

**HUMAN PRESENCE AND ENVIRONMENT DEGRADATION OF
NATIONAL PARK.**

A CASE STUDY OF ABERDARE NATIONAL PARK IN KENYA

BY

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DECLARATION

I **ASILAH AYUB** hereby declare that the work contained in this dissertation entitled, **HUMAN PRESENCE AND ENVIRONMENT DEGRADATION OF NATIONAL PARK** with the exception of the acknowledged references, ideas and concerns is my original work and it has never been submitted for fulfilment of the requirement of a degree award or any other education qualification in any institution of learning.

Signed..........

Date.....17th.....May 2010.....

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APPROVAL

This research report entitled, **HUMAN PRESENCE AND ENVIRONMENT DEGRADATION OF NATIONAL PARK. A CASE STUDY OF ABERDARE NATIONAL PARK** is submitted to Kampala International University, School of Engineering and Applied Sciences with my approval as the Supervisor.

Signature.....

Date.....

ORISHABA RWABUGAIRE AMMON

(Supervisor)

DEDICATION

To my mother BEATRICE OSCAR, I love you mum, may God be with you always because he said he will not cast off his people neither forsake his inheritance. And my grandmother EFERI AWINJA ONGECHA, who is my all time role model.

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I thank God in Jesus name for being so good to me.

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Watoto Church Cell ministry C3D 2A, Kampala International University zone, for being my family and place that taught me morality and kept my faith in Christ growing.

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Rumbe, Wamboi chege for being understanding, unselfish and above all for giving me a shoulder to lean on at all times.

LIST OF ACRONYMS

EIA	Environmental Impact Assessment
FFI	Flora Fauna International
G O K	Government of Kenya
IUCN	International Union Conservation of Nature
KWS	Kenya Wildlife Service
NGO	Non Governmental Organisation
NEMA	National Environmental Management Authority
UNEP	United Nation Environment Programme
UNESCO	United Nation Education, Scientific and Cultural organisation

TABLE OF CONTENTS

DECLARATION	i
APPROVAL	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
LIST OF ACRONYMS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF PLATES	ix
ABSTRACT	x
 CHAPTER ONE	 1
1.0 Introduction	1
1.1 Scope of the Study	1
1.1.1 Location	1
1.1.2 Land use	3
1.2 Statement of the problem	3
1.3 Objectives of Study	3
1.3.1 General objective	3
1.3.2 Specific Objectives	3
1.4 Research questions	3
1.5 Purpose of the study	4
1.6 Significance of the study	4
 CHAPTER TWO	 5
LITERATURE REVIEW	5
2.0 Introduction	5
2.1 Communities and their way of life	7
2.2 The link between human activities and environmental resources degradation	8
2.3 The impacts of environment degradation	16
2.4 Measures that are in place to sustainably manage the park	19
2.5 Conceptual framework	22

CHAPTER THREE	23
METHODOLOGY	23
3.0 Introduction	23
3.1 Research Design	23
3.2 Sample Techniques and Size	23
3.3 Data Collection	24
3.3.1 Interviews	24
3.3.2 Questionnaires	24
3.3.3 Observations	24
3.3.4 Focus Group Discussions (FGDs)	24
3.3.5 Using available information and documented evidence	25
3.6 Data Processing and Analysis	25
3.7 Limitation of the study	25
CHAPTER FOUR	26
RESEARCH FINDINGS	26
4.0 Introduction	26
4.1 Communities and their way of life	26
4.2 The link between human activities and environmental resources degradation	28
4.3 Impacts of environment degradation	37
4.4 Measures that are in place to sustainably manage the park	38
CHAPTER FIVE	40
CONCLUSION AND RECOMMENDATION	40
5.0 Summary and Conclusion	40
5.1 Recommendations	40
BIBLIOGRAPHY	45
APPENDICES	47
APPENDIX 1: RESEARCH QUESTIONNAIRE FORMAT	47

LIST OF TABLES

Table 1: Pie chart representation of the communities in the Aberdare region	28
Table 2 : A pie chart showing the number of charcoal kilns	31
Table 3: A pie chart showing number of livestock.....	34

LIST OF PLATES

Plate 1. The Aberdare range.....	26
Plate 2. Charcoal production in a kiln.....	30
Plate 3. Clearing of vegetation and cutting trees respectively.....	32
Plate 4. Crop farming.....	35
Plate 5. A Quarry.....	36
Plate 6. Destruction of charcoal kilns and law enforcement.....	39

ABSTRACT

The Aberdare national park is in the Aberdare range which is in Nyeri, central province in Kenya. The climate is of equatorial type and luxuriant vegetation. Human population is increasing at high rate which raises an alarm to the fragile ecosystem which to some is considered as “waste lands”. The key objective of the study was to identify reasons of resource degradation as influenced by human presence. We all ask ourselves how the future environment will look like when human are developing new ways of development at the expense of the environment and increasing on pollution. Humans are a great threat to the environment and that’s why they need to be examined and given sustainable solution.

The study was both descriptive in design, and it based on primary and secondary data to establish the magnitude of the problem. The primary methods included interview, questionnaire and observation. It gave a chance for ground truthing or counter checking with the secondary data which was obtained from numerous books, newspapers and journals.

The major findings in deterioration of the environment in the area of study were illegal activities like logging, charcoal production, poaching, mining and marijuana planting. Poor policies have pave way for crop farming in the forest, which later has become a problem. Nomadic pastoralist and deforestation also had their share.

The activities cause or initiate climate change, global warming, inadequate rainfall because of the loss of trees which are forever having numerous benefits and loss of bio diversity. At least the problem was not the first time for the community to hear about, they knew about it and they had some measures which they were practising to curb the deterioration

Recommendations were also raised with a purpose to address the weak points which went unmentioned, and as a means of updating the community with the current and best strategy to curb the current dynamism of the topic problem.

CHAPTER ONE

1.0 Introduction

The Republic of Kenya covers an area of approximately 582646 square kilometres. It comprises of 97.8% land and 2.2% water surface. Of the land, 16% can be classified as medium to high potential and the remaining land is mainly arid or semi arid.

Out of the total area of the country, forests and woodland occupy about 6.5%, and national reserve and game parks together account to 10%.

The current country's population is over 39 million people and many of them live in rural areas and derive their live hood from agriculture.

National park is an area set by a nation's government to protect natural beauty, wildlife or other remarkable features. National park also preserve places of cultural, historical or scientific interest, thus it to say that the entire environment is protected such as coral reefs, deserts, grasslands, mountain ranges or rainforests.

Parks serves remarkable purposes in the environment which include, appreciate majestic peaks, sparking lakes, spectacular waterfalls, wild animals n their natural setting, boating, camping, hiking and lastly it helps saves the endangered animals and plants.

Basically governments create national park to guard their national treasures from the harmful effects of farming, hunting, logging, mining and other economic development

1.1 Scope of the Study

1.1.1 Location

The Aberdare national park lies in category II under the IUCN management category and site code 756. The national park covers the higher areas of the Aberdare mountain range of the central Kenya on the equator. The Aberdare national park is found in central province in Kenya and stretches over a wide variety of terrain; it's located about 160kilometers north from Nairobi. The nearby town is Nyeri. And it was established in May 1950

As one of Kenya's five main "water towers", the forests of the Aberdare play a critical role in supporting the country's economy. They are the main source of water for Nairobi. Fifty-five percent of Kenya's electricity is generated by water flowing from the Aberdare and Mt. Kenya. The Range stretches over 125 kilometres from Nyahururu in the North to Limuru in the South and It is the third highest mountain in Kenya, with two main peaks, Oldonyo

Lesatima (also known as Sattima) and Kinangop, which reach, respectively, altitudes of 4,001 and 3,906 meters. The forest belt covers a major part of the range. Most of the forest is gazetted as forest reserves

Climate

Mist and rain occur throughout much of the year with precipitation varying from 1000mm yearly on the north western slope to as much as 3000mm in the south east. Heavy rainfall occurs through most of the year.

Altitude, latitude and longitude

It has an altitude with a minimum of 1829 meters and a maximum of 4001 meters, latitude of 022°48'S [-0.380 degrees]. And longitude of 36 41' 57"E [36.69917 E]

Area

The national park covers an area of 76619 square kilometres which include the Aberdare mountains ranges, mountain peaks, deep v-shape valleys, streams, rivers and waterfall.

Fauna

The weather in the area coupled with the terrain tends to support a wide variety of living things ranging from microscopic organism to large animals. Animals include lion, leopards, baboons, black and white colobus monkey, and the skykes monkey. Some of the rare animals include golden cat, bongo-antelopes that only live in bamboo forest.

Birds like jackson's francolin, sparry hawks, goshawks, eagles, sun bird and plovers are found.

Flora

There is a Aberdare forest, riverine forest along the permanent rivers and the waters that lead to Karuru fall, bamboo vegetation other species in the valleys are predominantly Acacia and Euphorbia candelabrum. The most common species of large trees include Camphor (*Ocotea usambarensis*), Cedar (*Juniperus procera*), Wild Olive (*Olea europaea*), Meru Oak (*Vitex Keniensis*), Podo (*Podocarpus latifolius*), East African Rosewood (*Hagenia abyssinica*), Croton (*Croton macrostachyus*), Mugumo(*Ficus thonningii*). Other species include Apodytes dimidiata, Canthium schimperiana, Elaeodendron buchananii, Ficus eriocarpa, Aspilia mossambicensis, Rhus natalensis, and Newtonia species. Several plants that grow on the rocky hillsides are unique and the exaple is Euphorbia brevitor

1.1.2 Land use

The activities which are carried on include livestock rearing which the animals are mainly of indigenous type. Crop farming is a major practice which both long term and short term crops are planted. This includes maize, Irish potatoes and vegetables which are consumed at household level, sold to the nearby towns of Nyeri and Nairobi for commercial gains. Charcoal burning, logging and lastly tourism closes the main categories of land use.

1.2 Statement of the problem

The population of human swelling at an alarming rate presents a gloomy picture to the resources present in the environment. The degradation of the environment is initiated by the desire of human to fulfil their food needs at the same time to supply the industries with raw materials and earn income in return. The areas around the Aberdare faces threats of water deterioration, extinct of species, pollution of air, desertification, changes in the weather patterns and an increased soil loss and thus infertility rates which may tempt shifting cultivation with its poison strings.

This pose a challenge in the entire environment to sustain itself as it has done in the past million of years, thus the study is aimed at digging deep on the root causes of environment degradation and come up with vital information which will highlight the extend and severeness of the environment degradation in the area.

