mitigation measures in resolving human wildlife conflict by assessing policy for wildlife conservation. This study adopted the descriptive survey design while revealing variables contributing negatively or positively towards human wildlife conflict. In order to achieve the objectives of the study, the target population comprised the households living adjacent the park, Community Based Organizations (CBOs), local authorities, Kenya Wildlife Service (KWS) as well as other stakeholders such as Delmonte and Muka Mukuu Cooperative Society within the area. Simple random sampling procedures were employed during the data collection exercise. Various techniques were used for the analyses and presentation of data, these include both quantitative and qualitative techniques. The study established that crop damages, human threat, property destruction were some of the mostly reported damages. Majority of the respondents indicated that the trend of Human Wildlife Conflict in general over the years was increasing. The study concluded that Kenya Wildlife Service has helped maintain the Park habitat or has increased programs to reduce degradation greatly. The study also concluded that some of the challenges faced while undertaking conservation measures were; communities lacked necessary skills and training in conservation practices, the negative perception and attitude by the locals on wildlife policies and conservation management. The study recommended that communities must participate in park management planning and consulted in policy formulation. Relevant sectors such as the agricultural, livestock, tourism and lands must work together to ensure the communities realize their crop yields, and livestock production while coexisting with wildlife. Ecotourism programs must be boosted to improve the locals' livelihoods as it will create a sense of Park ownership and sustainable wise use conservation practices.

CHAPTER ONE

INTRODUCTION

1.1 Background

Wildlife and indigenous peoples in different parts of the world have co-existed for many years, usually with limited conflict (Goodland 1992; McNeely and Pitt 1985). In recent years, conflict has increased, particularly in developing countries, mainly due to increasing human and livestock populations and changing socio-economic and land use patterns.

Human wildlife conflicts (HWC) occur when human or wildlife are having an adverse impact upon the other. Human wildlife conflict is fast becoming a critical threat to the survival of many globally endangered species, in particular to large and rare mammals. The numerous cases from countries all over the world demonstrate the severity of human wildlife conflict and suggest that an in depth analyses is essential to understand the problem and support the conservation prospects of threatened and potentially endangered species.

According to the world conservation union (World Park progress, 2003), human wildlife conflict occurs when the wildlife's requirements' overlap with those of human populations, creating costs to residents and wild animals. Many communities in Africa bear the costs of coexisting with wildlife without receiving any benefits (O'Connell-Rodwell *et al.* 2003.) Direct contact with wildlife occurs in both urban and rural areas, but it is generally more common inside and around protected areas, where wildlife population density is higher and animals often stray into adjacent cultivated fields or grazing areas.

Recent conservation policy changes have emphasized the need to integrate socio-economic development with protection of wildlife (UN 1992- Agenda 21) but with little success (Adams and McShane 1992; Wells and Brandon 1992). Although the conflict

and its implication are now widely recognized and effective integrative strategies are still rare in African arid and semi-arid lands (Bonner 1993; Kiss 1990; Lusigi 1992)

Wildlife traditionally refers to wild animals, native fauna and sometimes flora of a region. Wildlife plays a very important economic role in that it provides part of the revenue in different parts of the world, either locally, regionally or internationally. Socially, wildlife brings people together for recreation and leisure and provides a good atmosphere for interaction. Culturally many animals are symbolic and so they help to enhance the culture of different communities and nation, hence helping them to trace their roots.

Wildlife habitats are mainly conservation areas and natural forests but sadly are disappearing at an alarming rate. The loss is already a problem for millions of people yet their habitat; indigenous forests and conservation protected areas in Kenya are vital for the environmental health of our country as they are water towers and conservation areas. The remaining wildlife natural forest have reached a critical stage due to land pressure fuelled by population growth, land use, uncertainties about the political will to protect them and institution constraints. Communities living around mountainous ecological zones tend to utilize the natural resources as the only source of livelihood. These areas are greatly under threat and there is a growing urgency to protect them before human pressures, land-use change and political decisions eliminate all opportunity to preserve at least samples of earth's vital ecosystem.

Oldonyo Sabuk National Park is one of the mountainous forest and a national protected area which has been subjective to such enormous human exploitation. Prior to the parks gazettelement human population was very low and the area bordering the park was open and unsettled, an area that retained many things that Lord Macmillan bequeath. For many years the area was managed as a society land with coffee and sisal farms. In 1967 the Park was established and gazetted and land adjacent to the Park sold to a local association - the Muka Mukuu Co-operative Society that continued managing the society land as coffee and sisal farms in the 1960s. In the late 1970s the land was

subdivided and allocated to members who in turn started settling in the area. Other members subdivided their portions further and this became target to other land prospectors. To date the area has completely been settled with people occupying the park buffer zone and adjacent settlement. The park currently faces conservation threats which includes; illegal logging, charcoal burning, encroachment, collection of firewood, invasive species and unsustainable utilization of forest resources.

The Park area is chosen as the site for the study for its ecological and economic importance. It represents one of the most critical areas of natural resource management in a cosmopolitan county. Very little documentation on human- wildlife challenge have been researched and documented.

1.2 Statement of the Problem

Human-Wildlife Conflict (HWC) is fast becoming a serious threat to the survival of many endangered species in the world. It is not restricted to particular geographical regions or climatic conditions, but is common to all areas where wildlife and human population coexist and share limited resources. Dense human population in close vicinity to nature reserves seem to pose the greatest challenges in many countries. (Western and Pearl 1989).

The establishment of protected areas has often denied local people access to their traditional resource areas. Wildlife sanctuaries normally included sources of dry season water and pasture which were traditionally available to domestic livestock owned by pastoralists (Western 1982). Wildlife is often seen by the local people as belonging to government; as they alone seem to be responsible for its care (Berger 1989; Korfage 1985; Scott 1983). Wildlife agencies emphasis law enforcement, administrative procedure and conservation education but cannot contain or fully control wildlife damage and destruction.

Conflicts become more intense where livestock holdings and agriculture are an important part of rural livelihoods. Competition between rural communities and wild animals over natural resources is more intense in developing countries, where local human population tend to suffer higher costs. Considering the current human population

growth rate, increasing demand for resources and the growing demand for access to land, it is clear that human wildlife conflicts will still be a challenge in the near future. For this reason a better understanding of conflict management options is crucial. The local communities need a solution on compensation for the losses of property, human life, and crop damage due to wildlife. It is therefore not surprising that people and wildlife conservation policies are in conflict.

Human wildlife conflict can be defined as situations where human and wildlife affect each other in a negative way. The extent to which the interactions cause conflict reflects increased pressure for the utilization of those resources in a restricted area or decreased compatibility in uses. Despite the efforts being made in Kenya, wildlife conservation is still a challenge because poaching, competition for resource, population increase, demand for land for settlement and urban agriculture and injury or killing of wildlife due to wildlife –livestock predation or crop damage.

The protected area strategies to ensure peaceful co-existence between man and wildlife is still a challenge in individual parks and is evident and manifested in many forms such as crop damage, livestock predation, destruction of property, injury and loss of life by wildlife. The challenges of management are due to encroachment, wildlife barrier destruction, water pollution, habitat destruction, rapid change in land use, fragmentation of wildlife dispersal areas and breeding grounds.

Wildlife population in Kenya has declined for the past 25 years since 1970s and the government strategies have been implemented with a number of incentives to increase economic incentives for communities to co-exist or tolerate wildlife as they continue to live adjacent the protected area and reserves. The strategies are now limited to certain areas and are limited as human livelihood systems have continued to experience losses due to predation, crop damage and human threats.

The real challenge to Kenya's wildlife management and conservation efforts is the need for sustainable use and preservation of wild resources. This study sought to address successful management as regards involvement of the local community in natural resource management at Oldonyo Sabuk National Park. If sustainable use or

preservation of natural resources by the communities is to be encouraged, what development methodologies should be in place in order to accommodate the interest of the different stakeholders?

Previous studies on wildlife – human interactions have noted the existence of conflict; Omondi (1989) suggests that the law should provide for public participation in the planning for and management for wildlife resources. It should facilitate effective involvement of local communities through benefit and responsibility sharing arrangement that include: well defined user rights that are consistent with conservation objectives in a particular area, provision on conflict resolution and dispute avoidance and incentives for private land owners to devote land to biodiversity conservation management.

Masasabi Evans (2003) and Orina Dickson (2009) work in Nairobi National Park and its environs Kitengela and Athi Kapiti plains covered resolution of conflict and various community measures but they did not look at the larger ecosystem Nairobi to Oldonyo Sabuk National Park. The dynamics and factors that largely contribute to the occurrence of conflict on the adjacent protected areas or reserve to Nairobi National Park will complement their work by providing new insight into the causes of conflict and understanding hot spots where the conflict is frequent at Oldonyo Sabuk National Park. The above information will highlight causes of conflict and address ways of alleviating conflict and point to potential conflict in future for management intervention.

Recent studies, however suggest that a few models have been successfully implemented and those apparently that many of the projects have began with only a very limited understanding of the root causes of the threats to the protected areas that studies attempted to conserve (Wells and Brandon 1992). Conflict still exists and one reason of this lack of success in some areas is an inadequate understanding of the processes involved in the human - wildlife conflict.

1.3 Purpose

The purpose of this research was to provide a better understanding of the causes of human-wildlife conflict and to propose a program for integrating wildlife conservation with human development needs at Oldonyo Sabuk National Park.

The fact that human-wildlife conflict is a challenge it was important to evaluate current intervention measures put in place by Kenya Wildlife Service to manage human-wildlife conflict and recommendation were made on human-wildlife conflict resolution and different coping strategies for conservation management.

1.4. Objectives of the study

1. To establish if human population increase adjacent to the park influences human wildlife conflict.
2. To establish if land use pattern adjacent to the park influences human wildlife conflict
3. To establish which wildlife species mainly cause human – wildlife conflict.
4. To establish the current mitigation measures in resolving human wildlife conflict by assessing policies for wildlife conservation.

1.5 Research Questions

1. To what extent does human population increase adjacent the Park influence human-wildlife conflicts in Ol donyo Sabuk National Park?
2. To what extent does land use pattern adjacent the Park influence human wildlife conflict?
3. How does the various wildlife species influence human- wildlife conflict?
4. How does wildlife policy implementation affect human wildlife conflict?

1.6 Significance of the Study

The current increase in human settlement in Kilimambogo area makes it a victim of human-wildlife conflict with its proximity to Ol donyo Sabuk National Park. This conflict was anticipated to move to worrying proportion in the near future in the event that corrective measures are not put in place. Population projections (Ecosystems Ltd 1995), indicated that by the year 2010 the population of Kilimambogo area might increase above the carrying capacity of the area. This has reduced the wildlife ecological niche hence the need to injecting a sense of ownership for the local residents at Oldonyo to conserve wildlife and for the state to find a resolve to HWC.

The study area enveloped complex livelihood systems for the local community and wildlife, hence conservation and aversion of possible conflicts are continuously likely to be witnessed between people and wildlife. Wildlife ecosystem plays a very significant role in boosting Kenyan revenue due to tourism and its multiplier activities. The country derives a substantial amount of income from wildlife (one-quarter of its total earnings) making it the largest source of foreign exchange for the national economy (World Bank 1997). Therefore, the study aimed at appraising the role of the local community in conserving the biodiversity present in their neighbourhoods.

