PROMOTION OF ENVIRONMENTAL EDUCATION THROUGH ENVIRONMENTAL COMMITTEES: A CASE OF KORR LOCATION, MARSABIT COUNTY, KENYA.

MAMO, BORU MAMO

N50/CE/11148/2006

THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (ENVIRONMENTAL EDUCATION) IN THE SCHOOL OF ENVIRONMENTAL STUDIES OF KENYATTA UNIVERSITY.

AUGUST, 2013
DECLARATION

Student’s Declaration

This Research thesis is my original work and has not been presented for a degree or award in any other university.

Signature.......................... Date 22/08/2013

Mamo Boru Mamo (BSc.)
Department of Environmental Education
Kenyatta University

Supervisors’ Declaration

We confirm that the work reported in this thesis was carried out by the candidate under my/our supervision.

Signature.......................... Date 13/09/13

Amb. Prof. Michael K. Koech, MBS
Department of Environmental Education
Kenyatta University

Signature.......................... Date 22/08/2013

Dr. James A. Koske, PhD.
Department of Environmental Education
Kenyatta University
DEDICATION

To my loving parents, Mzee Boru Mamo (late) and Mama Juliana Talaso, I share this work with you all for always encouraging me to achieve my goals, for having unwavering confidence in my abilities, even during challenging times, for providing seemingly infinite compassion and support from which I too often drew, and perhaps most significantly, for instilling in me the values to always nurture, and have a life-long respect for the local environment. To my dear wife Kame, our loving Children- Ibrae, Adho, Sarah and Isack (Abbu), I thank you all for your love, support and patience during the entire process of this study.

Finally, I dedicate this thesis to the young people of the world, in whose hands our future rests.
ACKNOWLEDGEMENTS

I wish to acknowledge my supervisors; Prof. Amb. Michael Koech, Dr. James A. Koske and the late Dr. Godfrey A. Olukoye, whose experiences and insights provided the substance of this research. I salute them for their wealth of knowledge in the field of environmental science, which is exceptional and was invaluable to this study.

I am also greatly indebted to my dear friend Mr. Gutema D. Kussa who passionately assisted me during data collection, analysis and also gave constructive criticisms of which this study came to fruition.

I also wish to acknowledge with deep gratitude the services of all the people who made this work a success, particularly Mr. Thomas Amiyo (EMC Coordinator) Laisamis District, Mr. Stephen S. Katelo (Project Manager) Marsabit Environmental Conservation Consortium (MECOCO), Marsabit.

To the nomadic pastoralist community of Korr location and the entire EMC fraternity in Marsabit County, I wish to register my heartily appreciation for the support accorded to me during the entire study period. I wish to say to all who were involved in this study in one way or another and are not mentioned here, thank you very much.

God bless you all.
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<tr>
<td>ASAL</td>
<td>Arid and Semi-Arid Lands</td>
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<td>CBEM</td>
<td>Community Based Environmental Management</td>
</tr>
<tr>
<td>CBNRM</td>
<td>Community Based Natural Resource Management</td>
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<tr>
<td>CDTF</td>
<td>Community Development Trust Fund</td>
</tr>
<tr>
<td>CIFA</td>
<td>Community Initiatives and Facilitation Assistance</td>
</tr>
<tr>
<td>DEC</td>
<td>District Environment Committee</td>
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<tr>
<td>DESD</td>
<td>Decade of Education for Sustainable Development</td>
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<tr>
<td>EMC</td>
<td>Environmental Management Committee</td>
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<td>EMCA</td>
<td>Environmental Management and Coordination Act</td>
</tr>
<tr>
<td>EE</td>
<td>Environmental Education</td>
</tr>
<tr>
<td>ESD</td>
<td>Education for Sustainable Development</td>
</tr>
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<td>FARM Africa</td>
<td>Food and Agricultural Research Management-Africa</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization</td>
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<tr>
<td>FGD</td>
<td>Focused Group Discussion</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environmental Facility</td>
</tr>
<tr>
<td>GOK</td>
<td>Government of Kenya</td>
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<tr>
<td>GTZ</td>
<td>German Technical Cooperation</td>
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<td>IPAL</td>
<td>Integrated project for Arid Lands</td>
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<td>IVP</td>
<td>Indigenous Vegetation Project</td>
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<tr>
<td>LDDP</td>
<td>Laisamis District Development Plan</td>
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<tr>
<td>MDP</td>
<td>Marsabit Development Programme</td>
</tr>
<tr>
<td>NAAEE</td>
<td>North America Association for Environmental Education</td>
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<td>NCEOP</td>
<td>National Committee on Educational Objectives and Policies</td>
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<td>NEAP</td>
<td>National Environment Action Plan</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>--------------</td>
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<tr>
<td>SD</td>
<td>Sustainable Development</td>
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<tr>
<td>UNCED</td>
<td>United Nations Conference on Environment and Development</td>
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<td>United Nations Environment Programme</td>
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ABSTRACT