1.3 Objectives of Study

1.3.1 General objective

To identify reasons of resources degradation as influenced by human presence

1.3.2 Specific Objectives

- I. To establish the communities and their way of life
- II. To describe the link between human activities and environmental resources degradation
- III. To identify the impacts of environment degradation
- IV. To find out any measures that are in place for sustainable management

1.4 Research questions

- I. Which are the communities in the area and their way of living?
- II. What are the activities that enhance environment degradation in the park and its environs?

- III. How severe are the impacts of environment degradation?
- IV. What are the measures in place to sustainably manage the national park?

1.5 Purpose of the study

The current environment is facing threats which guarantee its crushing to a point of no reversing, massive deaths of animal and plant species. National parks are areas which act as bank to species and species which faces extinction pressure.

Therefore, the study is aimed at making valid strong foundation in preserving, protecting and managing the area against the expected overall degradation from the present signs.

1.6 Significance of the study

The area is important in earning the country economic benefits through tourism and agricultural activities, therefore its deterioration will sweep away those gains thus mitigation measures are paramount to free the area. The study will design a road map in further protection and streamline the relationship between human and the environment

The findings will be useful to the local community, government planners, Kenya wildlife services, NGO's and researchers who will need current information. The awareness in the status of the area will make the named above stakeholders to view the environment in an investment perspective where it should be highly valued. And in the implementation bit of sensitizing and empowering, the affected community coming up with the appropriate measures and strategies which will be effective and practical.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is bound to describe the state of the environment in the protected areas in terms of the pressure it faces and how they are being mitigated. Today there are about 1500 national parks which protects about 1.5 million square miles [3.9 million square kilometres] in more than 120 countries in the world. The first national park in earth is the yellow stone national park in the United States, and it was established in 1872. National park concept started to grow gradually and spread throughout the world, and by 1900's national parks proved popular as vital areas where a full range of nation's animals, landscape and plants, consequently it drew the attention of planners to consider protecting the areas because they are important for scientific and the environment cases

According to the national park service, throughout history people have been trying t preserve and protect places which they consider special, but due to the consistent increase in human population those areas faces challenges to collapse because they is need for new room to accommodate them. Thus, the Americans become interested in protecting their nation's wilderness and that's why they pioneered the national park idea.

In 1832, artist George Catlin become one of the first noted Americans to publicly call for the creation of national park, In 1858 writer Henry David Thoreau also promoted the idea. The dream of a great national park became a reality in 1872 when President Ulysses S. Grant signed a law creating Yellow National Park.

Worldwide national parks have been established with a purpose of preserving, protecting and conserving the environment. The state of national park at the global level has been locking horns with the threats of degradation. Only to a have a bigger advantage of suppressing it to the edges and have minimal effects.

In Australia, due to its diverse richness and uniqueness in animal, plants and historical features it has over 500 national parks. Strict protection from any form of degradation is paramount because the national parks are used for scientific research, the largest marine in the world i.e. Great Barrier Reef in south pacific oceans which is home to 400 species of coral, 200 kinds of birds and thousand species of fish and shellfish. Ecotourism is strongly anchored in this country example being Kakadu national park where the Aborigines who are the earliest inhabitants of Australia have leased their land to the federal government with an

understanding the park will be managed to protect and preserve all their traditional way of life including animals and plants.

In North America, Canada, as civilisation was strongly setting in it threatened the biosphere and there was need for its preservation, thus in 1885 the land near Banff, Alberta was protected and become Banff national park. Currently the country has 35 national parks which protect an area of 85000 square miles [220000 kilometres square] from the tempting pressures of overall degradation. They have pioneered in ecosystem approach to park planning; they have divided the country in 70 regions with each having a different combination of land, water, plants and animals. The brain behind the division is for adequate monitoring and proper management. Some elements under protection include rugged peaks, boiling hot springs, grizzly and black bear, big horn sheep, deer, elk, mountain goats and dense vegetation of ever green forest.

In Asia, Japan has 80 national parks; their approach in park protection is mainly based on religion and to a certain percentage recreation. Buddhism and Shintosm stress the people to have harmony with nature and deep respect for living things. Japan being one of the most densely populated in the world with a huge population and a small area, the government decided to work with land owners to save the beauty. And that's why ¼ of Japans national parks are privately owned. The major national park is Fuji-Hakone-Izu which attracts millions of people due to its successive protection.

Argentina which is found in South America has twenty national parks which covers 10000 square miles [26000 kilometres square]. National park of the South was the first national to be established in 1922 with a main aim of preserving geographical features, plants and animals. Other national parks include Nahuel, Huapei, Los Glaciares which are distributed in a manner that the cover all fragile areas country wide.

In Africa, South Africa is the nation with the highest wildlife population which did nature observers to call it the greatest wildlife show on earth. The achievement of such great impact has been traced to the country's national park system which focuses on wildlife protection

Narrowing it down to Kenya, national park areas are gazetted by the government, and KWS has been mandated to monitor, preserve and maintain those areas. Tsavo national park is the largest and most diverse in Kenya, it is divided into east and west both summing to 21000 kilometres square. It has Yatta plateau which is one of the longest in the world, luscious vegetation and animals and it host one of the Seven Wonders of the World. Protection is highly strengthen by the local people actively participating and running an organisation called

Friends Of Tsavo which is uses educational awareness in an effort to fully sink a realm of wildlife conservation among the communities.

2.1 Communities and their way of life

Eldon Kathy 2001, human race is a complex fact by the fact we have the same body organs and blood we end up becoming isolated from certain people by the mode of communication created in languages thus defining our community and our mode of life, and not the colour of skin. The world has got thousands of languages mainly in South America, Asia and Africa. This area has that kind of statistics because most of the individuals speak their native languages and attach high value and esteem in their way of life and are tightly preserving their cultures in all forms. In Europe, it is also a society with variety of languages which distinguish the people's community both the eastern and western Europe, people have different languages and communities and thus defining their interaction with resources available.

Africa is also a rich continent with dozens of communities, and basically majority of them being a society characterised with poverty which stir the usage of resource differently and guided with their culture. Example include the Fulani, San, Hutu, Hausa, zulu, kabyles and Yoruba but to mention few.

Ndege, George Oduor [2001], Kenya was inhabited during historic times by Cushitic, Nilotes and Bantu communities. which melts down to comprise dozen of ethnic groups which include Luhya, Kikuyu, Kamba, Luo, Kalenjin, Maasai, mijikenda and small groups.

The location of Aberdare unlike other upcountry areas where the community in the area are of a single ethnic group, there are a number of ethnic groups in the locality and they absolutely have different culture and how they harvest their livelihood. Kikuyu are the majority in the Aberdare and are traditionally agriculturalists that not only grow millet, beans, maize, potatoes, greens but also rare animals. They are large in population and leading in entire Republic of Kenya with the highest population size. And are a community which do not migrate but as observed, they increase their territory in the area they live if there is room for that.

Jens Fincke[2003] Maasai are an indigenous ethnic group of semi nomadic people who their residence for years have been near the game and wild animals. They are nomadic pastoral who rare cattle, sheep and goats. And have stand resistant to cultural change offered by the government to adopt more sedentary lifestyle. They live on milk, blood and meat. This

society is strongly patriarchal in nature with elder men, at times joined by retired elders who are very influential in deciding most major matters for each maasai group. Male maasai after initiation they are set in groups which are to kill a lion so as to graduate into a moran and thus having an impact in the wild animals. Mostly maasai travel from place to another with their large herd of animals clearing the green grass they find exposing the land to deterioration.

Samburu community, are related to the maasai only they are semi nomadic whose lives revolve around their cows, sheep, goats and camels. Milk is their main stay and sometimes it's mixed with blood, meat is only eaten on special occasions. They make soups from roots and barks and eat vegetables if living in areas where they can be grown. Generally between five and ten families set up encampments for five weeks and then move to new pasture. Adult men care for grazing cattle and women are in charge of obtaining water and gathering firewood. Their houses are of plastered mud and hides, and grass mats stretched over a frame of poles.

Daniel m Kobei [2001] Ogiek community are classified under nilo-hamatic speakers. They remain to date being hunter and gatherer contemporary known as forest dwellers. And from the outer pressures they are facing a challenge of destroying the forest for monetary gains and also being as there neighbouring communities. Rejection and bullying has done most Ogiek to be illiterate because they are unwelcomed in schools and even not recognised by the Kenyan government. This has caused these people to become among the poorest people in Kenya today as a community.

2.2 The link between human activities and environmental resources degradation

According to Nkiruka Chiemelu [2003], Wildlife is a controversial yet beneficial renewable natural resource for Kenya, which its supports ecotourism, subsistence hunting, and cash cropping and marketing. Yet the sustainability and management of this resource is in danger due to poor government policies towards domestic investment in wildlife conservation as well as ineffective polices to alleviate community-wildlife conflict. . In reality, wildlife and wildlife conservation is a hotly debated issue not only for its implementation but also in the traditional role of the community as competitors and victims of the wildlife. Amidst the game reserves, safaris, poaching and illegal ivory and game meat bans, lies a long-standing and fundamental problem of human-wildlife conflict and community exploitation.

KWS 2008, suggest that Opposition to accommodating wildlife on private land has often been wrongly interpreted to mean people have negative attitudes towards wildlife in Kenya creating land owning and use conflict. Yet it is the socio-economic activities including land use practices of people bordering wildlife conservation sites that determine whether or not co-existence is a workable conservation strategy, and argues that wildlife conservation approaches in Kenya must, as a matter of necessity, adapt to changing circumstances in areas surrounding the country's parks and reserves. The consensus amongst most communities is that both people and wildlife are better off if wildlife has its own area in which to live, away from human settlement and activity. This contradicts the idea of eco tourism which is largely campaigned for.

Although some Kenyan researchers and conservationists have maintained that people bordering wildlife conservation sites hold negative attitudes towards wildlife, their observations lack empirical evidence and are largely a vestige of misguided colonial conservation policy in Kenya which depicted people bordering wildlife areas as the greatest threat to the wildlife resource, totally ignoring the fact that such people had lived with and conserved wildlife for hundreds of years. Yet, as the world and the country grows smaller with increased development and growing population as well as the change in government which has taken a more community-centred approach to conservation, human-wildlife conflict has become an issue with shade of gray.