The specific significance of the study was to come up with recommendations that will help prevent future HWC while ensuring sustainable conservation.

The outcome of the recommendation could be used to review the current wildlife conservation policies in order to enhance it's effectiveness and to formulate new policies. Other National's parks could also benefit by adopting measures suggested in the study. The findings are also important for decision and policy makers in providing them with greater insight on the problems that are usually associated with wildlife conservation. The area community developers can use the findings as a tool of awareness creation to the local community. Finally, the report contributes to the pool of wildlife conservation knowledge and hence is useful to the academic fraternity and those interested in wildlife conservation.

1.7 Scope of the study

The scope of the study covers Ol Donyo Sabuk National park and its environs. The target population are the communities living adjacent to the park, Kenya Wildlife Service staff and other stakeholders surrounding the park.

The scope specifically examined conflict between the local residents and wildlife; intervention of human-wildlife conflict at Oldonyo Sabuk National Park; and propose remedial measures. Thus, the research established current intervention measures for human-wildlife conflict management in the area and proposed intervention for adoption in the new policy framework for the area.

1.8 Delimitation of the study

Geographical scope; the study was limited to Oldonyo Sabuk National Park environs as a case for study but the findings can be generalized to whole ecosystem.

Methodological scope; the prime aim of the study focused on conflict between local residents and the Oldonyo Sabuk National Park.

Value scope; The study attempted to explain how the rise in human population and land use changes adjacent to Oldonyo Sabuk National Park influences human wildlife conflict. The wildlife species responsible for conflict and type of conflict was also investigated as a preferred model for wildlife conflict resolution.

Academic scope; the study was also limited to fulfilling the requirement for the degree of Masters of Arts in Environmental Planning and Management.

1.9 Limitations of the study

The study encountered enormous challenges such as; the expansiveness of the selected study area, difficulty in effectively assessing individual locals attitudes towards environmental issues.

The respondents likely demonstrated values they think the researcher was looking for in effect distorting the outcome or lack of cooperation between the interviewers and respondents as some fear to give true information.

There were tendencies of the respondents to conceal information, others had lack of full knowledge about the subject under study which led them to giving unreliable and incorrect information.

The constraints therefore were overcome by adopting a research methodology and sample procedure focused on specific sample population targeting key players and stakeholders to ensure accuracy and effectiveness of data collection.

1.10 Assumption

The study assumption was that the information given by the respondents was true and free from bias. That the local authorities knew the issues of wildlife conflict and understand the scope in which they operate. The major assumption is that Kenya Wildlife Service had adequate information concerning the subject matter.

1.11 Definition of significant term

For the purpose of this study, the following terms had the attached meaning:

Human – This was taken to imply anthropogenic activities (relating to people) which include trade, settlement and transportation

Problem animal - means any wildlife which has caused or is causing damage to or harm to human life or property

Wildlife – This was constructed to imply the presence of wild animals within the context of their natural environment.

Protected area - means an area declared to be a wildlife protected area under the Wildlife Act Cap 376. An area prohibited or restricted or regulated for ensuring the security of the animal or vegetable life in a National Park for preserving the habitat and ecology zone by notice in the Gazette.

Human wildlife conflict (HWC) - was taken to imply negative results from the interaction between human and wildlife.

CHAPTER TWO:

LITERATURE REVIEW

2.0 Introduction

This chapter presented a review of both theoretical foundation and empirical literature relating to human dimension review with wildlife conflict in the context of sustainable conservation. It encompassed the empirical findings on conflict adjacent to protected area and proceeded to an overview of the theoretical basis upon which this research work was founded. A suitable conceptual model was formulated based on the background featuring the key variables of the study as means to achieve sustainable conservation as addressing mitigation to resolve human wildlife conflict at Oldonyo Sabuk National Park.

Demographic and social changes place more people in direct contact with wildlife: as human populations grow, settlements expand into and around protected areas (IUCN, World Park Congress 2003) as well as in urban and sub-urban areas. In Africa, human population growth has lead to encroachment into wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities (Siex *et al.*, 1999)

2.1 Rise in Human Population

According to Musyoki (2007), almost all human societies lived by hunting and gathering around ten thousand years ago. Co-existence between humans and animals was never strained as natural resources were abundant in terms of quality and quantity. When people started cultivating land for agricultural purposes and tamed animals, reliable food resource base was gained throughout the year but this faced new threats of crop damage by wild animals. Humans have suffered losses in crops and livestock ever since there has been agriculture (Naughton-Treves, 1998).

A rise in human population, the subsequent demand for settlements and socio-economic activities has led to expansion of human activities upto the edges of conservation areas and marginal land that were animal dispersal ranges (Musyoki, 2007). Wanjau (1999)

also argued that demand is a factor driving human wildlife conflicts and is made more complex by issues like poverty and overpopulation. He further noted that addressing issues related to economic development can be used as a conflict management strategy in cases where demand is a factor in human wildlife conflict. Gachugu (2006) reported that increment in human populations and poverty, coupled with the need to improve livelihoods continues to increase problems in conservation areas. A direct connection between human population, poverty and livelihood improvement activities was also drawn by Malik (1984) who argues that pressure on the environment arise from land requirements for development and poverty alleviation activities. He further notes that this is aggravated by ever increasing human populations around conservation areas. The relationships between human population growth, poverty and human wildlife conflicts in Oldonyo Sabuk National Park will be further analysed in this study.

2.2 Land Use Patterns adjacent to the Protected Area

The establishment of National parks and reserves has been seen as a central point in conservation of natural environments. However, according to Musyoki (2007), their absolute value has been put into question when compared to the benefits which the local communities accrue from conservation activities. He quoted a Central Bureau of Statistics report (Daily Nation 22/6/2004) which states that 40-60% of people neighboring Protected Areas are living below poverty line. He also argues that over the years, the economic and social prosperity of communities neighboring protected areas has been on the decline and this leads to conflict escalations as people fend for themselves from the natural resources available.

In scenario where wildlife induced damages to human property or life are neither controlled nor compensated, negative attitudes become entrenched with the locals and they therefore regard wildlife as a livelihood threat (Okech, 2011). This is worsened by incidents where local communities don't benefit from conservation efforts and are alienated from economic enterprises related to wildlife, for example the tourism industry. According to Okech (2011), local communities can retaliate or frustrate conservation programs and projects if they feel that the state agencies or conservation stakeholders care more for wildlife than the locals who are being directly affected by the

destruction caused by wildlife. The retaliations can be uncompromising in severe cases which can lead to conservation initiatives being rendered ineffective.

Okello and Canner (2000) examined how agricultural expansion fuels human - wildlife conflicts and found that wild animals destroy more crops than they harm livestock. Their case study of Maasai group Ranches revealed that over 40% of group ranch members experience annual crop damage by wildlife compared to 21% of those experiencing livestock losses. All these losses have greatly reduced support for conservation activities.

Human wildlife conflicts have been reported to be actually real in all the administrative districts in Kenya (KWS, 1997). These conflicts occur mostly in areas where agriculture is the main economic activity of the region. (KWS, 1997; Omondi, 2004). According to Omondi (2004), baboons and monkeys raid farms more frequently than other wildlife species. He argues that farming communities mostly live around conservation areas and therefore conflicts occur at most in all areas where wildlife conservations activities take place. Critical examination of the same parameters is of paramount importance to the success of conservation initiatives of Oldonyo Sabuk National Park as this will create a clear picture of the current status of human- wildlife conflicts in the area. It will also identify the entrance points for engaging communities in conflict- reduction strategies which form a part of this study.

The manner in which Kenyan protected areas were established also caused polarity between national parks and the surrounding communities, Lelo (1994). According to his study, locals were alienated from their traditional resources which led to resentment amongst the communities and the protected resources. He argued that state agencies controlled the land which included other resources such as water, forests and wildlife which formed the basic livelihoods of those communities. This changed their status in the eyes of the communities which were using them.

According to Musyoki (2007), the creation of these parks did not encompass the ecological and distribution ranges of wildlife species. Some shortcomings in the design of National parks and reserves were also highlighted by the fact that all the resources

required by wildlife were not included in the preserved areas e.g. saltlicks thus forcing animals to move out and seek the same. Lelo (1994) pointed out that the boundaries of Oldonyo Sabuk National Park excluded the important distribution ranges for animals and therefore the movement of wildlife outside the park to seek the same. Other parks like Tsavo National Park were designed after the government was sure that the land could not be used for other purposes e.g. agriculture. This resulted to a large chunk of mainly poor wilderness devoid of enough water and forest cover thus outward movement of wildlife into settlement areas when weather conditions are adverse (Musyoki 2007). These parks portray an approach in park designs that reserved significantly large tracts of land for animal migration with little regard to ecological needs of wildlife. According to Lelo (1994) settlements in the migration/dispersal areas have heightened the human-wildlife conflict scenario.

2.3 Research Perspectives of the impact of wildlife species on human livelihoods

Studies of the conflicts between humans and wildlife conducted over the years have revealed that all wildlife species act in ways that cause harm to human livelihoods (Conover 2000). Musyoki (2007) argued that large wildlife species that are potentially dangerous and those that gather in groups are more likely to bring about conflicts when they roam far than smaller animals whose ranges are restricted.

Two perspectives have been used in these studies; either from the wildlife conservation perspective or analysis of the people affected by the conflicts (Musyoki, 2002). Social scientists are more likely to use the farmers' perspective in their investigations about crop raiding. Wildlife biologists are more interested in consequences of crop raiding vis-a-vis conservation while focusing on the concerned wildlife species. Social science studies have used the farmers' perspective in human-wildlife conflict investigations and are limited. They use the needs of the local communities and aspirations of local communities to bring insight to the human-wildlife conflict problem. According to Musyoki (2007), these studies give an idea on the degree of losses experienced by farmers but very few explore the exact meaning of these losses to the farmers.

Observations made by Naughton-Treves (1996) on the communities bordering Kibale National Park in Uganda showed that they perceived crop damage as a larger problem

that in which it meant their loss of ownership of wildlife resource to the government. According to him all communities might be highly concerned with the impact of wildlife on agriculture while few people actually experienced or suffer extensive crop damage. This project shall borrow from the observation in Uganda and explore these perspectives in the study area and bring out the exact feeling of the local communities about Human-wildlife conflicts.

Other studies have revealed that human - wildlife conflicts can also have their source in people to people or people to state differences (Musyoki 2007). This is usually as a result of resentment of state-controlled wildlife conservation by communities which feel they were alienated or marginalized during establishment of parks. According to Musyoki (2007), local communities receive benefits, legally or illegally for neighboring wildlife resources. Some receive benefits of developmental nature from NGO's or government agencies due to the losses incurred. Regardless of those benefits, they resent wildlife as their focus is mostly on those losses. Musyoki (2007) further argues that as long as wildlife continues to raid peoples crops, they will face resentment from the local communities. Approaches which eliminate situations of conflict can be the best hope for a permanent solution to human- wildlife conflicts, Wanjau (1999) Identification of best strategies that can be used to reduce the magnitude of losses and those that contain the problem of animal species within their ranges and thus eliminating conflict situations forms another basis for this study.