This study was carried out in Korr Location of Marsabit County in Northern Kenya from April, 2009 to December, 2010. Marsabit County is a land of diverse ecological, biogeographical and cultural importance but is currently faced with myriad ecological challenges ranging from land degradation, desertification, increased demands for fuel-wood, pasture/fodder for the livestock and scarce water resources, all of which impact on the local environment. Moreover, recent literature indicates that there has been little understanding of the human impact connected with resource degradation in Korr Location of Marsabit County. To address these challenges, environmental actors in Marsabit County established Environmental Committee to educate local communities on the importance of environmental conservation. Korr Location was initially one of the highly degraded locations of Marsabit County. A decade after the formation and activities of these committees in Korr location, there was a marked transformation of Korr location in terms of environmental rehabilitation of the area. This study was carried out to find out if these transformations were attributable to the committees or other factors at the community level and also whether the concept of the environmental committee can be replicated in other arid and semi arid areas as a potentially best practice for adoption. Therefore, the first objective of the study was to explore the influence of the household environmental awareness on the biophysical environmental rehabilitation of Korr location, as influenced by the locally established Environmental Management Committees (EMC). The second objective was to establish the relationship between the type of domestic energy used by the households and the degree of biophysical environmental rehabilitation, and the third objective was to determine the influence of household participation in afforestation activities on the degree of biophysical environmental rehabilitation. In carrying out this study, a descriptive survey research design was adapted. This was carried out using a structured questionnaire that was administered to a sample of 193 randomly selected households. Four (4) focused group discussions and 10 key informants' interviews were conducted to provide information to support the survey results and their findings documented. Quantitative data from the field was entered into an appropriate computer programme, the Statistical Package for Social Sciences (SPSS) to aid in data analysis. Appropriate descriptive statistics of measures of central tendency, variability and correlations were also generated using the spss package while the Chi-square test \( \chi^2 \) and correlation were employed to test the three hypotheses. The results of the study established a significant relationships between adoption of energy saving stoves \( (0.034) \), household involvement in afforestation activities \( (<0.05) \) and the status of environmental rehabilitation \( (<0.05) \). Positive correlations were also established between environmental awareness and the EMC efforts with the status of environmental rehabilitation \( (0.093) \). Major finding was that the creation of environmental awareness is essential especially at the grassroots' levels for a sound environmental management. Tree-planting activities \( (79.6\%) \) coupled with active community participation in environmental matters is seen as a means to stop environmental degradation and improve the livelihood of the local communities. Based on these findings, the study recommends that the EMC structure be recognised under the EMCA, 1999 and strengthened through policy and legislative framework to develop local capacity to fully participate in environmental management initiatives.
CHAPTER ONE

INTRODUCTION

1.0 Overview
This chapter provides the background of the study, statement of the problem, objectives of the study, research hypothesis, justification and significance of the study. This section also contains the conceptual framework of the study.

1.1 Background to the Study
Marsabit County is a land of diverse ecological, bio-geographical and cultural importance. The immediate local problems in Marsabit County as a whole and Korr location specifically, hinge on increasing demands for fuel-wood, pasture for the livestock and scarce water resources, all of which impacts on the local environment and the consequent degradation of the quality of the environment. This has created considerable concern to most local communities in Northern Kenya (NEMA, 2009a).

There was also limited information on the past environmental education programmes among the nomadic pastoralists of Northern Kenya and especially on the environmental committee, popularly called EMCs. Research studies carried out in Marsabit County have focused mainly on land degradation, pastoral livelihoods and desertification issues.