According to winfred nelson 2003, conflicts of policies and compensation, It is clear that consensus among residents in those areas is that wildlife be kept within conservation sites to reduce conflicts with humans. Kenya Wildlife Service policies have often been criticized for being divorced from reality. Indeed, wildlife conservation in Kenya has been plagued by inappropriate policies for quite some time now. This shows how people bordering wildlife conservation sites have often found themselves on the frontier of the organization's policy conflicts and contradictions. Strong support for adequate and prompt compensation is evidence that those neighbouring conservation sites expect relief from costs associated with living with wildlife. Moreover, the Kenya Wildlife Service, without consulting the affected communities, scrapped the compensation scheme for all forms of property damage caused by wildlife some many years ago. The apathy with which the organization treats property loss and damage suffered by local residents is demonstrated by the fact that it no longer records cases of damage or loss of private property caused by wild animals. The corollary of such apathy is that most local residents not longer bother to report such cases. Essentially therefore, the situation translates to mean that individual landowners bordering wildlife

conservation sites maintain, at a personal cost, a resource, which is managed primarily as a national asset. But it's not an asset for them but a liability of constant frustration from conflicts.

Serneels, s. And Lamblin. E.F. [2001] says another conflict common is the loss of livestock by being killed by the wild animals like lions which makes the residents furious and hit back by killing the game animals. Also human at times are attacked by the wild animals and killed, the conflict lightens itself because the wildlife policy seems to favour wild life than humans. Wild animals are commonly blamed for being host to pest and diseases which hit livestock hard, this is common because of the sharing of pasture land and water systems like rivers, streams and open waters. According to the recent estimates by 9 major Wildlife forums in Kenya that include Samburu, Nakuru, Laikipia, Kenya Marine Forum, Machakos Wildlife forum, Taita-Taveta, Narok, Kajiado and Kwale wildlife forums, 70 - 90% of the wildlife roam on private peoples land thus increasing occurrence of both loss of live of human and livestock. And as a matter of fact the government of Kenya has failed to recognize that fact. The voice of these communities have remained locked out as the government often chooses to listen to NGOs that benefit from funding that focuses in the status quo.

Dr. Chris Gakahu asserts that the communities living within the boundaries of the parks in Kenya do not share in as much as 20 percent of the revenue collected. Conflict is exacerbated example by the maasai being dissatisfied about the current level of wildlife benefits being extended to the local community. He enlighten the depth of unsatisfactory revenue conflict in Kenya by giving an example of residents of the Nepalese villages on the slopes of Mt. Everest pocket as much as 60 percent of the trekkers' dollars because they own the cottages, cook the food, and guide trekkers unlike in Amboseli national park which generates more tourists' dollars for KWS than any other parkin the country. Moreover, lodges in Amboseli employ more than 1,500 people of which Amboseli residents constitute fewer than 100 people, put in the most undignified, poorly paid positions. This causes Amboseli residents feel cheated and are increasingly becoming resentful of tourism and conservation programs alike.

According to John Bongaarts, demographers project that the world's human population will double during the next half century from 5.3 billion people in1990 to more than 10 billion in 2050,having in mind currently it stand at over 6 billion, that can be said that the population is increasing by approximately 74 million people each year. This means that the population is increasing but the land is still constant, raising a concern that in order to feed that growing

population human must intensify agricultural practices by opening up virgin lands and other lands which are not under cultivation thus causing grave ecological damage. In the same line, national parks lie in unexploited lands in terms of agriculture and fertile forests. The fertility of them areas causes the nearby communities to continuously exploit the protected areas but basically ruining the park's ecological complexion. Thus, growing population poses some serious environmental threats. More people means less forest, water, soil, and other natural resources, but more waste, pollution, and greenhouse gases. This suggests that population growth is a catalyst in environments deterioration.

Leaster R.Brown states that population is an important source of development, yet it is a major source of environmental degradation when it exceeds the threshold limits of the support systems. Unless the relationship between the multiplying population and the life support system can be stabilized, development programs, howsoever, innovative are not likely to yield desired results. Population impacts on the environment primarily through the use of natural resources and production of wastes and is associated with environmental stresses like loss of biodiversity, air and water pollution and increased pressure on arable land.

Therefore, the basic needs of the people to be satisfied translate to over pumping and over consuming of the available environmental resources. The rate at which the resources is utilised clearly shows we are consuming at the expense of the future generation of human and the entire living things species. That's why we witness the hide and seek sort of play between parks management with poachers, illegal lumbering and squatters.

John Harte 2007 asserts that the environmental consequences of increasing human population size are dynamic and nonlinear, not passive and linear. The role of feedbacks, thresholds, and synergies in the interaction of population size and the environment are evident, with examples drawn from climate change, acid deposition, land use, soil degradation, are environmental issues resulting from human practices which are unsustainable and mind sets which never cares about the future of the whole environment components. The widely-assumed notion that environmental degradation grows in proportion to population size, assuming fixed per capita consumption and fixed modes of production, is shown to be overly optimistic. In particular, feedbacks, thresholds, and synergies generally amplify risk, causing degradation to grow disproportionately faster than growth in population size.

Lori Hunter [2000], In terms of population size, there is a complex relationship existing between population size and environmental changes. Moreover, as global population

continues to grow, limits on such global resources as arable land, potable water, forests, and fisheries have come into sharper focus. Decreasing farmland and losing of soil fertility contributes to growing concern of the limits to global food production and also to sustain the local communities. The desire to combat food shortages leads to individuals to be tempted to exploit protected areas resources and at the long run using it unsustainably causing the resources to become poor in quality and thus deteriorated.

In context of Population distribution, the ways in which population are distributed across the country affect negatively the environment. It does so in this manner, like in Kenya where national parks are found population may concentrate in those areas because of the opportunities that lies there and this causes urbanisation which comes with its developments of infrastructure, pollution in all resources and more demands from resources in the environment causing them to shrink away changing its composition and consequently deterioration.

Butynski [1999] Population composition can also have an effect on the environment degradation because different population subgroups behave differently. Within countries and across households, the relationship between income and environmental pressure is evident in terms of economic status of the population. Environmental pressures can be greatest at the lowest and highest income levels. Poverty can contribute to unsustainable levels of resource use as a means of meeting short-term subsistence needs. Most of the communities that are beside national parks are mostly poor and thus they will end up using the resources found in the protected area to make a living, and negatively affecting the environment. Furthermore, higher levels of income tend to correlate with disproportionate consumption of energy and production of more waste.

UNESCO [2002], a growing population poses some serious environmental threats. More people means less forest, water, soil, and other natural resources, but more waste, pollution, and greenhouse gases. The cultures and traditional values attached to the environment by the natives of that growing population around the national park determines the ultimate fate of the environmental degradation and its magnitude. The surrounding communities when they uphold and practice to value the resources in the environment by using them sustainably they could mitigate the percentage of degradation, but it happens that areas around Aberdare, mt. Kenya region, Amboseli and kitengela the growing population have cultures which degrades the environment, example the maasai male after circumcision they must kill a lion so as to seal the initiation and become a moran [warrior].

Muchena [2008] says the demands on the land, water, plants and animals for economic development and pressures from a burgeoning population are leading to unprecedented environment changes. It is the greedy of people to satisfy themselves that makes the environment fail to meet the need of everything and instead struggles to survive amidst thorns which it encounters and when it reach the pick exploitation in shrinks. The exploitation activities in those fragile areas when are practiced in long term, end up to become a catastrophe because recovery and reclaiming will be next to impossible.

Gideon N. Gathaara [1999] says illegal logging, which entails forest destruction of indigenous trees in large scale is at a high scale. The felling of trees in these ecological sensitive areas causes many animal and bird species to migrate to other places making the deserted areas poor in diversity. When the ground is left bare and the sun hits the ground directly it increases evaporation thus the soils loss moisture, consequently the land is subjected to desertification. All the harvesting of trees in the Aberdare is banned but still numerous lumbering activities is continuously evident which wholly encourages degradation of the biosphere and lithosphere.

Ciesla w.m [2009] observes that logging is deforestation, forest ecosystems are extremely efficient systems for both holding and recycling nutrients, and absorbing and holding water. Forest could prove to be a close ally as global warming progress, forests play a major in sequestering atmospheric carbons, in the slopes of the Aberdare where soil quality is poor had the logging been minimised the litters of the trees could turn to humus and at the same time the roots holds the soil tight and avoids soil structure from destruction. Thus because forest protect and maintain the porous humus rich top soil, converting the land from forest to either grass land because of logging doubles the amount of surface run off and the leaching of nutrients in many folds.

Moreover, charcoal production is a booming activity which negatively affects the atmosphere through the production of the toxic smoke which comes from the burning kilns. The raw material which happens to be trees makes charcoal burning a double edge sword which is tearing the environment apart in pieces. The available market for charcoal as fuel in Nyeri and Nairobi increases the producers to be more cunning in production so to meet the demands. Also the entire rural homes use wood as fuel with poor methods which don't save energy, translating to more use of wood and hence felling of more trees.

Muchena [2008] points out that soil erosion follows any time soil is bare and exposed to the elements of erosion. The removal may be slow and subtle as soil is gradually swept away or may be dramatic as gullies are washed away in single storm. Much worse is what occurs when the raindrops hits the exposed land. The pounding raindrops on bare ground makes water unable to infiltrate because the top soil becomes saturated with water and slides as muddy mass into water ways leaving barren land. Eroded sediments carried into rivers and streams fill reservoir, kill fish and generally upset the ecosystem of streams, rivers, bays and estuaries.

UNEP [2006] claims the southern, eastern and western slopes of the Aberdare ranges have tropical rainforest, as observed soil erosion when experienced in such areas it hits hard because the areas are subject to heavy rains and leaching for millennia. Soils of the equatorial region are oxisols and are notoriously lacking nutrients since the parent materials have been leached and the soils being washed away by erosion. When soil erosion occurs, the thin layer of humus with nutrients readily washes away only for the nutrient-poor clayey subsoil which is lame to support plants is left.

Joanne Burkholder, water is polluted by the by products of otherwise worthy and essential activities, unlike point source pollution where its source is known like factories, sewage systems, power plants, underground coal mines and oil wells. Water pollution in the Aberdare is polluted by non-point source which is evident and prominent only a few cases of point pollution is seen where animals when taken to quench thirst excrete in the water and traditional methods of fishing which they use a certain grinded plant which they mix with water and pour to the water body and is poisonous to fish which makes the fish to die and float.

Coleridge [2002] the sediments from erosion and nutrient they have encourages eutrophication with its setback in water quality and reliability. The nutrient enrichment allows rapid growth and multiplication of phytoplankton and increasing turbidity of the water. The increasing turbidity shades out the submerged aquatic vegetation because of an obvious loss of food, habitat and dissolved oxygen from their photosynthesis. Dead phytoplankton settle down on the bottom of water which in turn supports an abundance of decomposers mainly bacteria. Explosive growth of bacteria creates an additional for dissolved oxygen as they consume oxygen in their respiration. The result is the depletion of dissolved oxygen with the consequent suffocation of fish and other living organisms in water

also some species of phytoplankton causes foul taste and secrete toxins into the water and be injurious to human health who are part of the biosphere.