Lelo (1994) reported in a survey of farmers around Oldoyo Sabuk National Park regarded wildlife as more disadvantageous to them. 25% of them think the park is an important watershed to the community. Posing the same question but replacing the word "Park" with "Hill", 90% of farmers cited the springs emanating from the hill as important water source. This showed that the people resented the concept of the National park and visualized the hill being more beneficial to them. It is ironic that the national park encompasses the hill.

Kenana, L. & Owino, A.O (2008) identified threats to human livelihoods for residents bordering Oldonyo Sabuk National Park as being human- wildlife conflicts, lack of access to water pasture, wildlife diseases and other factors. They argued that critical to

the long term conservation of the park was the need for focused attention on these threats to livelihoods. According to their analysis 85% of local residents supported the existence of the park. These are those who had resided around the park for the last 10 years and experienced the benefits.

The difference in the two analysis done by Lelo (1994) and that of Kenana & Owino needs to be further examined in order to find out other reasons for change of perceptions by local residents apart from arise in education levels. This will be further investigated in this study to note strategies for minimizing human - wildlife conflict.

2.4 Wildlife Policies and Human Wildlife Conflicts

Creation of national parks in Kenya did not include input from local communities as no consultations or sensitizations were done. It is apparent that the park designs would work using strong machinery for enforcement, an option embraced by the colonial Government and passed over to the government of Kenya (Lelo, 1994). Government policies have reinforced this view with conservation work being undertaken while emphasizing law enforcement while regarding people as a living threat to National Parks.

According to Musyoki (2007), wildlife laws and alienation of land led to people resenting wildlife regulations. A hardened attitude towards conservation was also observed by Lelo (1994) among the Akamba community when their grazing lands were declared wildlife reserves by Europeans. Ownership of wildlife is unlikely to be relinquished to the local people especially due to the global politics regarding conservation and the role of wildlife in the national economy of Kenya. A study done by Omondi (1994) revealed that employment in conservation areas did not favour local communities who lacked necessary skills or training. This results in conflicts on differential distribution of conservation costs and benefits. He further argued that there is equal distribution of wildlife benefits with the communities being disadvantaged. This could actually disadvantage conservation initiatives.

Conservation of wildlife in Kenya is governed by the wildlife policy which is contained in the sessional paper NO. 3 of 1975, "Statement of the Future of Wildlife management

policy in Kenya “(KWS 1997) the paper encouraged a modified approach to wildlife conservation based on local participation. Wildlife law is governed by the Wildlife Act Cap 376 and new bill is awaiting approval by cabinet.

This important shift in conservation policies was intended to harmonize social and economic development with wildlife conservation (Musyoki 2007). The sessional paper proposed remuneration of land owners who supported conservation in order to sustain utilization of wildlife resources. The realization of the important links in planning and management of parks with animal dispersal areas called for an approach linking human activities to conservation and was envisioned in sessional paper No.3 of 1975. The aim of the new policy was mitigating human wildlife conflicts and a reverse of imbalance of imbalance costs especially through enhancing wildlife benefits to local communities.

KWS established a department of community wildlife service (CWS) to work with people in areas utilized by wildlife (KWS 1990). CWS activities were majority training, extension, problem animal control and revenue sharing. Community Wildlife Service then launched the Conservation of Biodiversity Resource Areas Project (COBRA) from 1992 – 1998. The project aimed at increasing socio-economic benefits from wildlife conservation and improving the conservation of natural resources within communities that live adjacent to national parks (KWS, 1997).

Scholarly attention has also increased in regard to policy initiatives that focus on human wildlife conflicts and this indicates the seriousness of this problem and the need to strategically analyze the methods used to address the problem using up to date information. Recent studies show that many local communities around protected areas have negative feelings about policies developed by the state or conservation initiatives being used to manage human wildlife conflicts.

2.5 Theoretical Framework

This study was founded from Paul Stern theory of Value – Belief – Norm theory (VBM) as he presents a theoretical basis for understanding the type of values that cause moral obligation to environmentally responsive behavior that work towards solving social and environmental problems (Stern et al. 1999)

Paul Stern and his colleagues link individuals with community and observe the pro-environmental behavior which comes from moral obligations or personal norms embedded with a certain value orientation. They believe that valued objects are threatened, and believe that their actions can help restore those values, thus experience an obligation as a matter of norm.

The theory reveals a chain of influence on behavior from people's value sets and beliefs that the danger posed by the threats is greater than they feel obliged to address the environmental problems. The VBN – model builds on Schwartz's (1992, 1994), topology of value theory that presumes that altruism value lead to awareness of adverse consequences on other people and thus instigates responsibility to help eliminate the problem.

The model divides the value sets into three types; egoistic, biospheric and altruistic. Stern, through his survey findings, holds that VBN – theory, when compared with other prevalent theories, offers the best available account of support for the social and environmental concerns to communities.

There are three types of support; citizenship actions, policy support and acceptance, and personal-sphere behaviors that accord with socio-environment principles. The interface between self-concept and collectivism, the theorists argue provides a good foundation to community based management of natural resources and social relations.

In Kenya, the Government through the Kenya Wildlife Service (official custodian of wildlife) is the de jure of wildlife. However, the biggest percentage of wildlife is found outside protected areas. Over the years, a tussle has developed between these two owners of wildlife. The land owners argue that they are de facto owners of wildlife since they bear the larger cost of living with it. A logical framework for peaceful coexistence between wildlife and human is necessary to ensure sustainability of wildlife resources in the area, as well as to enhance environmental, economic and social wellbeing of the region.

2.6 Conceptual framework

A conceptual framework refers to a network of inter linkages of variables in a relationship or phenomena under study. It is also a collection of interrelated concepts that guides the research and determines what variables will be measured and relationships to look for.

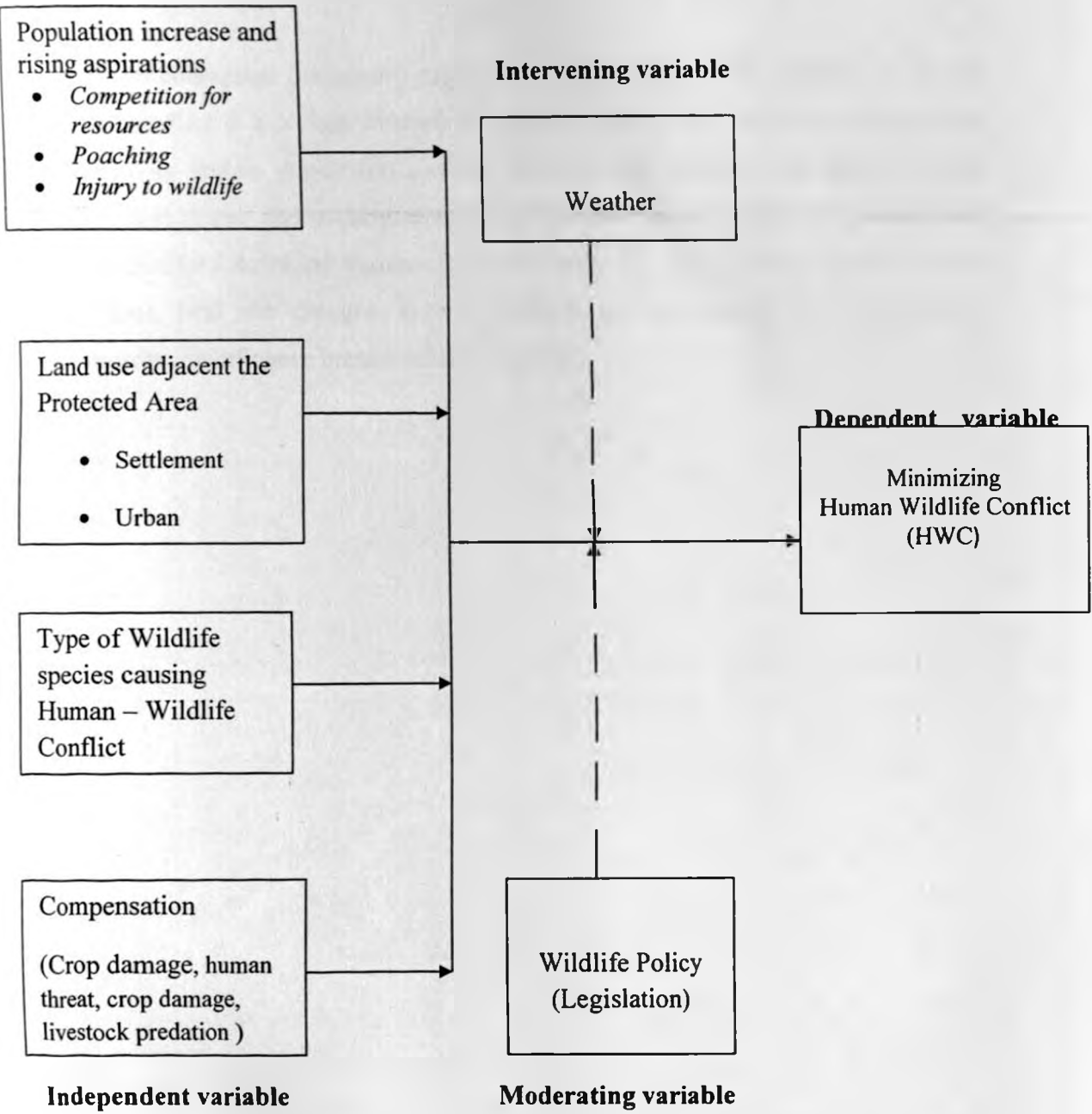
Figure 1 represents the analytical conceptual framework of this study drawing from the theoretical backgrounds earlier illustrated. By applying the theoretical model from the past literature the key implications for the study has the researcher to develop a set of conceptual framework that is expected to explain the key causes of human-wildlife conflict. The following schematic diagram explains the relationship between the independent variables and the dependant variable.

An independent variable (also called the “predictor variable”) is those variables that cause changes in the dependent variables. An independent variable is presumed to affect the dependent variable. A dependent variable is a variable whose outcome depends on the manipulation of the independent variable.

The below illustrated conceptual framework figure shows how the independent variables (rise in population, land use changes, type of wildlife species and review of policy implementation) influences the dependant variable (human-wildlife conflict).

Weather is the intervening variable, as it is a variable that might affect the relationship of the dependent and independent variables but it is difficult to measure or to see the nature of their influence.

A moderating variable is a variable that behaves like the independent variable in that it has a significant contributory or contingent effect on the relationship between the dependent and the independent variable (politicians or legislations).



Source: Researcher 2012

Figure 1. Conceptual framework

The above conceptual framework explains the relationship of the variables as human wildlife conflict is a serious obstacle to wildlife conservation and is becoming more prevalent as human population increase, development expands, the global climate changes and human and environmental factors put people and wildlife in greater direct competition for a shrinking resource base. However, this study draws on how the rise in population, land use changes, type of wildlife species causing HWC and policy implementation influence human wildlife conflict.

CHAPTER THREE:

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter provided the description of research design that was used in achieving the study objectives. The chapter described the study design, the target population, sample size and sampling techniques. It also gave description of the study instruments, their validity and reliability, collection procedures and data analysis techniques.