The solution to environmental and resource degradation requires efforts which are rooted in the local context that present a picture to which the community can relate and provide solutions of which all can be a part. In realization of this fact, environmental actors in Marsabit County initiated the establishment of Environmental Committees to undertake environmental education programmes in Korr location. In 1990s, Korr location was one of the highly degraded locations of the County. A decade latter, it was observed that Korr has been transformed drastically in terms of environmental rehabilitation in the area and communities' participation in conservation programmes. Was this transformation attributable to the established committees in Korr or other factors at the community level? This study therefore, seeks to find out the contributions of the committees in the
promotion of Environmental Education and their influence on the degree of biophysical environmental rehabilitation of Korr Location.

Environmental Actors in Marsabit County envisage that initiatives like the establishment of the local Environmental Management Committees (EMCs,) at the grassroot may serve as means of environmental protection and poverty reduction strategy because it was generally believed that the main cause of desertification and land degradation in Northern Kenya is mainly attributed to poverty, climate change and limited environmental education and awareness. Further, such initiative also provides lessons and a framework for Education for Sustainable Development (ESD) aimed at providing long-term environmentally sound decisions that can lead to appropriate joint activities between the Government and the local communities in environmental conservation in the larger Arid lands of Kenya.

Furthermore, the Kenya Government policy statements have also acknowledged the linkage between poverty alleviation and environmental conservation with the need to address the social economic status of communities through the sustainable management of natural resources. Therefore, it follows that, the issue of resource degradation (pasture/water) be addressed through an organised environmental awareness/education programmes and strengthening of the grassroots’ committee. Otherwise, it would be difficult for the local communities to fully participate in environmental conservation initiatives at the local level. This, in the long run will make it difficult for Kenya to achieve equality in National Development and also the Millennium Development Goals (MDGs) of poverty alleviation and Environmental Sustainability.

1.2 Roots of Environmental Education

The roots of the environmental education movement extend back to nature study movement in America, with leaders such as John Muir and Enos Mills and their study of natural history of plants and animals in 1891(Sauvé, 2006). The conservation education movement began in response to the soil erosion, dust storms and flooding disasters of the 1930s. Initiated by resource management agencies, the goal of conservation education was to awaken Americans to the importance of conserving various natural resources. Forester Aldo Leopold gained national fame during this era and significantly influenced
the movement through his passionate essays and provocative theories. Legislation was passed giving schools land designated for nature purposes (Buchan, 2000). Additionally, Buchan (2000) observed that, camps sponsored by churches and agencies, such as the youth associations, used recreation to help promote an understanding of the natural world. At the same time, the progressive education movement surfaced. Led by John Dewey, the focus of progressive education was learning by doing, incorporating learning about the environment while in the environment. The 1950s gave rise to outdoor education, with its sole specification of the place for learning – outside the school building. Outdoor education was described by Sharp as, “That which can best be learned inside the classroom should be learned there; and that which can best be learned through direct experience outside the classroom, in contact with native materials and life situations, should there be learned”. This movement was in response to concerns that urban youth were not experiencing direct contact with the natural environment. Teachers were encouraged to teach many different subjects in the outdoors, giving students this opportunity.

During the nuclear testing of the 1950s and Rachel Carson’s book, *Silent Spring*, people began to notice the impact on the environment by unseen forces, such as nuclear fallout and modern agricultural practices (NAAEE, 2000). During the 1960s and into the early 1970s, the environmental movement contributed a human aspect to the evolution of environmental education, helping people realize the impact humans have on the natural and built environment. The 1970 Earth Day celebrations were a landmark expression of public support for a realignment of values and a new respect for the environment (Buchan, 2000). This set the stage for the transition of education about the environment and in the environment to education for the environment.

environmental education and establish its basic objectives. The Belgrade Charter was adopted at this conference, providing a widely accepted goal statement for environmental education. It states: “The goal of environmental education is to develop a world population that is aware of, and concerned about, the total environment and its associated problems, and which has the knowledge, attitudes, skills, motivation, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones” (UNESCO-UNEP, 1976).

The UNESCO-UNEP report in Connect states that, in 1977 representatives from 66 member nations and observers from two non-member nations gathered for the world’s first intergovernmental conference on environmental education. This conference, held in Tbilisi in the former Soviet Republic of Georgia, led to the release of an official statement on environmental education - the Tbilisi Declaration. Built on the Belgrade Charter, the Tbilisi Declaration acclaimed “the important role of environmental education in the preservation and improvement of the world’s environment, as well as in the sound and balanced development of the world’s communities.”