World Resource Institute asserts that overgrazing occurs when many animals graze too long and exceed carrying capacity of grassland area. Grasslands that receive too little rain or forest land with grass are suitable for grazing animals. Although pastoralist in the Aberdare are covered within the forestry Act, subsistence grazing proved to be a liability since their herds are increasing direct competition with an increasingly beleaguered wildlife population. This causes a constant fleeing of wild animals from that area. As pasture production decreases or fails to keep up with consumption, the land becomes barren and lacks vegetative cover and diversity since some insects and birds depends on such extinct plant species. Most people in the region practice livestock rearing thus overgrazing is rampant, encroaches and profoundly upset the dynamics of many ecosystems, reducing biodiversity and altering feeding and breeding patterns of birds, small mammals and reptiles.

The hooves of the large numbers of animals trampling on land combat the soil diminishing its capacity to hold water, this when combined with prolonged drought it catapult desertification hence encourages invasion of undesired woody shrubs such as mesquite and prickly cactus.

Agriculture society of Kenya [2006] reports that crop farming as an agriculture practice by farmers in fragile and protected areas contributes to unwanted influence in the environment. They points out that most farmers use inorganic fertilizers which tends to need a lot of water and at the long run makes the soil infertile and unable to flourish plant growth and ultimately the fertilisers find their ways to water bodies changing that ecosystem. Irrigation of crops not only causes inadequate water for the aquatic life but also increases Salinization, siltation is also common with the fact that farmers break the soil for planting but as they are swept away downstream they decreases water levels and choke water living things causing their death.

More so, because the location has huge track of lands which are virgin squatters practice shifting cultivation. They use fire as a means of clearing land which causes death to many species of both plants and animals, migrating of animals and their constant shifting cause degradation to every area they occupy since they drain all the resources in that area before leaving.

FFI [2009] asserts that poaching in the Amboseli, Mt. Kenya, Aberdare and Tsavo is a menace and at times the poachers collaborate with the game warders. They insist that it is clear illegal poaching is wiping away the beauty of national park since poachers have

improved their way of hunting and also the high demanding and rewarding game products are in the market.

2.3 The impacts of environment degradation

As the century begins, natural resources are under increasing pressure, threatening public health and development. Water shortages, soil exhaustion, loss of forests, air and water pollution, and degradation of coastlines afflict many areas. As the world's population grows, improving living standards without destroying the environment is a global challenge. Most developed economies currently consume resources much faster than they can regenerate. Most developing countries with rapid population growth face the urgent need to improve living standards. As we humans exploit nature to meet present needs, are we destroying resources needed for the future? How can we deal with the impacts?

Postel .S.1997, In the global overview the land area on earth covers a total of more than 140 million kilometres square and the total water on is about 1400 million cubic kilometres of which 2.5 percent is freshwater. Resources in the environment are not spared by man and exploitation increases by every new day, parts of china, India, former Soviet Union and Western U.S.A are experiencing decline in water tables and much of water use in irrigation farming resulting in lower sea levels, inadequate moisture in the atmosphere and the whole imbalance in the water cycle.

FAO[200 1b]Land usage in the Alberta and Saskatchewan in North America to meet the food demands it has increased soil erosion, use of fertilizers and herbicides which are having an impact in the environment. Forest clearing in South America in the Amazon for economic development has brought changes in climate of countries like Brazil where they have reported landslides, flooding and droughts in Colombia. This results as an ignorance to care for the resource of vegetation and land. In china Asia, the blinds eye given to the environment has resulted in acceleration of melting of ice at a high rate which has now become a concern to the Chinese government because they fear the worst may follow.

Vanclay J, Bruner,Gullison [2001] Africa feels the knock of the impacts of the environment rooting from all sides, this is to mean the degradation especially of the atmosphere it is highly influenced by the developed countries. In the continent there is a run for industrialisation and developments which also encourages more environmental crisis and the impacts are majorly revealed by global warming and in particular changes in the weather patterns, mudslides from

heavy rains, drought and flooding. Now it is obvious that the international organisation present in the continent that are endeavoured to mitigate environmental collapse shows the impacts are felt and its reversal is worthy, or if not, the entire world suffers severely.

Public health deterioration which arises from unclean water, alongside sanitation kills 12 million people each year mostly from developing countries. This implies that the unsustainable use of water resource result to those deaths. Most communities use the water for all household needs and the sharing of the water source with animals contribute largely on the degradation of the waters.

Dudley 2002. Loss of biological diversity on an unprecedented scale, the earth's biological diversity is crucial to the continued vitality of agriculture and medicine and perhaps even to life on earth itself. Yet human activities are pushing many thousands of plant and animal species into extinction. Two of every three species is estimated to be in decline. Although tropical forests cover only six percent of Earth's land surface, they happen to contain between 70% and 90% of all of the world's species. As a result of deforestation, we are losing between 50 and 100 animal and plant species each day. Inevitably, the loss of species entails a loss of genetic resources. Many of these species now facing the possibility of extinction are of enormous potential to humans in many areas; especially medicine. As of 1991, over 25% of the world's pharmaceutical products were derived from tropical plants and even now the trend still remain but at a different percentage. By contributing to the extinction of multiple species of plants and animals, we might be destroying the cures for many of the diseases that plague the human race today.

The world's forests, particularly tropical rainforests, are home to over 10 million members of the "last surviving intimately resource-based cultures". Given the importance of forest products to the daily lives of forest peoples, the destruction of tropical forests entails the destruction of tribal populations as a whole. Even in the rare cases when forest dwellers are compensated for this loss, the changes visited upon their cultures by the inexorable expansion of industrial culture are devastating." Without a doubt, deforestation has had a profound effect on cultural diversity throughout the forest regions, and ultimately, the world.

David w, Flooding is a quite serious consequence of deforestation. Clearing the forest dramatically increases the surface run-off from rainfall, mainly because a greater proportion of the rain reaches the ground due to a lack of vegetation which would suck up the excess rainfall. Tropical forests can receive as much rain in an hour as London would expect in a wet

month, and a single storm has been measured as removing 185 tonnes of topsoil per hectare. In tropical regions where the forests are dense, flooding is not as serious a problem because there is vegetation to absorb the rainfall. It is in areas where there is little vegetation that there is a problem. Hence, to avoid the disastrous effects of flooding, tropical forests need to remain dense and lush. But the attachment attached to these lands by the indigenous people gives little hope to avoid flooding which also comes with its negative impacts when it hits an area.

Climate change cannot go unmentioned as impact arising from the rampant utilisation of resources. Earth has an atmosphere which contains a variety of gases, all in a delicate balance, to ensure life on Earth. One of these gases in Earth's atmosphere is carbon dioxide; a gas which helps moderate heat loss to outer space. Insulating gases such as carbon dioxide are called "greenhouse gasses because their function is much like that of the glass in a greenhouse: they allow solar heat into the system, but discourage its escape". Other greenhouse gases include methane, chlorofluorocarbons, nitrous oxide, and ozone. If there are additional greenhouse gases, there will be a gradual increase in temperature on Earth's surface. This could lead to changes in weather patterns, sea levels, and other cycles in nature that directly affect life on Earth.

The process of greenhouse gas increase is quite simple. Carbon dioxide levels increase for a number of reasons; but one of the main factors contributing to the increase of carbon levels is decay of woody material. The only way to help moderate the levels of carbon dioxide in the atmosphere is through plant life. Alive plants and trees absorb the carbon dioxide from decaying plants and trees. With a decrease in trees and plant life (due to inappropriate harvesting of resources) it is much harder to moderate these levels. Ultimately, the amount of carbon will increase due to a lack of plant life present to keep the carbon dioxide levels in check. This whole process leads to an "albedo effect which reflects more heat and light back into the atmosphere than would be the case if the sun shone on green trees". The bottom line is that the increase in the carbon level and other greenhouse gas levels into the atmosphere leads to an increase in temperature, and eventually a change in climate and weather.

National Geographic Magazine 2002, Decrease in food supply and increasing hunger, the droughts coupled with poor weather modified by the human activities leads to agricultural production not achievable to feed a large population. Most people end up lacking food and starving others even die. Competition for food which is available heightens more conflicts and creates an atmosphere of political unrest jeopardizing public health by using unclean

water especially to individuals who share a water point with animals and also using it for all household needs, and releases it back to the water source which another community downstream uses it. Pollution from burning bushes and charcoal increases chances of acid rain and also chronic respiratory illness. Air pollution kills nearly three million people and also 12 million people die each year mostly in developing countries because of poor sanitation and unclean water

The supply of freshwater is finite, but demand is soaring as population grows and use per capita rises. Human activities affect the distribution, quality of water resources both surface and ground. Both point and non point sources increases the inability to find clean and fresh water. The absence of water limits irrigation and also increase in the cost of production mainly to agricultural based industries and food producing industries and this ultimately affects the country's economy growth, stability and straining in the budget to meet other developmental goals in all sectors.

2.4 Measures that are in place to sustainably manage the park

Kidd and Pimentel [1992], the concept of resource management is an approach that offer parallel and links closely with the concept of ecosystem management. Resource management is the synthesis of resource management systems fragments into a functional whole. Thus, the objective of resource management is to bring all of the management into a planning and implementation that effectively sustains sustainable resources outputs than traditional fragmented approach to management. The approaches are designed and operated in a way that all parts work together to enhance productivity and sustainability.

G.O.K ministry of Health 2009, Fertility rates remain high not because people are behaving irrationally, but because the socio cultural climate in which they live favours high fertility and often lack of contraceptive, this increases pressure to the environmental resources to feed the population. Further more, it is understood that poverty [which arises when the large population lacks employment], environmental degradation and that high fertility drive one another in a vicious cycle. Increment in population density, it leads to greater depletion of rural communities' resources like fuel wood, water and land which encourages couples to have more children to help gather the limited resources. The government has initiative which offers free contraceptive to the rural women, free pre and post natal care which is aimed to check on fertility rate so as to contain the population growth and its composition.