3.1 Research Design

Research design is the plan and structure of investigation so conceived as to obtain answers to research questions. It is actually an outline or a scheme used to generate answers to the research question. According to Adams and Schveneldt (1985), it is a set of rules that enables the investigator to conceptualize and observe the problem under study.

This study adopted the descriptive survey design while revealing variables contributing negatively or positively towards human wildlife conflict. The design was appropriate for the study because it revealed variables like, rise in population, land use changes, policy implementation bias that contribute positively or negatively to human wildlife conflict.

3.2 Description of sampling area

The scope of the study covered Ol Donyo Sabuk National park and its environs incorporating the adjacent areas of influence or interest that relate to the ecosystem approach. (Appendix V)

3.3 Target population

In order to achieve the objectives of the study, the target population comprised the households living adjacent the park, local authorities, Kenya Wildlife Service (KWS) as well as other stakeholders such as Delmonte and Kantara farm which is within the area.

The study population involved a total of 1600 individuals. The population was drawn from the District Officer who has records of land (adjacent to the Park) issued by Muka Mukuu Cooperative Society management.

3.4 Sampling Procedure

Simple random sampling procedures were employed during the data collection exercise. Sample size shall be a percentage of the total population of 1600 which was secondary data collected from Mukaa Mukuu Cooperative Society list of all members with land adjacent to the park. Out of the 1600, simple random sampling was used to select 10% for the statistical investigation (Kothari, 1999). This sampling method ensures an equal probability chance of individuals being selected.

3.5 Method of data collection

To achieve the objectives of the study, both primary and secondary data were used, primary data included local views, perception, and opinions in relation to human-wildlife conflicts in the area. The data was obtained from primary stakeholders such as households, and at various levels of community organizations as well as institutions with key opinion of the subject.

The secondary data in the other hand included published and unpublished information on the causes of human-wildlife conflicts in Kilimambogo area, the existing policy and legislative framework for wildlife conservation and the current intervention measures put in place by KWS to manage human-wildlife conflict. The report reviewed so as to propose recommendation for human-wildlife conflict resolution and management and gaps not address at Ol Donyo Sabuk (Kilimambogo) area.

Literature on government policy and legislation related to the sustainable management of human-wildlife conflicts and the general wildlife conservation were equally analyzed in order to understand the gaps that needed to be addressed in the park management and resolving human wildlife conflict. The secondary data was used to provide the information on the background to the problem as well as to authenticate the information obtained from the primary data.

Primary data was obtained from sampled households, Community Based Organization (CBOs) government institutions, all these pieces of information were obtained through the administration of both household and institutional questionnaires. This was collected through oral interviews, observation guides, and focus group discussion.

Secondary data on the other hand was sought from previous studies carried out on human-wildlife conflicts at global, regional and local levels. Such information was obtained from published and unpublished reports; which included books, journals, occurrence book and newsletters. Brochures, annual and quarterly reports, magazines, national and district development plan, thesis, studio report from libraries, relevant documentation and the internet.

Directly administered questionnaires to 160 individual, oral interview guides, Focus group discussion, observation guides and photographic techniques are the instrument that were employed during the collection of data. Both household and institutional questionnaires were administered randomly to the selected households and institution within the KWS premises. Most of the questions were kept open ended so as to enable the responded to give answers that manifest their accurate opinions and perceptions. Questions requiring specific answers are to be equally included. Oral interview was carried out with responded whose lines of duty deems relevant to the study.

Observation guided and photographic techniques were also used to capture scenes as they appeared so as to support the information extracted from the questionnaires. In order to supplement the information obtained using the aforementioned instruments, secondary data was used to serve this purpose. Such information was obtained from libraries, documentation centres, internet, and resource centres in various institutions.

3.6 Validity and Reliability

Validity refers to the degree to which evidence supports any inferences a researcher makes based on the data he or she collects using a particular instrument. Validity, therefore, depends on the amount and type of evidence there is to support the interpretations the researchers wish to make concerning data they have collected. A pre test of the data collecting instrument was administered to respondents from a population

at Nairobi National Park before a full scale survey (Mugenda and Mugenda, 2003). The validity established whether the questionnaire content is measuring what it purports to measure.

Reliability of the research instrument is the degree of the consistence that the instrument demonstrates (Best and Kahan, 2004). Reliability refers to the consistence of the scores obtained. That is how consistent the scores are for each individual from one administration of an instrument to another and from one item to another. The reliability of a standardized test is expressed as a co-efficient which measures the strength of association between the variables. Reliability was ascertained by placing all odd numbers in one sub set and all even numbers in one sub set and finding out the coefficient of internal consistency.

3.7 Data analysis Techniques

Various techniques were used for the analyses and presentation of data. These include both quantitative and qualitative techniques. In quantitative technique, the analyses are to be characterized by the use of statistical package for social science, proportions, percentages and averages to arrive at a general picture for the generation of conclusion. Qualitative data from questionnaires as well as interviews were analyzed thematically. Qualitative techniques on the other hand were employed in the computation of statistical tables, bar graphs, charts as well as map.

Figure 2 : Operationalization of Variables

Objective or Research question	Variables	Indicators	Measurement	Level of measurement	Data collection method	Data analysis	Measuring scale
To what extent does human population increase adjacent the Park influence human-wildlife conflicts in Ol donyo Sabuk National Park ?	<u>Independent</u> -Rise in Population Adjacent the Park	-HH adjacent the park	No. of physical facilities adjacent the park % increase /reduction in frequency of illegal activities in the protect areas	Ordinal	Questionnaire Reviews	Descriptive survey	-Frequencies -Percentages
	<u>Dependant</u>		-No. of type of	Ordinal	Questionnaire	Descriptive	-Frequencies

	Human wildlife conflict	Stakeholders satisfaction or dissatisfaction	conflicts -No of reported cases and attended cases in KWS Occurrence book		Reviews	survey	-Percentages
To what extent does land use pattern adjacent the Park influence human wildlife conflict?	Independent Land use changes adjacent the park	Economic activity undertaken	-Type of economic activity undertaken -Type of livestock reared or crops grown - No. of occurrence of wildlife on farmland	Ordinal Interval	Questionnaire	Descriptive survey	-Frequencies -Percentages

	<u>Dependant</u> -Human Wildlife Conflict	Stakeholders satisfaction or dissatisfaction	- No. of compensation claims awarded	Ordinal	Questionnaire Observation	Descriptive survey	-Frequencies -Percentages
How does the various wildlife species influence human conflict?	<u>Independent</u> Wildlife species Responsible for conflict	Reported case noted in KWS occurrence book	-Nature of encounter/destru ction by wildlife species in farmland -Type of wildlife spp. responsible for conflict	Ordinal	Questionnaire	Descriptive survey	-Frequencies -Percentages
	<u>Dependant</u> Human wildlife conflict	Stakeholder satisfaction or dissatisfaction	-No. of cases reported and attended	Interval	Questionnaire Observation	Descriptive survey	-Frequencies -Percentages

			- Effective strategies in deterring wildlife			Interviews	
How does implementation of policy affect human wildlife conflict?	<u>Independent</u>	Reports of cases attended in occurrence book and stakeholders satisfaction or dissatisfied	No of cases attended and compensation claims approved and awarded	Ordinal	Questionnaire	Descriptive survey & interviews	-Frequencies -Percentages
	<u>Dependant</u>	Satisfied stakeholders	Review of wildlife policy	Interval	Questionnaire Observation	Descriptive survey	-Frequencies -Percentages

CHAPTER 4:

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents analysis and findings of the study based on data collected from the field. The analysis was focused on answering the research questions. The results are presented on the assessment of human wildlife conflict in Ol Donyo Sabuk National Park, Machakos County. The data was gathered exclusively from questionnaire as the research instrument.

4.2 Response Rate

Table 4.1 Response Rate of the community

Response	Frequency	Percentage
Responded	110	69
Not responded	50	31
Total	160	100

The study targeted to sample 160 respondents in collecting data on the assessment of human wildlife conflict in Ol Donyo Sabuk National Park, Machakos County. From the study, 110 out of 160 sampled respondents filled in and returned the questionnaire contributing to 69%. This commendable response rate was made a reality after the researcher made personal visits to remind the respondent to fill-in and return the questionnaires.

4.3 Demographic Information

The researcher begun by a general analysis on the demographic data got from the respondents which included; - the gender, age, marital status, academic qualification of the respondents and the occupation.

4.3.1 Gender of Respondents

This section of study sought to establish the gender of the community.

Table 4.2 Gender of community

Gender	Frequency	Percent
female	47	43
male	63	57
Total	110	100

From the findings, respondents indicated that 57% were male and 43% of the respondents were female.

This section of study sought to establish the gender of the authorities.

Table 4.3 Gender of authorities

Gender	Frequency	Percent
female	6	40
male	9	60
Total	15	100

From the findings, respondents indicated that 60% were male and 40% of the respondents were female.

4.3.2 Age of Respondents

The study also sought to establish the community's age bracket.

Table 4.5 Age of the Community

Age	Frequency	Percent
15-35 years	66	60
36-50 years	27	25
51-65 years	10	10
above 65 years	7	8
Total	110	100

From the findings, the majority of the respondents in the age bracket of 15 – 35years were shown by 60%, 25% of the respondents were between 36 - 50 years, 10% of the respondents were between 51 - 65years and 5% of the respondents were above 65 years.

The study also sought to establish the authorities' age bracket.

4.6 Age of the Authority

Age	Frequency	Percent
24-35 years	8	53
36-50 years	4	27
51-65 years	3	20
above 65 years	0	0
Total	15	100

From the findings, the majority of the respondents in the age bracket of 24 – 35years were shown by 53%, 27% of the respondents were between 36 - 50 years, 20% of the respondents were between 51 - 65years and none of the respondents were above 65 years.

4.3.3 Education Level

The study ought to know the level of education of the community.

Table 4.7 Education Level of Community

	Frequency	Percentage
Primary	44	40
Secondary	29	26
College	28	25
University	9	9
Total	110	100

From the findings, 40% of the respondents had reached primary level, 26% of the respondents indicated that they had reached secondary level, 25% of the respondents had reached college level and 9% had reached the university level.

The study sought to know the level of education of the authorities.

Table 4.8 Education Levels of Authorities

	Frequency	Percentage
College	9	60
University	6	40
Secondary	0	0
Primary	0	0
Total	15	100

From the findings, 40% of the respondents had reached college level, 40% of the respondents indicated that they had reached university level.

4.3.4 Marital Status

The study sought to find out the marital status of the community.

Table 4.9 Marital Status of community

	Frequency	Percentage
Married	59	54
Separated	37	34
Single	10	12
Divorced	0	0
Total	110	100

From the findings, 54% of the respondents indicated that they were married, 34% of the respondents indicated that they had separated, 12% of the respondents indicated that they were single and none of them were divorced.

The study sought to find out the marital status of the authorities.

Table 4.10 Marital Statuses of Authorities

	Frequency	Percentage
Married	8	53
Single	4	27
Divorced	2	13
Separated	1	7
Total	15	100

From the findings, 53% of the respondents indicated that they were married, 27% of the respondents indicated that they were single, 13% of the respondents indicated that they were divorced and 7% of the respondents were separated.

4.3.5 Occupation of Respondents

The study sought to find out the occupation of community.