In addition to establishing overall goals of environmental education, the Tbilisi declaration also established the following objectives of environmental education: “The Tbilisi Declaration constitutes the framework, principles and guidelines for environmental education at all geographical levels, local through international, and for all age groups, both inside and outside the formal school system”. According to NAAEE (2000), the Belgrade Charter and the Tbilisi Declaration are considered founding documents of the field and provide the foundation for much of what has been done in the field since 1978. More recently, the 1987 Brundtland Commission and the United Nations Conferences on Environment and Development (UNCED) in 1992 have influenced environmental education at an international level.

In Kenya, the introductions of Environmental Education (EE) at the tertiary levels are seen as one of the efforts the Kenyan Government adopted following the 1977 Tbilisi Conference, and the 1987 Moscow Conference (Otieno, 2009). The Kenyan government is committed to Agenda 21, Chapter 36 on Education for Sustainable Development, as demonstrated by the adoption of the National Environment Action Plan (NEAP).
However, poverty is still a major challenge facing the country. According to GoK (2009a) and Otieno (2009), it is estimated that, 75 per cent of the nation’s population is living below the poverty line and the poor socio-economic status of the people has far-reaching consequences for the country’s efforts to conserve its natural resource base and also achieve equality in National Development and the Millennium Development Goals (MDGs) of poverty alleviation and Environmental Sustainability.

1.3 Problem Statement
Korr location is one of the most degraded locations of Marsabit County according to the recent report in Kenya Atlas of our changing environment (UNEP, 2009). The main challenges reported are land degradation, desertification, increased demands for fuelwood, pasture/fodder for the livestock, scarce water resources and limited environmental education, all of which impact on the local environment. In 1990’s the area was highly degraded due to over harvesting of Acacia tree species for construction of livestock enclosures and fuel wood among other domestic use, that the land almost became a desert with the local resources (pasture/water) becoming extremely scarce. In fact, a film documentary was produced by the World Bank funded - Arid lands Resource management project dubbed the “The Last Tree of Korr”.

To address the challenges, environmental actors in Marsabit County initiated a grass root Environmental Committee to educate the local communities. A decade latter, after the formation and activities of the committees it was reported that there was a marked transformation of Korr location in terms of environmental rehabilitation of the area and community participation in environmental issues.

This study was therefore, carried out to find out if these transformations were attributable to the committee or other factors at the community level and also whether the concept of the local environmental committee can be replicated in other arid and semi arid areas as a potentially best practice for adoption in the management of the environment.
1.4 Hypotheses
The following three null Hypotheses were proposed.

a) \( H_{01} \) – Household environmental awareness can influence biophysical environmental rehabilitation.

b) \( H_{02} \) – There is no significant relationship between type of domestic energy used by households and the degree of biophysical environmental rehabilitation.

c) \( H_{03} \) – Households participation in afforestation programmes have no significant influence on the degree of biophysical environmental rehabilitation.

1.5 General Objective of the Study
The general objective of this research was to determine the role of the Environmental Committees in promotion of environmental education among the pastoral communities biophysical environmental rehabilitation of Korr Location.

1.5.1 Specific Objectives
The following three specific objectives guided the achievement of the broad objective of the study:

i) To examine the influence of the household environmental awareness on the biophysical environmental rehabilitation, as influenced by the EMC efforts.

ii) To establish the relationship between the type of domestic energy used by households and the biophysical environmental rehabilitation.

iii) To examine the influence of household participation in afforestation programme on the biophysical environmental rehabilitation of Korr Location.

1.6 Research Questions
The study was guided by the following research questions:

i) How does household environmental awareness influence the biophysical environmental rehabilitation in Korr Location?

ii) What is the relationship between the type of domestic energy used by households and the biophysical environmental rehabilitation?
iii) What is the influence of household participation in afforestation programme on the biophysical environmental restoration?

1.7 Significance of the Study
This study was conducted to fill the gap of inadequate environmental education and awareness and also lack of a formal recognised structure to be used a vehicle for creation of environmental awareness at the community level.