Prof. Sam Onger [2009] says that every child in Kenya is entitled to receive and access primary level education even to the deepest rural village. The improving of literacy and educating both sexes will empower power in the entire community because an educated populace is an important component of 'wealth' of a nation. Numerous NGO's are in the grassroots working tirelessly in sensitizing the communities and making them aware in the matters which concerns resource management and the benefit of conserving their valuable environment. The knowledge cemented to them has brain wash their perspective towards the national park as not an island and waste lands but an asset, they have a choice to unsustainably exploit resources to benefit at a short time and suffer a long time or to use the taught education which mainly put lots of emphasis on ecotourism, by weighing the choices the idea of ecotourism is well received only time will make it reach its apex.

Ministry of Agriculture, in a bid to salvage degradation caused by agriculture practices farmers are encouraged in low-input agriculture also called organic farming or agro ecology. This method of food production uses ecological knowledge to increase yields, control pests and build soil fertility so as to tackle the issues of poor farming methods. To avoid using fertilizers the communities have/are embracing the use of manure and tilled-in crop residues to help maintain and build soil fertility by increasing its carbon content and also reduce runoff

The ministry carried out research on crop species which will thrive well in the region using the low input and they have been numerous demonstration projects including in the Nyeri agricultural show. The farmers got the chance to practically see the yields, access the seeds and enlighten more thus reducing the over pumping of the environment to have sufficient yields. Also the revenues collected from the national park there is a percentage farmers receive to subsidize farming, decreasing more exploitation of the land.

Muchena, says soil conservation involves using ways to reduce soil erosion and restore soil fertility where land as resource has been degraded. Conservation tillage isn't practiced in the region but terracing is evident, land is converted into a series of broad, nearly level terraces that run across the land contour. Contour farming in the slopes of the ranges provide farmers with sustaining yields without deterioration. Some farmers practice mixed cropping prefers strip cropping which they alternate maize and Irish potatoes in strips of rows. In case of soil erosion, the cover crop traps the soil that erodes from the row crop and reduces runoff.

Alley cropping is dominant in which several crops planted together between trees that can provide fuel wood and or fruits. The trees provide shade which reduces water loss by evaporation and help retain and slowly releases soil moisture.

Deborah Nightingale, policies play a crucial role in determining resources is conserved. Grazing in the forest areas and grass land is accepted by the law only pastoralists tend to breach the carrying capacity set in the law. The adhering of the law and being enforced by game warders' limits overgrazing since the number of livestock and duration of their grazing in a given area is controlled.

NEMA, development projects are mushrooming in a bid to improve the entire infrastructure and the threat of pollution is shouting. KWS being the body responsible in the area has consistently consult NEMA in carrying out E.I.A to approve the projects. Competence of NEMA has been promising and degradation of all resource in the environment has been minimal amidst the urbanisation and modernisation.

2.5 Conceptual framework



Human activities directly affect the environment and make it lose its ability to meet the demand of all flora and fauna. This causes handicaps in the economy which raises health concerns like malnutrition and conflicts arises and enmity. This cements the position of degradation to our environment

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter is intended to explain methods through which data was collected, analysed and presented. The accurate techniques and methods which gave the needed and desired data from samples in the community are the ones which later on will be identified.

3.1 Research Design

The descriptive research design was used because it involves getting facts on the phenomena and describing the existing situation and reporting. And, where it is not possible to test and measure the large number of sample. Moreover, it has no control of the variables

3.2 Sample Techniques and Size

The best technique used in the area was the random sampling technique because it gave all the samples of the same size with equal probability of being selected.

Determining of the sample size was done as follows;

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

n_0 = estimated sample size

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} = \frac{80}{1 + \frac{[80-1]}{1300}}$$

$$n = \frac{80}{1+0.060} = 75.47$$

$$n = 75$$

n = the sample size

N = the population size

3.3 Data Collection

3.3.1 Interviews

This research mainly uses face-to-face interviews, which provided a fast hand experience and personal contact with interviewees. Interviews also provided high capability for facial validation which was instrumental in gaining insight into various reasons for certain responses from participants.

3.3.2 Questionnaires

Questionnaire were used because these gave the respondents a chance to objectively give their honest opinions without any influence of my presence or feeling timid, and it enabled data to be collected over a large area within a limited time. The questionnaire also enabled the respondents to fill them at their convenient time which will reduce bias and incomplete responses attributed to lack of time. Questionnaires were chosen since they were more cost effective than conducting interviews.

3.3.3 Observations

Observations were like ground truthing and a chance to validate responses from the respondents with what is actually on the ground on a first hand basis. Through observation it created room for recording image data inform of photographs which meant a lot in the extent of the problems.

3.3.4 Focus Group Discussions (FGDs)

In this session groups from the different communities and other relevant stakeholders in the protected area were chosen for response considering the issues raise through the research objectives. The research study used focus group discussion guide to collect data from the knowledgeable respondents. This guided and controlled the interview in order to facilitate data collection. The FGDs performed the following functions; they examined the data derived from other data collection methods, devised the appropriate data presentation techniques, assessed the relevance of the data included in the final study findings and got guided on the proper ways of general report writing procedure conclusion, recommendation of study findings.

3.3.5 Using available information and documented evidence

This is basically materials which contains the information about the area of study. The information present from past research, and from different individuals which are relevant and from reliable source.

3.6 Data Processing and Analysis

Two categories are important and reliable in this process, this include exploratory and confirmatory methods. Exploratory method is typically used to discover what the data seem to be saying, at times this method involve simply computing averages or percentages and displaying the data on the pie chart. While confirmatory method use ideas from probability theory in an attempt to answer specific questions and often include calculation. To sum up, data was sorted and coded manually, quantitative and qualitative data analysis were used as well.

3.7 Limitation of the study

The major problem was that the community were reluctant to give information with the basis that they fear to be identified as the ones who gave the information if anything might happen, they might be considered traitor of the communities.

The other concern was the individual demanded payment for response and going through the different communities. They did like that because they thought that the research was sponsored and the government has a hand in it.

CHAPTER FOUR

RESEARCH FINDINGS

4.0 Introduction

Each dawning day to our environment means a more complex problem is induced than the existing ones, in Aberdare the same can't go unmentioned. Thus, this chapter present findings which are found from the research in the ground which is tackling the different problems as guided by the study objectives.

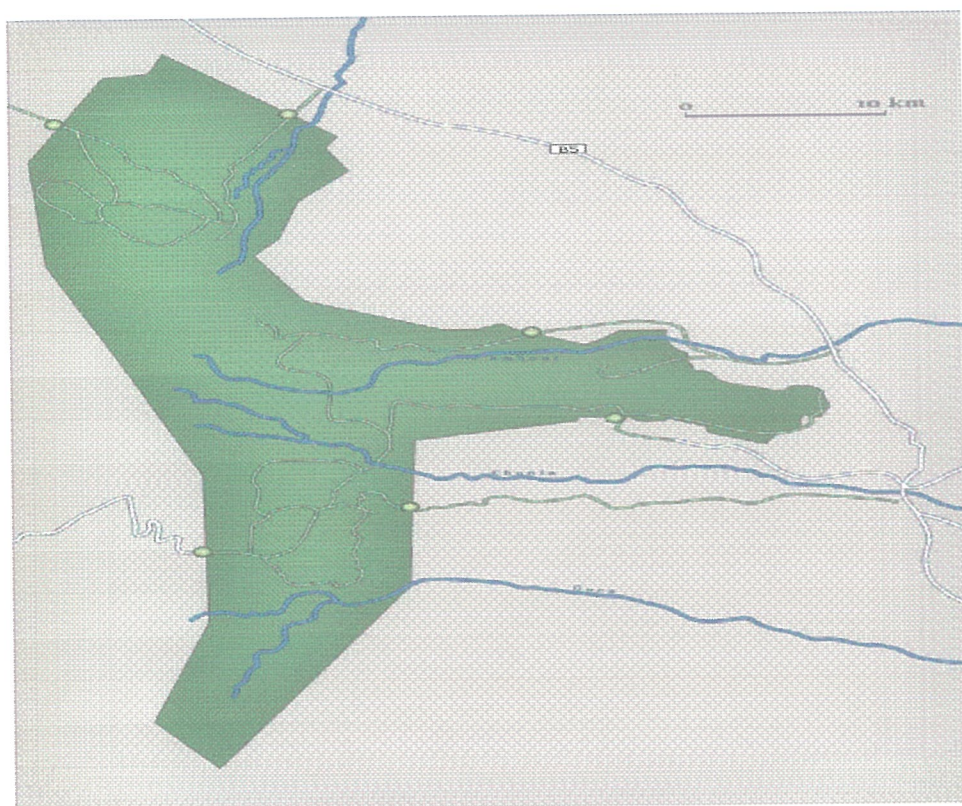


Plate 1. The Aberdare range

[Source: UNEP, August 2003]

4.1 Communities and their way of life

Human communities are increasing and to date there is very limited approach we can take to reduce human population increment, and us being with different cultures and ways of feeding equates to the way we tend to associate with environmental media and usage at a whole. In the area under study the communities which were present include;

Maasai [language they speak is called Maa] – I was given a brief history of them and how they found themselves in the Aberdare, they originated from the lower Nile Valley north of Lake Turkana and began migrated south and covered most of the Great Rift Valley, then the

British evicted them from where they were concentrated and confining most of them to Kajiado and a few remained scattered including the ones present in the Aberdare among other areas.

Their lifestyle wholly centres on pastoralism which reveals to us that they depend on the natural resource [grass and water] to make ends meet and not confined in one area but on a wide range since they move from place to place. Weather changes and inadequacy of their main resource are the major component which makes the community to mobile.

They value large number of children and take it as wealth; this means that they have a high fertility and population growth which is a noose to the environment. In connection to that, they value large herds which are also a problem when it interacts with the environment.

Their diet consists of meat, milk and blood from their livestock with maize meal. Most people think that their staple food is meat, they are wrong because they eat it irregularly. They however, have a shift in their lifestyle to more crop planting practices. This is because they have learn that from their neighbours, their small size plots are small to accommodate herds of animals and also the ever tightening rules in the national park which is discouraging pastoralism.

Samburu [language they speak is called samburu] – they are related to the maasai only for them they live just above the equator where mount Kenya merge with the northern desert and that's there home. Those who were found in the Aberdare said that they migrated there when the weather condition had been extremely bad for them and their animals in the other side.