Table 4.11 Occupation of community

	Frequency	Percentage
Married	48	44
Single	27	25
Divorced	24	21
Separated	11	10
Total	110	100

From the findings, 44% of the respondents indicated they were self employed, 25% of the respondents were casual workers, 21% of the respondents were formal workers and 10% of the respondents were unemployed.

4.4 Human Population

4.4.1 Type of Activity Carried Out

The study sought to establish how the community used their land.

Table 4.12 Activity Carried Out

	Frequency	Percent
Farming	65	59
Keeping livestock	31	28
Playground	14	13
Total	110	100

From the findings, 59% of the respondents indicated that they were using their land for farming, while 28% of the respondents indicated that they kept livestock and 13% of the respondents used their land as playground.

The study sought to establish the major use of the land around the parks by the authorities. From the findings, respondents indicated that they used the land for conservation programs and projects.

A scale of 1-5 was used. The scores “very great extent” and “great extent” were represented by mean score equivalent to 3.6 to 5.0 on the continuous Likert scale (3.6 < great extent < 5.0). The scores of moderate extent were equivalent to 2.6 to 3.5 on the Likert scale (2.6 < moderate extent < 3.5). The score of little extent and no extent were equivalent to 1 to 2.5 on the likert scale (1 < little extent < 2.5).

4.4.2 Level of Agreement

Table 4.13 Level of Agreement

	Mean	Std. Deviation
Co-existence between humans and animals was never strained as natural resources is concerned for many years	3.1765	1.31358
The locals have suffered losses in crops and livestock due to attacks by wild animals in recent past.	3.1176	1.70142
Poverty and overpopulation demand are some of the factors driving human wildlife conflicts as wildlife habitats are disappearing at an alarming rate.	2.7941	1.47257
The need to improve livelihoods adjacent the protected area continues to increase problems in conservation areas.	2.7059	1.69722

The study sought to establish the level to which the respondents agreed to the following statements. Majority of the respondents indicated that co-existence between humans and animals was never strained as natural resources is concerned for many years was to a moderate extent as shown by a mean score of 3.1765, the locals have suffered losses in crops and livestock due to attacks by wild animals in recent past was to a moderate extent as shown by a mean score of 3.1176, poverty and overpopulation demand are some of the factors driving human wildlife conflicts as wildlife habitats are disappearing

at an alarming rate was to a moderate extent as shown by a mean score of 2.7941, the need to improve livelihoods adjacent the protected area continues to increase problems in conservation areas was to a moderate extent as shown by a mean score of 2.7059.

4.4.3 Reasons that facilitated losses in crops and live stock

The study sought to establish reasons that facilitated the humans have suffered losses in crops and livestock over the past few years. From the findings, respondents indicated that rapid population growth and poverty were some of the reasons that facilitated the humans have suffered losses in crops and livestock over the past few years.

4.4.4 Increment in Human Populations

The study sought to find out how the increment in human populations and poverty affected the environment around conservation areas. From the findings, a human population has led to expansion of human activities up to the edges of conservation areas and marginal land that were animal dispersal ranges.

From the findings, during the park gazettement, the human population was very low and the area bordering the park was open and unsettled. The land belonged to the Muka Mukuu cooperative society and was managed as a society land. Late 1970s the land was subdivided and allocated to members who in turn started settling in the area. Others subdivided their portions further and this became target to other land prospectors. Today the area has completely been settled with people occupying the park buffer zone.

4.4.5 House Construction Material

Table 4.14 Walling

	Walling	
	F	%
Timber	57	52%
Stones	7	6%
Brick	10	9%
Mud	36	33%

The study sought to find out the type of construction the community had used on their walls. From the findings, 52% of the respondents indicated that they used timber, 33% of the respondents indicated that they used mud, 9% of the respondents indicated that they used bricks and 6% of the respondents indicated that they used stones.

Table 4.15 Roofing

	Roofing	
	F	%
Brick	45	41%
Iron sheet	6	5%
Thatch grass	59	54%

The study sought to establish the type of roofing used by the community while constructing their houses. From the findings, 54% of the respondents indicated that they used thatch grass, 41% of the respondents indicated that they used iron sheet and 5 % of the respondents indicate that they used bricks.

4.5 Land Use Pattern

4.5.1 Economic Activities

The study sought to find out the economic activities undertaken by the community in the area.

Table 4.16 Economic Activity

	Frequency	Percent
Farming	50	45
Pastoralism	28	25
Charcoal burning	18	17
Tourism	14	13
Total	110	100

From the findings, 45% of the respondents indicated that farming was the main economic activity, 25% of the respondents indicated that pastoralism was the economic activity carried out in the area, 17% of the respondents indicated that charcoal burning was the economic activity in the area, and 13% of the respondents indicated that tourism was the economic activity carried out in the area.

4.5.2 Source of Water

The study sought to establish the major source water from the area by the community.

Table 4.17 Source of Water

	Frequency	Percentage
River water	99	90
Boreholes	11	10
Total	110	100

From the findings, 90% of the respondents indicated that water was from rivers and 10% indicated that the main source of water was from boreholes

4.5.3 Extent of Agreement

Table 4.18 Extent of Agreement

	Mean	Std. Deviation
Parks portray an approach in park designs that reserved significantly large tracts of land for animal migration.	3.7647	1.53857
Local communities can frustrate conservation programs and projects	3.6765	1.24853
The state agencies care more for wildlife than the people.	3.4706	1.63735
Traditional resources in the Park have led to resentment amongst the communities and the protected resources and their managers.	3.2647	1.63871
There is compensation for wildlife induced damages to human life or injury	3.0588	1.72225
Wild animals destroy more crops than they harm livestock.	2.9412	1.70456
Where there is wildlife crop damages and property damage there is no compensation	2.0820	1.58425

The study sought to establish the extent to which respondents agreed with the following statements. Majority of the respondents indicated that parks portray an approach in park designs that reserved significantly large tracts of land for animal migration to a great extent as shown by a mean score of 3.7647, local communities can frustrate conservation programs and projects to a great extent as shown by a mean score of 3.6765, the state agencies care more for wildlife than the people to some extent as shown by a mean score of 3.4706, traditional resources in the Park have led to resentment amongst the communities and the protected resources and their managers to some extent as shown by a mean score of 3.2647, there is compensation for wildlife induced damages to human life or injury to some as shown by a mean score of 3.0588, wild animals destroy more crops than they harm livestock to some extent as shown by a mean score of 2.9412, where there is wildlife crop damages and property damage there is no compensation to little extent as shown by a mean score of 2.0820.

4.5.4 Economic Activities Undertaken

The study sought to find out whether the authorities encourage economic activities undertaken in the area by people living around.

Table 4.19 Economic Activity

	Frequency	Percent
Yes	13	87
No	2	13
Total	15	100

From the findings, 87% of the respondents indicated that they do encourage economic activities, while 13% of the respondents indicated that they do not encourage economic activities.

The study sought to find out some of the economic activities that the authorities encourage to be carried out and why. From the findings, respondents indicated that they encourage tourism because it earns the country revenue and also helps in creating employment. Farming is also encouraged to eradicate poverty in the area.

4.5.5 Measures

The study also sought to find out how the authorities deal with the local communities that frustrate conservation programs and projects. From the findings, authorities indicated that they hold conservation education meetings and have begun a tree planting exercise to involve the communities in agro forestry projects.

4.5.6 Causes of Human Wildlife Conflict

The study sought to establish the main causes of human wildlife conflict in the area. From the findings, respondents indicated that the local communities lacked necessary skills or training to employ in conservation areas. Also many local communities around protected areas have negative feelings about policies developed by the state or conservation initiatives being used to manage human wildlife conflicts

4.6 Wildlife Species

4.6.1 Wildlife conflicts

The study sought to establish whether the locals encountered any conflicts with wild animals.

Table 4.20 Wildlife conflicts

	Frequency	Percent
Yes	110	100
No	0	0
Total	110	100

From the findings, all the respondents indicated that they encountered conflicts with wild animals as shown by 100%.

4.6.2 Type of Conflict

The study sought to establish the type of conflicts that the locals encounter with wild animals.

Table 4.21 Type of conflict

	Frequency	Percentage
Crop damage	61	55
Destruction of property	18	16
Human threat	11	10
Livestock killing	9	9
Human injuries	8	7
Human life loss	3	3
Total	110	100

From the findings, 55% of the respondents indicated that they encountered crop damage, 16% of the indicated that they encountered destruction of property, 10% of the respondents indicated that they encountered human threat, 9% of the respondents

indicated that they encountered livestock killing, 7% of the respondents indicated that they encountered human injuries and 3% of the respondents indicated that they encountered human life loss.

4.6.3 Compensation

The study sought to establish whether the locals get compensation for the losses they encounter.

Table 4.22 Compensation

	Frequency	Percent
No	101	92
Yes	9	8
Total	110	100

From the findings, majority of the respondents indicated that they did not get any compensation for their losses and only 8% indicated that they got compensation for their losses.

4.6.4 Type of Wildlife Species

The study sought to find out the type of species that frequently attack the farms. From the findings, majority of the respondents indicated that buffaloes, baboons, monkeys, hyenas and bush pigs frequently attacked their farms. The respondents also indicated that buffaloes and antelopes were among others that frequently attacked the farms.

4.6.5 Crops

The study sought to establish whether the locals grew crops.

Table 4.23 Crops

	Frequency	Percent
Yes	88	80
No	22	20
Total	110	100

From the findings, 80% of the respondents indicated that they grew crops while 20% indicated that they did not grow crops.

Crops

4.6.6 Crops Grown

The study also sought to find out the type of crops that they grew. From the findings, respondents indicated that maize, beans were some of the crops grown in the area.

4.6.7 Livestock Keeping

The study sought to find out whether the locals kept livestock.

Table 4.24 Livestock Keeping

	Frequency	Percent
Yes	69	63
No	41	37
Total	110	100

Source: Survey Data, 2012

From the findings, 63% indicated that they kept livestock while 37% of the respondents indicated that they did not keep livestock.

4.6.8 Frequency of Wildlife Conflict

The study sought to find out the frequency of the different types of wildlife conflict.

Table 4.25 Frequency of Wildlife Conflict

	Frequency	Percentage
Seasonally	40	36
Annually	37	34
Weekly	21	19
Daily	12	11
Total	110	100

From the findings, 36% of the respondents indicated that the conflict were seasonal, 34% of the respondents indicated that the conflicts were annual, 19% of the respondents indicated that the conflicts were weekly, 11% of the respondents indicated that the conflicts occurred daily.

4.6.9 Trend of Human Wildlife Conflict

The study sought to establish the trend of human wildlife conflict in general over the years from the community.

Table 4.26 Trend of Human Wildlife Conflict

	Frequency	Percentage
Not changing	40	56
Increasing	37	35
Decreasing	21	9
Total	110	100

From the findings, 56% of the respondents indicated that human wildlife conflict was not changing as it was still a problem and no solution has been found, 35% of the respondents indicated that human wildlife conflict was increasing and 9% of the respondents indicated that human wildlife conflict was decreasing.

4.6.10 Animals Involved in Human Wildlife Conflict

The study sought to find out the main animals involved in human wildlife conflict. From the findings, respondents indicated that buffaloes, bush pigs, baboons, hyenas and monkeys are the main animals in human wildlife conflict.