Further, this study would have an input into the advancement of knowledge regarding the envisaged revision of the Kenya’s environmental legislative framework, EMCA, 1999 Act. The EMCA act currently recognizes a structure of environmental management only at the District level (the District Environment Committee).

Finally, the resultant databases are useful for informing policy regarding the Community Based Environmental Management (CBEM) in Kenya with the intentions of up scaling EMC concept to other ASAL’s of Kenya as a potentially best practice for adoption and replication.

The study would also build on the Limited studies that have been conducted in Marsabit County regarding the Community Based Natural Resources Management (CBNRM) initiative in the arid and semi-arid lands (ASALs) of Kenya.

1.8 Limitations of the Study
This research encountered a number of challenges that hindered its smooth progress. The target population is nomadic pastoralists who are highly mobile and the dispersion of the groups made the target population at times inaccessible especially during dry season. It was also quite a challenge to get accurate information about the groups during the period of the study due to the difficult terrains, insecurity (including banditry and cattle rustling) and the distances between villages (between 20 to 30kms) within the study area. However, the researcher overcame the challenges with the assistance of the local provincial administration that provided armed guards. The researcher was also supported by their field office in Korr which helped in sampling the study population. The GTZ (the German Technical Team) also provided a 4-wheel drive vehicle and their local staffs who are well known in the study community as development agents and were well versed with
geography and the villages’ locations. Thus, the researcher was able to adequately access the target population (with the assistance of GTZ/Provincial administration) and sampled the study area well as planned.

1.9 The Conceptual Framework

The conceptual framework for this study was based on the premise that the efforts of the Environmental Committees (EMC) should be understood and recognized by the households. The consideration of the relationships between the committee efforts, households environmental awareness, type of domestic energy used by the households and the household participation in conservation activities were the composite variables identified in this study to have an influence on the environmental rehabilitation of Korr location. Figure 1.1 shows the conceptual model, which encompasses the major variables and their possible patterns of influences on each other and eventually on the biophysical environmental rehabilitation. The Households are expected to adopt the various environmental protection practices so that environment could be rehabilitated. The environmental practices are: household environmental awareness, household participation in environmental awareness programmes, types of domestic energy used by the households and household involvement in afforestation activities. These practices are intervening variables in the conceptual framework model, whereas the EMC efforts are the independent variable, while the biophysical rehabilitation is the dependent variable.

In the context of the above conceptual framework, the theoretical underpinning of the study is the development of community is complex, multi-facet process involving changes in the demographic nature of society and changes in the productivity of its people while educative activities undoubtedly have other purposes whose importance cannot be denied (UNEP, 2009).

In the conceptual framework model, the positive signs indicate a positive relationship, while a negative sign indicate a negative relationship between the two factors. Positive relationship is where an increase of the independent variables (committee efforts) will influence an increase of the dependent variable (biophysical environmental rehabilitation). An example of a positive relationship, is where a high environmental awareness at household level can lead to a higher biophysical environmental
rehabilitation while, a negative relationship is where an increase of the independent variable will influence decrease in the dependent variable.

Increased involvement of the EMC in environmental awareness activities can lead to a better environment, greater involvement of households in afforestation activities, increased use of non-wood fuels. Thus, increased involvement of EMCs in environmental awareness leads to increased awareness at the household level.

In conceptualizing, the researcher attempted show the interaction of the environmental committees’ inputs of awareness at the household level, promotion of energy saving stoves and increased use of non-wood fuels reduces the pressure on local environmental resources hence accelerating the process of environmental rehabilitation.
Figure 1.1: Conceptual Framework Model of the study (Source: Author, 2009).

Key:  

+ = Positive Relationship.  
- = Negative Relationship.  
HH = House Hold
1.10 Conclusion
This Chapter provides the reader with the description of the problem from an international, national, to the local context for the reader to clearly conceptualise the problem. The background section puts the problem in the correct perspectives to provide the genesis of Environmental Education (EE) to the readers. Available literature on evolution of EE have also been summarized, hypotheses tested to guide the researcher to delimit the area of research by confining to Korr Location where the activities of the Committees are more pronounced. The conceptual frameworks of the study have also been used to explain the relationships of concepts/variables and this particular study fits into the conceptual framework captured in the study.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
This chapter contains the review of various literatures regarding history of environmental education. The chapter is meant to give the reader an understanding of the previous relevant contributions to environmental education and the concepts of community based environmental management in Africa and Kenya. The chapter also looks at the establishment and roles of the local Environmental Management Committees in Marsabit County for the reader to get the detailed knowledge of the Environmental Education.