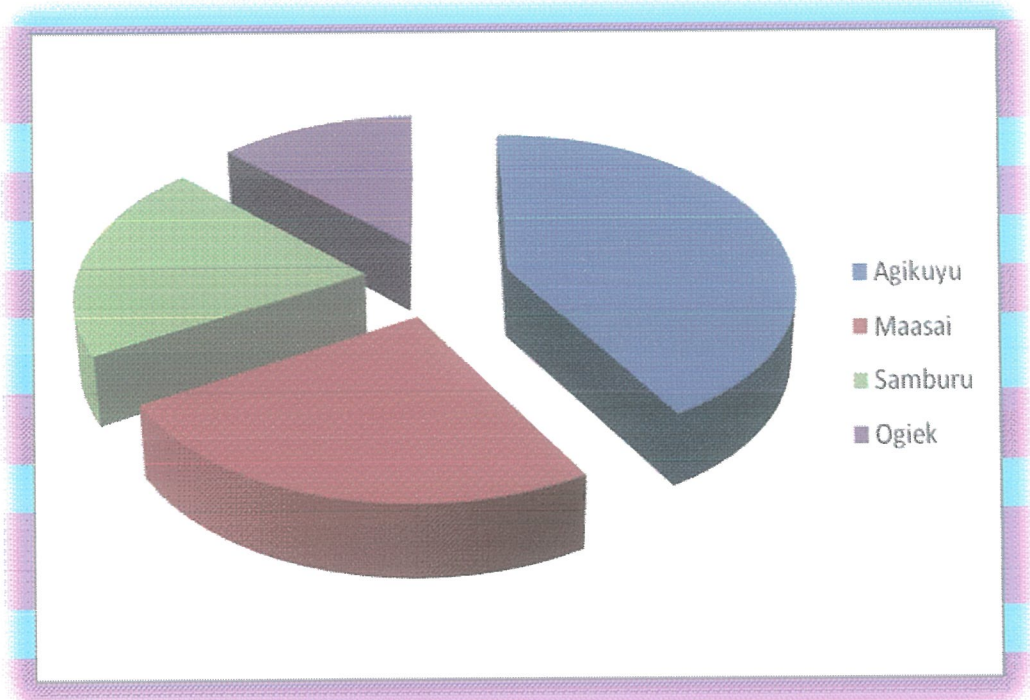
They are semi nomadic pastoralist whose lives revolve around cows, sheep, goats and camel. Like many communities, their women are in charge of obtaining water and gather firewood. They are more adamant than their cousin the maasai on the need for change, they use traditional herbs as medicine, governed in traditional way and above all they are very violent which means they use any land to graze animals and if they face any resistant they solve in a violent manner.

Although linguists have found it hard to distinguish them from the maasai, the samburu themselves agree they differ from the maasai

Ogiek [language they speak is called ogiek] - they classify themselves as nilo hamatic speakers, they are the poorest people in Kenya and as it was identified they still have a lifestyle of hunting and gathering, they said that forest is the only place they can call home, in the Aberdare especially in the area of interest are the minority community.

Agikuyu [language they speak is called kikuyu]- they are a Bantu speaking people who make up the largest tribal group in the Aberdare [which is located in the central province home of to this large community in Kenya]. They are traditionally an agricultural practising people who plant variety of crops. Their fertility rate is high and that's a factor which makes them to expand their territory so as to accommodate the high population needs, most families have an average of 4 children, and they depend mostly in the agriculture venture because apart from the tourism industry, there is no any other employment ground for them who are more literate than their neighbours.

Table 1: Pie chart representation of the communities in the Aberdare region



[Source: Population census, 2009]

4.2 The link between human activities and environmental resources degradation

According to the World Bank the main source of pressures generating problems of environmental degradation is thought to lie in rapid human activities and population growth. This pressures come from the widespread use of natural resource intensive technologies; ineffective regulation of common property resources; land tenure systems that do not secure long terms rights to land use; and policies that distort the prices of non-renewable resources [World Bank 1991, in Biot et al. (1995)]. The same case was noted in the study and revealed that human can be ignorant to the threat they pose the environment in, what they keep in mind is how they can harvest more, infact in the shortest time possible.

Census [2009] figures indicated that Nyeri population has increased in all its constituencies and they projected the trend will still rise. This is the actual picture in the ground of study where families had large numbers and marriages are encouraged immediately after initiation. All the communities said that after the rite of passage the individuals are ready to begin their families. This means that early marriages are all over and hence child bearing starts at early age and thus population increases highly. The location of the area limits other economic adventures and most people are unemployed and poverty is evident. Thus the poor population cause degradation of resources because it is often the problems of population, poverty and environment are intertwined.

90% of the respondents said that the poor do not wilfully degrade the environment but often lack the resources to avoid degrading their environment. The very poor are struggling at the edge of day to day survival. It is not that the poor have inherently short horizons, poor communities often have a strong ethic of stewardship in managing their traditional lands. But their fragile and limited resources, their often poorly defined property rights, and their limited access to credit and insurance markets prevent them from investing as much as they should in environmental protection.

Environmental degradation therefore can affect the health and nutrition status of the poor and lower their productivity. This has happens both directly through, lower yields per unit of labour or land because of reduced soil quality, and indirectly through the reduced physical capacity of labour to produce because of malnutrition and poor health. In cases where the poor are healthy labour productivity is still low due to increased time being allocated to less-productive activities such as fuel wood collection and away from agriculture and other income generating activities. Where the poor depend on biomass fuel and confront increasing fuel wood scarcity they often shift to using animal dung, fodder and crop residues for fuel. The quantities of these materials that are returned to the soil are thus reduced and its fertility declines. Non-replenishment of soil nutrients leads to soil exhaustion as fuel wood supplies diminish and animal manure is increasingly used as a fuel substitute. Poverty forces a trade-off between the immediate demands for fuel for cooking and heating and manure for the land.

The combination of poverty and drought has serious environmental consequences that threaten future agricultural productivity and the conservation of natural resources. Poor people are induced to scavenge more intensively during droughts, seeking out wood and other organic fuels, wild life and edible plants, both to eat and to sell. This scavenging aggravates deforestation and damage to watersheds and soil already under stress from the drought.

Illegal logging and charcoal production has changed the appearance of the protected area and literally look like unshaven head infested with ring worms and fresh wounds. The Rhino Ark, the Kenya Forest Working Group and the Kenya Wildlife Service conducted an aerial survey which was funded by UNEP and the European Union [August 2002] revealed shocking pictures of the extent to which the forest resource is being abused and large chunks of virgin forest have been wipe out to illegal logging and raw materials for the charcoal kilns.

I found out that most trees harvested are of indigenous type, camphor and cedar. The trees are for sale, fuel wood, burning charcoal, which is a large scale commercial venture for the natives.



Plate 2. Charcoal production in a kiln

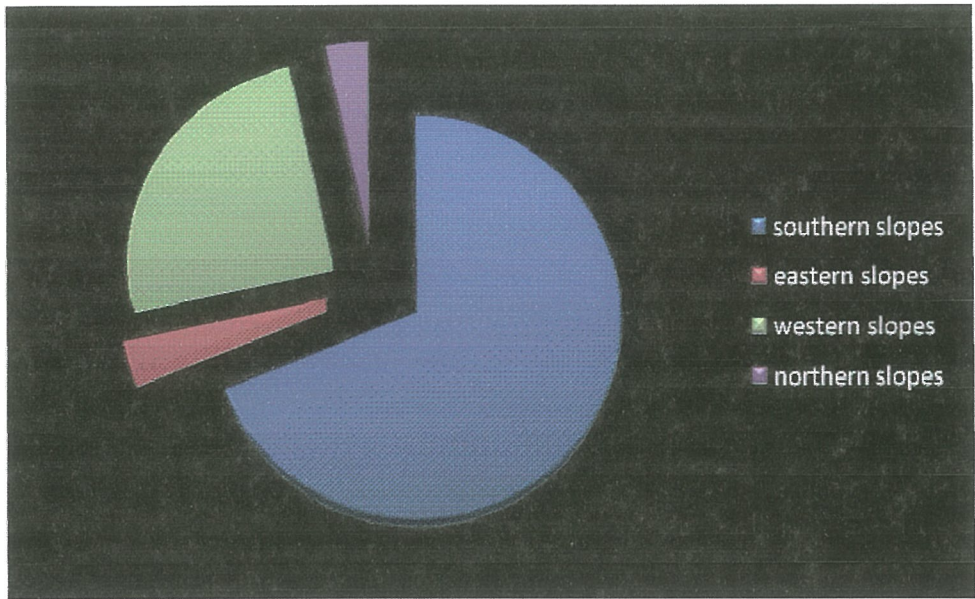
[Source: N. Livana and A. Asilah, December 2009]

Although there is tight security guarding the protected area, 75% of the respondents said that the people gain access to the forest through unmanned gates, digging trenches underneath the fence and short-circuiting the electric fence and use special power saw which doesn't make noise. They fell trees and ship them to the nearby private lands. Moreover, charcoal burning has been causing a lot of risk and times results in forest fires which brings grave to the entire ecosystem.

Logging of indigenous trees has been banned since the 1986 under the Presidential Ban on the Exploitation of Indigenous Forests, it is no longer effective through the observed magnitude of fresh fell down trees. Licenses were granted on exceptional basis but no such licenses have been issued recently. This clarify that the trees being harvested are illegally done.

The below graph sum the number of charcoal kiln recorded which are the engines that produce charcoal from the fell down trees. Not all trees cut are converted into charcoal, also some tree barks are used in the medicine industry and individuals use the chance to smuggle the medicinal plants to where the demand is.

Table 2 : A pie chart showing the number of charcoal kilns



[Source: KWS, Kenya Forest Working Group and Rhino Ark, 2003]

Killing of wildlife with reasons of conflict between the communities and the wild animals which destroy their crops, attack domesticated animals, act as vectors for diseases and competition in water and pasture results into conflicts. Conflicts have been too persistent in this area and it has been an issue which makes any development in environmental conservation and protection to be stagnant, this is an issue which 99% of the people commented on. This is to say, constant clash between community members and the wild life has by far questioned the future of wild animals like lions, elephants to name a few. Although the wild animals attack food crops and livestock, they should not be killed in return as it is being done. Daily Nation [2009] points out how communities for years have struggled with the elephants which regularly invade their land and destroy their crops. Also they point out

how the Maasai community have been killing lions which they say they have been eating their livestock. All this revenge strategy is not sweet at all to the ecosystem and jeopardizes the biosphere composition.

Clearing of virgin vegetation to create room for economic growth and development is among the reason why the area of study has of recently increased in deterioration. Samburu communities are changing from the nomadic lifestyle and have started also to grow crops. This means that more vegetative land is being cleared to meet the ever increasing need for farms. Habitat loss is the greatest threat to the biodiversity, most species are adapted to certain condition and any change in their environment may lead to their demise. Nkiruka Chiemelu [2004] commented that immense trend in place which all habitats are being cleared because the third world countries are on the race to develop and feed its population, it's being selfish to other species which with time they are going to be wiped out due to lack of favourable condition to nourish.