4.6.11 Mitigation Measures

The study sought to establish what the community does to guard against attacks from animals. From the findings, respondents indicated that the community is educated on - chasing wild animals like buffaloes by lighting up fires and beating of drums, baboon and monkey are chased by hitting tins or they respond to men raising a big stick. The

wildlife still remains a threat to human and sometime restrains children from going to school.

4.6.12 Damages Reported

The study sought to find out the types of damages mostly reported to the authorities. From the findings, respondents indicated that crop damages, human injuries, property destruction are some of the mostly reported damages.

Table 4.27 Details of Reported Cases of Human Wildlife Conflict

Details of Reported Cases of Human Wildlife Conflict 2012				
Crop Damage	Human Injury	Human Death	Human Threat	Livestock Predation
96	10	3	37	42

4.6.13 Major Areas experiencing conflict

The study showed the areas mostly experiencing conflict as reported to the authorities. From the findings, authorities indicated Park Village, Kitambaase, Zambani, Kyeleni.

4.7 Current Mitigation Measures

4.7.1 Response to Wildlife Invasion

Table 4.28 Responses to Wildlife Invasion

	Yes		No	
	F	%	F	%
Chasing away	80	72	20	18
Trapping animals	9	8	91	82
Kill	33	30	77	70
Call KWS Officers	77	70	33	30
Avoid them	85	77	25	33

The study sought to establish how the local residents respond to wildlife invasion in their land. From the findings, 82% of the respondents indicated that they did not trap the animals which invaded them while 8% of the respondents trapped the animals, 77% of the respondents indicated that they avoided them while 33% of the respondents indicated that they did not avoid them, 72% of the respondents indicated that they chased them away while 18% of the respondents indicated that they did not chase them away, 70% of the respondent indicated that they would call the KWS officers, 30% of the respondents indicated that they did not call the KWS officers, 70% of the respondents indicated that they did not kill the animals while 30% of the respondents indicated they killed the animals.

4.7.2 Environmental Change

The study showed that there has been any environmental change over the years.

Table 4.29 Environmental Change

	Frequency	Percent
Yes	79	72
No	31	28
Total	110	100

From the findings, 72% of the respondents indicated that they had observed negative environmental changes while 28% of the respondents indicated that they had not observed any environmental changes.

4.7.3 Maintenance of the Park Habitat

Table 4.30 Maintenance of the Park Habitat

	Frequency	Percentage
To a large extent	68	62
To a very large extent	22	20
To moderate extent	16	15
To a low extent	4	3
To no extent at all	-	-

The study sought to establish the extent to which respondents think that Kenya Wildlife Service has helped maintain the Park habitat or has increased its degradation. From the findings, 62% of the respondents indicated that it was to a large extent, 20% of the respondents indicated that it was to a very large extent, 15% of the respondents indicated that it was to a moderate extent while 3% of the respondents indicated that it was to a low extent and none of the respondents indicated that it was to no extent at all.

4.7.4 Strategies adopted by KWS to Deal with Human Wildlife Conflict

Table 4.31 Strategies adopted by KWS to Deal with Human Wildlife Conflict

	Mean	Std. Deviation
Fencing	3.8421	1.11869
Chasing/scaring wildlife away from farmlands	3.8235	.96830
Capture and translocation of problem animal	3.6842	1.33552
Controlled shooting problematic animals	3.4211	1.57465
Compensation	3.0000	1.73205

The study sought to establish whether the strategies adopted by KWS to deal with Human Wildlife Conflict are effective. Majority of the respondents indicated that fencing was to a very great extent as shown by a mean score of 3.8421, chasing/scaring wildlife away from farmlands was to a very great extent as shown by a mean score of 3.8235, capture and translocation of problem animal was to a very great extent as shown by a mean score of 3.6842, controlled shooting problematic animals was to a moderate extent as shown by a mean score of 3.4211, compensation was to a moderate extent as shown by a mean score of 3.0000.

4.7.5 Suggestions to minimize conflict

The study sought to establish the suggestions from the respondents to minimize the conflict. From the findings, respondents indicated that educating the locals on methods

to deter wildlife from invading their farms was a temporary solution but KWS should find a lasting solution and entirely fence the Park.

4.7.6 Challenges Faced while undertaking conservation measures

The study sought to establish some of the challenges faced when undertaking your conservation measures. From the findings, respondents indicated that some local community had a negative attitude towards conservation; others lacked necessary skills or training in chasing away wildlife. Some communities had negative perception about formulation of the wildlife policies as they felt they were not consulted.

4.7.7 Recommendations by Communities on Sustainable wildlife management

The study sought to find out communities recommendation on sustainable wildlife conservation in the area. From the findings, respondents indicated a long term solution on fencing the Park would deter wild animals from invading their farms, compensation awards from the government on crop damage and destruction of property should be introduced. Compensation on human injury and death was insufficient and should be increased.

4.7.8 Compensation

The study sought to find out whether the farmers are compensated in the occurrence of damage resulting from Human Wildlife Conflict.

Table 4.32 Compensation

	Frequency	Percent
Yes	10	67
No	5	33
Total	15	100

From the findings, 67% of the respondents indicated that farmers were not compensated while 33% of the respondents indicated that they were compensated.

4.7.9 Trend of Human Wildlife Conflict

The study sought to establish the trend of Human Wildlife Conflict in general over the years from the authorities.

Table 4.33 Trend of Human Wildlife Conflict

	Frequency	Percentage
Increasing	7	47
Decreasing	5	33
Not changing	3	20
Total	15	100

From the findings, 47% of the respondents indicated that it was increasing, 33% of the respondents indicated that it was decreasing and 20 of the respondents indicated that it was not changing and was at status quo.

4.7.10 Mitigation Measures

The study sought to find out the mitigation measures proposed for more effectively dealing with HWC. From the findings, fencing, capture and translocation of problem animal, the big cats were some of the mitigation measures proposed for more effectively dealing with HWC at Oldonyo Sabuk National Park.

CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the findings, the conclusion and the recommendations of the study presented on the assessment of human wildlife conflict in Ol Donyo Sabuk National Park, Machakos County.

5.2 Summary of Findings

The following were the summary of the research findings upon which the conclusion and recommendations of the study were made.

The research findings revealed that majority of the respondents were male for both the community and the authorities. Majority of the community respondents indicated they were aged between 15 – 35years. Majority of the respondents from the authorities indicated they were aged between 24 – 35 years. The study also found out that majority of the authorities respondents had reached college level. Majority of the community respondents had reached primary level. The study also found out that majority of the community respondents indicated that they were married. Majority of the authority's respondents indicated that they were also married.

The study established that occupation of community respondents were self employed. The study established that majority of the respondents indicated that they were using their land for farming. Majority of the respondents indicated that they used the land for conservation programs and projects.

The study established that majority of the respondents indicated that co-existence between humans and animals were never strained as natural resources are concerned for many years were to a moderate extent. The study also established that an increase of human population has led to expansion of human activities up to the edges of conservation areas and marginal land that were animal dispersal ranges.

The study established that majority of the respondents indicated that farming was the main economic activity. Majority of the respondents indicated that the source of water was from rivers. The study established that majority of the respondents indicated that parks portray an approach in park designs that reserved significantly large tracts of land for animal migration to a great extent. The study also found out that majority of the respondents indicated that they do encourage economic activities. Majority of the respondents also indicated they encourage tourism because it earns the country revenue and also helps in creating employment. The study also established that majority of the respondents indicated that the local communities lacked necessary skills or training to employ in conservation areas.

The study established that all the respondents indicated that they encountered conflicts with wild animals. Majority of the respondents indicated that they encountered human injuries. The study established that majority of the respondents indicated that they did not get any compensation for their losses. The study also established that majority of the respondents indicated that baboons and monkeys frequently attacked their farms. The study established that majority of the respondents grew crops. The study also established that maize, beans were some of the crops grown in the area. The study established majority of the respondents kept livestock. The study found out that the respondents indicated that the conflicts were seasonal. The study also found out that human wildlife conflict was at status quo. The study also established that the community educate on park management. The study established that crop damages, human threat, property destruction were some of the mostly reported damages.

The study established that majority of the respondents indicated that they chased wildlife which invaded them. The study also established majority of the respondents had observed environmental changes. The study established that the extent to which respondents think that Kenya Wildlife Service has helped maintain the Park habitat or has increased its degradation was to a large extent. The study also established that fencing is an effective strategy adopted by KWS to deal with Human Wildlife Conflict. The study also established that negative attitude towards conservation, lack of necessary skills or training in conservation programs and the negative perception on wildlife t

policies developed by the state to manage human wildlife conflicts were some of the challenges faced when undertaking conservation measures. The study also established that majority of the respondents indicated that farmers were not compensated in the occurrence of damage resulting from Human Wildlife Conflict. Majority of the respondents indicated that the trend of Human Wildlife Conflict in general over the years was increasing. The study also established that fencing, capture and translocation of problem animal were some of the mitigation measures proposed for more effectively dealing with HWC.

5.3 Discussions

The study revealed that majority of the respondents indicated that the respondents indicated that they were using their land for farming. The study also revealed that co-existence between humans and wildlife were never strained as natural resources are concerned for many years were to a moderate extent. According to Musyoki (2007), co-existence between humans and wildlife was never strained as natural resources were abundant in terms of quality and quantity. When people started cultivating land for agricultural purposes and rear animals, reliable food resource base was gained throughout the year but this faced new threats of crop damage by wild animals. The study revealed that that a human population has led to expansion of human activities up to the edges of conservation areas and marginal land that were animal dispersal ranges. Similarly, according to Naughton-Treves (1998), humans have suffered losses in crops and livestock ever since there has been agriculture.

The study revealed that majority of the respondents indicated that farming was the main economic activity. The study revealed that majority of the respondents indicated that parks portray an approach in park designs that reserved significantly large tracts of land for animal migration to a great extent. According to Lelo (1994), the boundaries of Oldonyo Sabuk National Park excluded the important distribution ranges for wildlife and therefore the movement of wildlife outside the park to seek the same is inevitable if salt licks are not provided in the park.

The study realized that communities living adjacent the Park were mainly involved in intensive small holder agriculture, irrigation farming (growing horticultural crops e.g.

Peas- Kantara farm) and livestock keeping. Nearby also, are large scale farms, the Delmonte farm with pineapples farms. It was observed that the communities use the forests resources for basic subsistence needs including firewood, poles, forest fibres, grass, honey collection, trapping small game meat, the most disturbing is the number of charcoals kills within the park boundary. These activities are unsustainable if unregulated and would lead to further degradation and prevent degraded areas from recovering.

The study revealed that all the respondents indicated that they encountered conflicts with wild animals. Majority of the respondents indicated that they encountered human injuries. The study also revealed that majority of the respondents indicated that baboons and monkeys frequently attacked their farms. The study revealed that human wildlife conflict was not changing. The study also revealed that the community needs to be educated on planning and management of parks with animal dispersal and restrain people from contacting with them. According to Musyoki (2007), large wildlife species that are potentially dangerous and those that gather in groups are more likely to bring about conflicts when they roam far than smaller animals whose ranges are restricted.

The study revealed that majority of the respondents indicated that they chased animals which invaded them. The study revealed that the extent to which respondents think that Kenya Wildlife Service has helped maintain the Park habitat or has increased its degradation was to a large extent. The study also revealed that hardened attitude towards conservation, lacked necessary skills or training and the negative feelings about policies developed by the state being used to manage human wildlife conflicts were some of the challenges faced when undertaking conservation measures. According to Lelo (1994) among the Akamba community when their grazing lands were declared wildlife reserves by Europeans, ownership of wildlife is unlikely to be relinquished to the local people especially due to the global politics regarding conservation and the role of wildlife in the national economy of Kenya. Similarly, according to Musyoki (2007), wildlife laws and alienation of land led to people resenting wildlife regulations.

The Compensation systems for HWC carry significant economic costs to humans and compensation is a measure which aims to alleviate conflict by reimbursing people for

their losses. Compensation systems rely on giving out monetary payments or licenses to exploit natural resources, allowing the hunting of game or the collection of fuel wood, timber and fodder from inside protected areas. Of the two methods, financial compensation is a very contentious issue and the least popular due to its inefficiency and low rate of reimbursement. This is a reality in many developing countries, which face budget constraints and usually pay on an irregular basis and to a limited extent. The second compensation scheme, also known as the "settlement of rights" to use natural resources, appears to be a more practical solution. In Kenya, compensation schemes are very problematic. The government has not provided any reimbursement for crop damage and livestock predation since 1989. Moreover, the compensation received for loss of human life or injury is not sufficient to cover funeral expenses or hospital bills. An alternative approach, the "settlement of rights", appears to be a better strategy. It fixes a quota of commodities that can be exploited, it clearly demarcates reserve zones that are accessible to local villagers and it legitimize their rights to those resources. Indeed, the benefits derived from the legitimate collection of natural resources influence the attitudes and perceptions of rural residents towards wildlife and conservation, while promoting responsibility and awareness (Sekhar, 1998)

5.4 Conclusions

The study concluded that demand is a factor driving human wildlife conflicts and is made more complex by issues like poverty and overpopulation. The study also concluded that co-existence between humans and wildlife was never strained as natural resources are concerned for many years.

The study concluded that encouraging tourism activities as part of land use would help the country earns revenue and also helps in creating employment. The study also concluded that the local communities lacked necessary skills or training to employ in conservation management and problem animal control.

The study also concluded that respondents were not compensated for their losses for crop damage, property damage and livestock predation. The study also concluded that the community needs to be educated on planning and park management and conservation education. . The study also concludes that crop damages, human threat,

human injuries, property destruction were some of the mostly reported damages by buffaloes, baboons and monkeys. Hyenas were responsible for livestock predation. Buffaloes and hippos from Athi River were responsible for human death.

The study concluded that Kenya Wildlife Service has helped maintain the Park habitat or has increased programs to reduce degradation greatly. The study also concluded that that hardened attitude towards conservation, lack of necessary skills or training and the negative perception about policies developed by the state to manage human wildlife conflicts were some of the challenges faced when undertaking conservation measures. The study concluded that wildlife laws and the perception of alienation of land led to people resenting wildlife regulations.

5.5 Recommendations

The study noted human wildlife conflict was a major problem in Ol Donyo Sabuk National Park, Machakos County.

This study recommends active management of the park. In the absence of major migratory system, a feasibility study on fencing of the entire park should commence. Water resource appeared inadequate to the animals and watering points should be developed.

There is need to control illegal human activities in the park including charcoal burning, firewood collection, logging and collection of other forest resources for the park to be conserved for posterity. There is need to intensify protection and conservation measures in these areas. Enrichment planting with indigenous species to be considered as an option to increase the tree/vegetation cover in the forest after another study detailing the factors hindering slow or retarded tree development in some parts of the park.

Alternative sources of resources derived from the park to be sought in order to reduce pressure on the park e.g. by encouraging farmers to practice agro-forestry, investment in other sources of renewable energy such as solar or wind, constructing water tanks outside the park etc

Encourage participatory approaches to management by considering ways of managing forests in a manner that preserves ecological integrity and takes into account the human well-being while addressing the diverse demands. These efforts should start in the areas bordering the community.

Further study should be carried out incorporating the entire wildlife sector, land department and agriculture sector. Different strategies should be formulated at the functional level and set within the context of sustainable conservation measures. This would enable the whole wildlife sector to know the mitigation measure to resolve human wildlife conflict at Oldonyo Sabuk National Park. The communities must participate in park management planning and other partners consulted in various aspect. Relevant sectors such as the agricultural sector, livestock sector, tourism sector and land plan department must work together to ensure the communities realize their crop yields, and livestock production is sufficient. Ecotourism to should be boosted to improve the locals' livelihoods as create a sense of ownership on Park conservation.

REFERENCES

- Conover D.O. & Conover M.R. (2000) *Historical forces shaping Americans perception of wildlife and wildlife conflict.*
- Gachugu D, M. (1992) *Can Monkeys and humans co-exist? Land use and primate conservation: Conflicts and Solutions in Tana River National Primate Reserve, Kenya.* Msc Thesis in Environment and Natural resource management, University of Canberra. University Drive, Bruce ACT 2617, Australia.
- Goodland R. & McNeely J & Pitt C. (1985) *Culture and conservation with human dimension; developing a partnership of indigenous people.*
- Kothari C.R. *Research Methodology: Methods and Techniques* (New Delhi: New Age International Publisher) pgs 97-100.
- KWS (Kenya Wildlife Service Report) 1990. *A Policy Framework and Development Programme 1991–1996.* Nairobi, Kenya Wildlife Service.
- KWS (Kenya Wildlife Service Report) 1997 – *A five man Review of Human Wildlife Conflicts in Kenya.* A report to KWS.
- KWS (Kenya Wildlife Service Report) 2006. *KWS Strategic Management Plan (2005-2010),* Nairobi.
- Lelo, F.K (1994). *Humanisation of Wildlife management: A case study of Oldonyo Sabuk National Park, Kenya.* Phd Thesis, Clarks University Atlanta.
- Malik, A. (1984). Protected areas and protected reality *in National parks, conservation and development: The role of protected areas in sustaining society,* edited by J. A. McNeely and K. R. Miller, 11-12.
- Masasabi W. Evans (2003). *The human wildlife conflict: A case of the Nairobi National Park*
- Mugenda O.M & Mugenda A. B. (1999). *Research Methods: Quantitative & Qualitative Approaches.*

- Musyoki C, M. (2007). *Human Wildlife Conflicts in Kenya: Crop raiding by Elephants & other Wildlife in Mahiga "B" Village of Nyeri District*. Phd Thesis, Kyoto University, Japan.
- Naughton-Treves, (1998). *Predicting Patterns of crop damage by world life around Kabale National Park, Uganda*. *Conservation Biology*: 12: 156-168. <Retrieved from> onlinelibrary.wiley.com/doi/10.1046/j.1365-2664.1998...x/pdf
- Nkonge G. N. (2008) *An analysis of Human Wildlife Conflict in Matheru Location, Meru South District*.
- Ogodo, O. (2003). *Resolving the conflict calls for a tight balancing Act-Legislator*. East African Standard Newspaper, Monday 7 July. The Standard Limited.
- Okello, M.M. and B.E.L. Wishitemi (2006). *Principles for the establishment of community wildlife sanctuaries for ecotourism: Lessons from Maasai Group Ranches, Kenya*. *African Journal of Business and Economics*, 1 (1), pp. 90-109.
- Okech, R. (2011) *Wildlife-community conflicts in conservation areas in Kenya*. Sir Wilfred Grenfell College Memorial University. Newfoundland, Canada. <Retrieved from> kms1.isn.ethz.ch/serviceengine/Files/ISN/123268/.../Chapt.4.pdf
- Okello, M.M. and K. Conner (2000), *Wildlife distribution and densities, and associated human-wildlife conflicts on Kuku Group Ranch, Kenya*. Unpublished Research Report SFS Centre for Wildlife Management Studies. Fall 2000, Nairobi, Kenya. <Retrieved from> www.iucn.org
- Omondi, P. (1994). *Wildlife-human conflicts in Kenya. Integrating wildlife conservation with human needs in the Maasai Mara region*. Phd Thesis, Mcgrill University, Canada.
- Ouma, N. D (2009). *On Human conflict in Nairobi National Park*

Sekhar N. U (1998) *Crop and livestock depredation caused by wild animals in protected areas: the case of Sariska Tiger Reserve, Rajasthan, India* - Environmental Conservation.

Stem P.C. (1988) *Value, Belief, Norm theory of support for social movement: the case of environmentalism*

Wanjau, M. (1999). *Sustainable extractive use of Wild plant resources to resolve natural management conflicts & promote conservation: A collaborative management approach - Case study of Chyullu Hills National Park, Kenya*. African Centre for Technological Studies. Nairobi, Kenya.

Wells & Brandson (1992) *Conservation ecology: Land care on the poverty – protection interface in an Asian watershed*.

APPENDIX I: QUESTIONNAIRE FOR COMMUNITIES

I am a postgraduate student from University of Nairobi Department pursuing a Master Degree in Project Planning and Management and carrying out a research study on Human Wildlife Conflict in Oldonyo Sabuk.

The questionnaires are designed for this research only. You are kindly requested to contribute and fill in the questionnaire which will be used in the study. I assure you that the information gathered will be used for the purpose of this research only and will be treated with strict confidentiality. Thank you in advance for your co-operation.

Part A: General Information

Tick the appropriate answer to your level best

Gender Male [] Female []

Age: 15-35 [] 36 – 50 [] 51 – 65 [] above 65 []

Level of education:

Primary [] Secondary [] College [] University []

Marital status Married [] Single []

Separated [] Divorced []

Occupation: Self employed [] Casual []

Formal [] Unemployed []

Part B: Human Population

What is the approximate Distance from the National park to your home?

Buffer zone [] Close (1Km – 2km) [] Far (3km – 5km) []

What is major use of your land?

Farming [] Playground [] keeping livestock []

Others indicate.....

To what level do you agree with the following? Use a scale of 1-5 where; 5 Very great extent, 4 Great extent, 3 Moderate extent, 2 Little extent, 1 No extent

	5	4	3	2	1
Co-existence between humans and animals was never strained as natural resources is concerned for many years					
The locals have suffered losses in crops and livestock due to attacks by wild animals in recent past.					
Poverty and overpopulation demand are some of the factors driving human wildlife conflicts as wildlife habitats are disappearing at an alarming rate.					
The need to improve livelihoods adjacent the protected area continues to increase problems in conservation areas.					

Part C: Land use pattern

Which economic activities are undertaken in this area?

Pastoralism [] Tourism []

Farming []

Charcoal burning []

What is the major water source from this area?

River water emitting from the Park []

Boreholes []

Others.....

To which extent do you agree with the following statements, using a scale of 1-5 below, in which; 5 – To a very large extent 4 - To a large extent 3- To some extent

2- To a small extent

1- To no extent

	1	2	3	4	5
Where there is wildlife crop damages and property damage there is no compensation					
There is compensation for wildlife induced damages to human life or injury					
Local communities can frustrate conservation programs and projects					
Wild animals destroy more crops than they harm livestock.					
Traditional resources in the Park have led to resentment amongst the communities and the protected resources and their managers.					
The state agencies care more for wildlife than the people.					
Parks portray an approach in park designs that reserved significantly large tracts of land for animal migration.					