Plate 3. Clearing of vegetation and cutting trees respectively

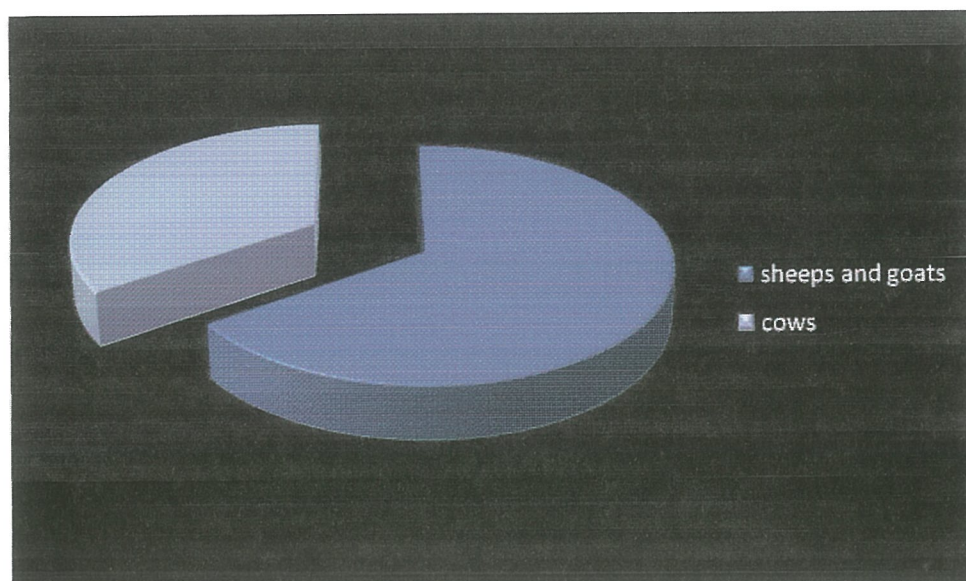
[Source: Ammon, 2010]

Grazing in forests, as a matter of practice, is provided for in the Forest Act (Cap. 385). As a management tool, this practice enables suppression of weeds in forest plantations, facilitating faster growth of the young trees, and reduces biomass that could otherwise pose fire hazards in the dry seasons. However, grazing would be detrimental in young plantations, particularly

during the first three to four years, depending on the site. As a rule, goats are not allowed in forests due to their detrimental grazing and browsing habits. Government has been forced to suspend the practice because it has gotten out of hand by the fact that the applicable rules and regulations have been glaringly flawed, especially by the Maasai and Samburu people. They bring about overgrazing because the carrying capacity of land is overwhelmed by the numbers of the animals. Extremely high numbers of livestock were recorded to imply uncontrolled access even to fragile areas. The pressure they exert and coupled with the wild animals increases the soil compaction, breaking of soil and thus exposing it to agents of soil erosion. This means the soils are heavily degraded. The livestock also were noted to be the cause of water pollution and reducing the water levels, the large herds are usually driven to the water points where they drink water and they drop cow dung in the waters changing its purity and the hooves dig river beds and soil accumulate in the depression making the water volume to reduce respectively. Some of the respondents totalling to 55% agree that they cause the named damages, but they have no choice if they want their animals to live and contribute to the country's economy and pay taxes as other citizens.

The following graph shows the number of domesticated animals which were important in the study. Their numbers is so huge and it definitely portrays the danger it carries on the environment. Donkeys and camels are also part of human animals which were observed but their numbers are not a threat to the environment in the immediate community.

Table 3: A pie chart showing number of livestock



[Source: KWS, 2008]

Weakness in the shamba system, under this system individuals are permitted to clear and cultivate in indigenous bush cover from a specific land and of a size between 0.4 - 0.8 ha per year. Throughout historical time, the establishment of forest plantations has, by-and-large, been achieved through the inter-cropping of tree seedlings with annual agricultural crops. This is a form of agroforestry practice in which management policy requirements call for the agricultural crops to be phased out in the third year of tree growth. By the third year, the tree canopy would usually out-shadow the normal growth of the agricultural crops. The farmer would then have to move out of the allocated plot and would be eligible for another plot, if available. This methodology was borrowed from the successful experience of establishing teak plantations through a similar practice, referred to as “the taungya system” in Burma; applied since the middle of the 19th century. During and since colonial times, Kenya adopted this system by giving it the name the “Shamba-system”.

Irrespective of the level of economy and technology of a country, successful establishment of plantations is one of the most expensive activities in forest sector development. The Shamba-system has been a strategy identified as a means to provide cheap labour - which later turned out to be totally free - in establishing forest plantations. At the same time, this would contribute to increased national food production and later led to creation of rural employment as the practice extended beyond resident workmen. The system developed serious problems which encouraged forest degradation due to illegal activities, sabotage of planted seedlings, extending the land more in the forest, and increased demand for plots allocation for the squatters as the system was politicised.

Crop farming is the main activity and is under the rain fed system, the crops include maize, beans, Irish potatoes, cabbages, tea, sukuma wiki and variety of indigenous crops. The crops in some farmers are mixed [mixed cropping] when growing while in other fields each crops are of pure stands [mono cropping]. The entire year the land is covered by crops and the fallow periods are of very few days or never exist. Therefore the soils have become unfertile and the farmers have decided to use fertilizers which form the non- point sources of pollution in the water bodies altering the aquatic life.



Plate 4. Crop farming

[SOURCE: N. Livana and A. Asilah, December 2009]

More so, the loosen soils are swept down the stream when erosion occurs and leads to eutrophication and siltation. Farming on the steep hills encourages land slide and massive loss of soil.

Land fragmentation is an all time problem in land management, the increase number of people and their need to own land and settlement leads to dividing the available land into more small plots which are not productive and a liability.

Creation of more land for farming has largely encouraged desertification, some freshly cleared vegetation were three metres and 20 metres long, this is to say that lands are changed from luxuriant vegetation to farms and after sometime they become low of nutrients and thus support desert like vegetation and little grass which the pastoral communities use as grazing grounds, and then wipe away the few vegetation remaining. Desertification is gradually becoming a threat in the area though at this point is still in an infancy stage. Cultivation of marijuana deep in the forest has been practiced for a long time, this has influenced destruction of the forest from all sides and poses a great threat in the rate which the forest is dying and the animal species it carries.

Quarries were identified to be in full operation, it came to my knowledge from the few respondents that the government was aware of the practice and had set no measures to be met in an effort to minimise severe degradation. The only concern is that the location of the activity is contrary to the area potential. The fertile top soils are being removed to pave way for mining of stones. As we know, soils take millions of years to form but in the quarries no measures are taken to salvage soil degradation. Other than that, the mined holes are left uncovered and they make those lands to be dead, no signs of reclamation are in place. The water in the abandoned holes are breeding grounds for pest like tsetse fly which causes disease like Nagana to animals and also a risk to animals which fall inside.



Plate 5. A Quarry

[Source: N. Livana and A. Asilah, December 2009]

Respondents largely highlighted the loss of wildlife population at the hands of poachers who are believed to be collaborating with the game warden in hunting down the animals. The high price tag of game products has influenced the poor local communities to try the venture giving a blind eye to the consequences. Even the Convention on International Trade in Endangered species being in the front line working with the different national parks in ensuring that the endangered species of flora and fauna are protected, it is not effective because the number of the endangered species are going down at the hands of poachers. The people said that the poachers use crude weapons with poisons and do it best during the night hours. Abandoned fresh flesh of leopard and another unrecognized were part of the evidence seen. Also, when elephants came near homes they are killed, their flesh and tusk are taken before the Kenya wildlife service come after them.

4.3 Impacts of environment degradation

Climate change and global warming due to most of human activities, the emissions of carbon dioxide and other gases from the numerous charcoal production kilns, use of wood fuel into the air are forming a barrier that prevents the sun's energy from radiating back into space, thus raising the earth's temperature causing more intense and frequent droughts.

Flooding is a quite serious consequence of deforestation. Clearing the forest dramatically increases the surface run-off from rainfall, mainly because a greater proportion of the rain reaches the ground due to a lack of vegetation which would suck up the excess rainfall. Forests can receive as much rain when they are dense

The deforestation has come about from people clearing the land for farms, timber merchants over-logging, government selling or giving away large tracts of forest in corrupt deals, and other forms of mismanagement. This has caused many of the rivers and streams in the upper catchments of the Tana, Sasumua, Chania and other lakes/dam [Ndakaini] to shrink or dry up, leading to a drop in water levels.

The once grassy plains in the nearby hills that once were forested, but have since been burned and cleared by the local community has caused less rain in the area and changing rainfall patterns. Reason being there is less forest cover to trap moisture, keep temperatures cool and attract cloud cover.

Incomplete water cycle, the continuous movement of water on, above and below the surface, has been influenced by the high temperature which accelerate evaporation and reduces

infiltration rate, and the moisture which rises are very dry and can't support condensation and heavy down pour but only showers and at the long run imbalance in the hydrological cycle

Crop farming causes water pollution, increases salinisation and modification of the landscape. This encourages surface runoff which strip land its fertility, and affects ground water recharge. The use of agricultural chemicals, some pesticides are only soluble in water and may attach to soil particles instead of remaining in solution these compounds are likely to contaminate the ground water.

Loss of biodiversity, the tropical forest is the number one habitat for variety of species and genes in the entire world. The loss of habitat translates to loss of flora and fauna, or changes causes migration of the animals and has a negative impact on the tourism industry. The degradation recorded has no point to challenge the fact that the numerous species in the area of study are dying out and needs control if the species are valuable

4.4 Measures that are in place to sustainably manage the park

The importance of the environment has seemed to have gone public and measures are being developed and implemented to curb the projected sudden death of the environment so as to sustain life.

Electric fencing is in place to keep off animals from the communities and solve the human-wildlife conflict. And also minimise further human encroachment activities, the fencing is covering 320 kilometres perimeter fence.

Fundraising activities have been in place to raise money for proper conservation measures. Institution like the Nation media group and safaricom have spearheaded in soliciting funds which have been turning up with positive results.

Review team at UNEP advised the government to consider nominating the Aberdare Range as a UNESCO World Natural Heritage Site. This would shift some of the burden of protecting the range from the domestic to international officials. If the Aberdare Range is seen as world natural heritage, then its protection would be more strictly enforced.

The forest sector is guided by Sessional Paper No.1 of 1968 (the Forest Policy) and the Forest Act (Cap. 385). It has become evident that there is an urgent need to revise the forest policy and legislation to bring them in line with the needs of today. Thus there is harmonized cross-sectoral policies and legislation that relate to natural resources. In enforcing new policies and

legislation, it is apparent that institutional arrangements are addressed. The much talked about restructuring requires careful consideration, and decisions implemented in a timely manner.

Policy weakness are being rectified to meet the current changes, example being the shamba system has been changed to become Non Residential Cultivation

Proper farming methods which are sustainable are in place, this was seen by the contour farming in the steep slopes, alley cropping and also the pastoralist communities have been granted access to the grass land by the government and they should not interfere with other grazing wildlife or risk denied access.

Encouragement of ecotourism which is diversifying the communities source of income and reduces the pressure on the environment on unsustainable activities and also give the community essence of living in peace with the wild resources.

Government of Kenya through the ministry of Education sponsor free primary education programme which is reducing illiteracy and empowering the community with the knowledge of importance of the resources and how to use the sustainably. There are a lot of tree planting activities mostly by the general public who are aware of the importance of the Aberdare water catchment.

Numerous NGO's are working in awareness and sensitisation, they are working hand in hand with the communities in the village level to transform the don't caring mentality to caring mentality. They for example they are campaigning against charcoal production and with the assist of game warders and community youths destroy kilns and arrest the suspects to act as warning to the rest in the business.



Plate 6. Destruction of charcoal kilns and law enforcement

[Source: N. Livana and A. Asilah, December 2009]

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Summary and Conclusion

This chapter is endeavoured to make conclusion and perfect recommendation basing on the evident findings found through the research as it has been discussed on the previous chapter. The research has established monitor able baseline information on the on-going extensive destruction of Aberdare's. It clearly illustrates that these rich resource area are under extreme threats emanating from unsustainable agriculture, charcoal production, overgrazing, squatter settlements, extensive illegal logging of indigenous tree species, poaching, abuse of the Shamba-system and pronounced encroachment into indigenous forests, including large-scale growing of marijuana. Clearly, effective and long-term measures to ensure forest protection are not in place at the moment. Sustainable resource management is faced with various difficulties that should be resolved urgently, both in the short as well as in the long-term. The difficulties can be attributed to: policy, legislation, institutional arrangement, finance and good governance in management. If timely protection measures are not put in place, these environmental resources, the integrity of which is already in great jeopardy, could be decimated so fast that it can be irreversible in the next few years to come.

Of further concern is the numerous rare, endemic, threatened and endangered flora and fauna species and critical habitats. The destruction of these ecological sensitive areas as we have seen cause unrest in the bio diversity perspective and hence it's like an incitement to the entire environmental governing bodies to stand bold and take the risk of standing against humans who are proven to be the main causes of the unrest in nature diversity.

And as a matter of fact, earths future is on our hands and we have the ability to heed by its seen cry through climate change, desertification to name a few and give out the desired conditions that will not only makes the earth's diverse species to flourish but even humans to be assured of a catastrophic free future with abundance of resources.

5.1 Recommendations

Therefore, the extensiveness of degradation observed and the information gathered especially on the measures that are in place, reveals that in spite of the numerous efforts on the ground there is still some loop holes which needs to be mend so that to have a sustainable resource management practices. Thus it stimulates the following must said suggestion as remedy;

- The first step to walk the talk of reducing environmental degradation is by having numerous awareness and sensitisation programmes. These are the core pillars in any community related project in the sense that, many of the individuals have low understanding of the importance and risk of utilising the resources around them without caring. The communities should be made aware of the causes and impacts resulting from the use of the resources and thus they will be sensitised and adapt to proper utilisation and hence conservation achievement.
- Kenya should provide a comprehensive list of rare, endemic, endangered flora and fauna species and critical habitats and should develop long-term strategic intervention measures both at the local and international levels
- The Government should provide support documentation with specific instructions and guidelines on all Presidential directives, other measures that have been issued, and those that will be issued in future, focusing on improved environmental conservation and protection. This measure would facilitate harmonised and coordinated implementation of the directives, such as the 1986 Presidential ban on cutting of indigenous trees and the 1997 Presidential statement on management of indigenous and plantation forests
- The Shamba-system should be restricted to sites designated as protected areas, and in those areas fall in any category of protection and it is still home for some ethnic communities who are not willing to relocate, there should be a strategy to accommodate them but given guidelines which they should abide with it or not so face evacuation. And if the abuse of the Shamba-system persists, the system should be suspended.
- Crash replanting programme should be embarked upon in all clear-felled areas and also in overgrazed lands. This afforestation should be made open to all the general public who feel to plant trees in the areas, and no formal authorisation should be granted for any tree planting activities
- As we have seen there is the use of electric fencing as a measure to control both the wild animals and humans, yes it is a good idea but they should first seek out alternatives to fencing, focusing on how to create an environment

where humans and wildlife coexist successfully instead of looking to complete separation as the answer. The people and wild animals have lived together for a long time and therefore they could use zoning and increasing the number of game rangers to keep off entrance in unrestricted areas, this will have not act as an alternative to electric fencing alone but also provided employment to the local people who are jobless.

- Water being essential and scarce, raises all the impacts of degradation and it should be guaranteed to the community by either drilling bore holes or tapping into existing pipelines in the area. This means the immediate practical need of herders is met and restricts movement and conflicts.
- Government enforcement and policy change, poor policy management is the source to failures in resource management. The government must play a greater role in wildlife conservation but with some limitations. It should be their responsibility to enforce policies such as the bans on logging and charcoal production in the Aberdare's as well as making sure that fenced areas are manned to prohibit individuals from sneaking in to log or illegally cultivate. Also, they need to encourage more community-based conservation through ecotourism.
- Privatization of institution and giving community groups more power to take on the roles to supplement the weak governments governing bodies which traditionally stance on taking the side of the wildlife alone without caring the people living within. The private sector has always been in the forefront of wildlife conservation and human conflict. In this respect, the community must take the lead in providing benefits for themselves using the wildlife. Sustainable use of wildlife not only through controlled culling and game hunting but also through ecotourism can benefit communities if they ensure they are the direct recipients of the revenue. Thus, the fact remains that in order for Kenya as a whole to have sustainable wildlife conservation, they must work with the community and incorporate communal forms of wildlife management as well as the benefits of ecotourism in order to create a situation in which the rural population and landowners can learn to cooperate with the wildlife rather than come into conflict

- Stricter enforcement on compensation for loss of life and livestock for communities living in dispersal region. Such acts will sound passionate to the people from the government, this will help the government to have good relationship with the people living with the wild and in cases of implementing and enforcing measures by the government for better resource management it can't face rejection, due to the tight understanding forged between the parties.
- Gender balance in education and opportunities which creates income. When women are educated it becomes simpler to embrace family planning and generally check on the fertility rate and human population which we are convinced is the start of every causes of degradation. More so, employment opportunities in the national park, forest reserves and other available fields should be offered to the immediate people without being bias. This will reduce poverty levels and free the resources from burdens given to it by a poor community which wholly relies for the environment for all their necessity.
- Intervention measures should be identified and put in place to intercept transit illegal forest products and to address control in the local market of targeted indigenous tree species. This should involve all government arms and also seek support from the Lusaka Agreement Task Force;
- All concerned stakeholders should actively seek political goodwill and support for the sustainable management and conservation of the remaining resources
- Integrated management plans for the World Heritage Site and the overall ecosystem should be developed using the zoning concept, followed by implementation;
- Resources nourishing areas destroyed should be rehabilitated
- The revised forest policy should be assigned with a parliamentary sessional paper number and the revision of the legislation should be finalised forthwith, accompanied by requisite restructuring.
- All Shamba-system areas encroaching into indigenous forests should be stopped forthwith and Special operations should be carried out in the forests to round up illegal material and bring to law those apprehended
- Focused and detailed studies should be undertaken on, among others, the root causes of environment destruction and corresponding intervention measures,

including the promotion of stakeholder participation (including local communities) in environment management and protection.

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APPENDICES

APPENDIX 1

RESEARCH QUESTIONNAIRE FORMAT

KAMPALA INTERNATIONAL UNIVERSITY

RESEARCH TOPIC

HUMAN PRESENCE AND ENVIRONMENT DEGRADATION OF NATIONAL PARK.

AREA OF STUDY:

ABERDARE NATIONAL PARK

Dear sir/madam

I am a student of KAMAPLA INTERNATIONAL UNIVERSITY carrying a study on the above topic. You are kindly requested to answer the following questions by providing the most relevant information and to the best of your knowledge on the issues sought by the questions below. The information being sought is purely for academic reasons and will be treated with the utmost confidentiality.

Section A: Personal information

Age.....

Sex {male or female}.....

Occupation.....

Education [tick where necessary]

{None}.....

{Primary}.....

{Secondary}.....

{Tertiary} specify.....

Section B: communities and their way of life

- Which ethnic community do you belong to?
.....
.....
- How do you practice your culture?
.....
.....
.....
- How long have you been living in this area?
.....
.....
.....
- Have you ever participated in national census, {yes} or {no} why]?
.....
.....
- How has census benefited you?
.....
.....

**Section C: The link between human activities and environmental resources
degradation**

- What is the number of your family?
.....
- How do you ensure that your family is satisfied in terms of the basic needs { food,
shelter and clothing}
.....
.....
- Which is the general activity mostly practiced in your area?
.....
- How can you interpret degradation of resources and the way it is revealed?
.....
.....
- Which activities do you engage in so as to get income or earn something?
.....

- How does your neighbour utilise the forest and land or earn a living?

.....

- How did you acquire your land and how big is it?

.....

.....

- Have you ever seen or heard people illegally using/invading the protected area?

.....

.....

.....

- What do they do?

.....

.....

- Why do they do it?

.....

.....

Section C: The impacts of environment degradation

- Are you aware of the impacts that arise when resources are used unsustainably?

.....

- Please name them

.....

- How severe are the impacts felt?

.....

Section E: Any measures that are in place to sustainably manage the park

- Have you ever undergone any training, seminar, workshop or agricultural shows?

.....

..

- Is there any N.G.O working with the community in this area?

.....

- Can you name them and what do they do?

.....

- How do you sustainably use the different environment resource?

.....

.....

.....

- Which measures do you know and practice of protecting the resources around you?

.....

.....

- Are you involved in any community based organisation?

.....

.....

- Do you support protected areas being “idle” and the communities having inadequate resources to sustain them?

.....

.....

- What is the government through its various departments doing to properly manage the area?

.....

.....