Part D: Wildlife Species

Do you encounter any conflicts with wildlife?

Yes [] No []

If yes, which one?

Human life loss [] Livestock killing by wildlife []

Crop damage [] Human injuries []

Human threat [] Destruction of property []

Do you get compensation for these losses? Yes [] No []

Which wildlife species frequently attack your farm?

i)..... ii).....

iii)..... iv).....

Do you grow crops Yes [] No []

If yes which crop type.....

Do you keep livestock Yes [] No []

If yes which livestock

What is the frequency of the different types of wildlife conflict?

Annually [] Seasonally [] Weekly [] Daily []

What is the trend of Human Wildlife Conflict in general over the years?

Decreasing [] Not changing [] Increasing []

Part E: Current Mitigation Measures

How do you respond to wildlife invasion to your land?

	Yes	No
Chasing away		
Trapping animal		
Kill		
Call KWS Officers		
Avoid them		

Have you observed any environmental change over the years? Yes No

To what extent do think Kenya Wildlife Service (OL DONYO SABUK) has helped maintain the Park habitat or has increased its degradation?

To a very great extent To a great extent

To a moderate extent To a low extent

To no extent at all

Give reasons for your answer

.....

.....

.....

To what extent do you agree that the strategies adopted by KWS to deal with Human Wildlife Conflict at Oldonyo Sabuk are effective? Use a scale of 1-5 where; 5 Very great extent, 4 Great extent, 3 Moderate extent, 2 Little extent, 1 No extent

	5	4	3	2	1
Fencing					
Capture and translocation of problem animal					
Controlled shooting problematic animals					
Chasing/scaring wildlife away from farmlands					
Compensation					

What would you suggest should be done to minimize conflict?

.....

.....

.....

.....

.....

APPENDIX II: QUESTIONNAIRES FOR AUTHORITIES/INSTITUTIONS

Part A: General Information

Name of the officer.....

Department.....

Gender Male [] Female []

Age: 24 -35 [] 36 – 50 [] 51 – 65 [] above 65 []

Level of education:

Primary [] Secondary [] College [] University []

Marital status Married [] Single []

Separated [] Divorced []

Part B: Human Population

Humans have suffered losses in crops and livestock over the past few years. What could have been some of the reasons that facilitated this?

.....
.....
.....
.....

What is the major use of the land around the parks?

.....
.....
.....
.....

How has the increment in human populations and poverty affected the environment around conservation areas?

.....
.....

Part c: Land use pattern

Do you encourage economic activities to be undertaken in this area by people living around?

Yes [] No []

If yes, name some of the economic activities that you encourage and why

.....
.....

If no, name some of the economic activities that you do not encourage and why

.....
.....

How do you deal with the local communities that frustrate conservation programs and projects?

.....
.....
.....

What are the main causes of human wildlife conflict in the area?

.....
.....
.....

Part D: Wildlife Species

What are the main animals involved in human wildlife conflict?

.....
.....
.....

Which are the major areas experiencing conflict?

.....
.....
.....

What does the community do to guard against attacks from animals?

.....

What types of damages are mostly reported?

.....
.....

What action do you take when conflict is reported are they effective as far as human wildlife conflict management and resolution is concerned

.....

Part E: Current Mitigation Measures

What are some of the challenges faced when undertaking your conservation measures?

.....

What issues are addressed towards the communities for sustainable wildlife conservation in this area?

.....

Are the farmers compensated in the occurrence of damage resulting from Human Wildlife Conflict?

Yes []

No []

What is the trend of Human Wildlife Conflict in general over the years?

Decreasing []

Not changing []

Increasing []

What is the future well being of wildlife in this area towards sustainability and conservation of biodiversity?

.....

Which mitigation measures do you proposes for more effectively dealing with HWC.....

.....

APPENDIX III RESEARCH TIME FRAME

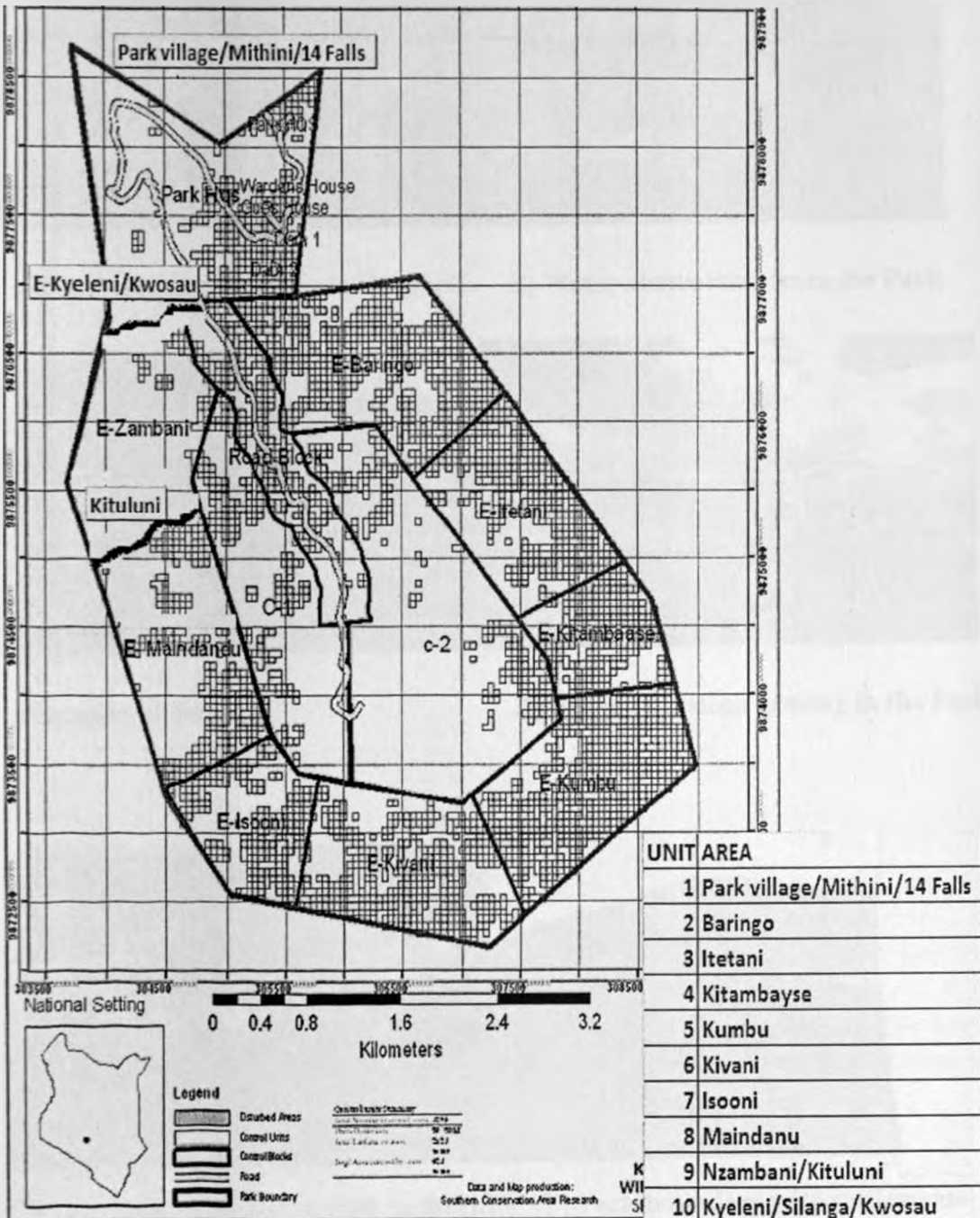
DATE	ACTIVITY
WEEK 1	PROPOSAL WRITE UP AND SUPERVISION FROM LECTURER
WEEK 2	SUPERVISORS APPROVAL
	PROPOSAL DEFENDING
WEEK 3 AND WEEK 4	PRE TEST OF AREA AND RECRUITING TWO ASSISTANTS
	HH SAMPLING
	COMMUNITY BASED ORGANIZATION SAMPLING
	INSTITUTIONAL SAMPLING
WEEK 5	REPORT ANALYSIS AND WRITE UP
	PROJECT SUPERVISION AND COMPLETION

APPENDIX IV: RESEARCH BUDGET

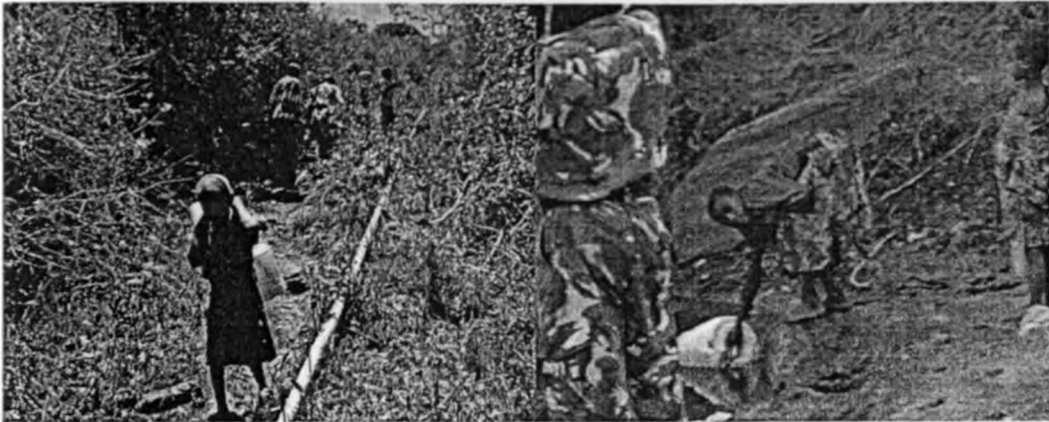
Descriptive Items				Total amount
Particulars	Unit	Quantity (time plan)		Kshs.
Method : Sampling				
Allowance	a) 500	2 Assistants * 20day	20,000	35,000.00
	b) 250	1 Driver * 20 days	5,000	
	c) 250	2 Rangers * 20 days	10,000	
Transport				
Fuel	50/Litres	a) 50km* 15 days	75000	75,000.00
Repair and Maintenance				
Report Aanlysis & Write up				
Printing			3,000.00	10,000.00
Photocopy & binding			4,000.00	
Airtime			3,000.00	
Miscellaneous			6,000.00	
Total				126,000.00

APPENDIX V: MAP OF STUDY AREA

OLDONYO SABUK NATIONAL MAP: ZONATION OF UNIT FOR CFA WORKING GROUPS



APPENDIX VI: Photographs



A) Illegal fetching of water in the park

B) Water abstraction from the Park



C) Logging in the park



D) Illegal Livestock grazing in the Park



E) Focus group discussion with authorities



F) Park boundary with settlements

**AN ASSESSMENT OF HUMAN - WILDLIFE CONFLICT: A CASE
OF
OL DONYO SABUK NATIONAL PARK, MACHAKOS COUNTY**

ELIZABETH A. A. ESIROMO

**A RESEARCH PROJECT REPORT SUBMITTED IN
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
THE DEGREE OF MASTER OF ARTS IN PROJECT PLANNING
AND MANAGEMENT - UNIVERSITY OF NAIROBI**

2012