2.2 History of Environmental Education
The definition of environmental education has been evolving in the last fifty years. It was initially seen as the study of the natural environment (nature study): trees, soil, water, etc. The focus was of 'nature' and on the study of selected species. In the 1960's, education about the appreciation of environment acquired an ecological and global perspective according to Muthoka, (1998). It focused on inter-relationships of biotic and abiotic elements in ecosystems. In the 1970's, however, the term "environmental education" was coined, and ever since, there have been different perceptions about the exact interpretation of EE. However, the definition and objectives, ratified at the international EE conferences at Belgrade (1975) and Tbilisi (1977) are still widely accepted, as follows:

Environmental education is defined as "a process aimed at developing a world population that is aware of, and concerned about the total environment and its associated problems, and which has the knowledge, value, attitudes, skills, motivation, and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones"(Muthoka, 1998).

But a review of some of the past and current EE initiatives in Africa and Kenya showed that they are generally content-based. There is a tendency to present an environmental problem and to suggest ways of dealing with it. The target audience is usually admonished not to engage in activities which will degrade the environment. Another
approach is to provide information on a technique, e.g. tree-planting which is being advocated more and more. EE is currently being seen in a new light, not solely as a subject for acquiring knowledge, but as a process to develop new forms of behaviour towards the environment, based on relevant knowledge, skills, attitudes and values. These behaviours will ultimately result in sustained development and improved quality of life. For this to happen, the environment should be used as the medium for education, and learning gained through the different subject areas should be consolidated by applying it to the solution of real-life environmental problems. This is why the concept of establishment of local environmental committee is important as a medium of educating the pastoralist communities on the importance of environmental conservation and rehabilitation of degraded environment (NEMA, 2009b)

According to NEMA State of Environment report, 2009, there are many factors that contribute to this process; these are (1) governance, (2) cultural beliefs and traditions; and (3) socio-economic and political conditions. In all these spheres, behaviour is influenced by key individuals who make an impact on others in one way or another. These include traditional and opinion leaders, politicians, extension workers, teachers, religious leaders, artists, businessmen, journalists and broadcasters. It is thus imperative that information reaches these key individuals so that they may become increasingly environmentally literate to promote environmentally-sound behaviour.

Though environmentalism itself has been around for decades, as outlined in the previous section, it had been a movement typically championed by the minority of the population and by grassroots movements. The creation of the Brundtland Report by the World Commission on Environment and Development (WCED) in 1987 brought environmentalism to centre stage by introducing the idea of sustainable development. Most well-known for the idea of meeting the needs of the present population without compromising the needs of future generations, the report by Norwegian Prime-Minister Gro Harlem Brundtland is repeatedly referenced in discussions on sustainability and environmentalism (UNESCO-UNEP, 2002)

Brundtland’s perspective began to realize the importance of interconnectedness of nature and human development. UNESCO-UNEP (2002), observes that the natural resources are
being depleted and environmental degradation is increasing because of unsustainable patterns of production and consumption, uncontrolled population growth, and inequality of social and economic opportunities available to the people. These problems will cause more and more strain on the earth's natural resources and habitats (Muthoka, 1998). This is currently the situation in Africa and if the business as usual prevails, the natural resources would be greatly depleted and the population would suffer the consequence.

In solving environmental problems, it is imperative that every person develops an informed awareness of the limits of our natural resources and understand the interrelationship among living and nonliving elements in the cosmos or the whole environment. According to Sauvé (2006), human should conserve and protect nature is not only for human benefit but also for nonhuman nature. If we do not do so, we will destroy ourselves and our society (Freebody, 2003). At present, everyone knows and acknowledges environmental problems but comparatively few people truly understand and are aware of the importance of the environment. It is difficult and time consuming to persuade other people to appreciate the value and worth of the environment. To achieve this, new attitudes, skills, knowledge, awareness and behaviours towards the environments are needed. Hence, UNESCO-UNEP (2002), maintain that environmental education for every level of education may be an appropriate way to help face environmental problems in a globally changing world.

Since 1968, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) have been driving the agenda for education for sustainability across all sectors of society, in partnership with a range of other international organisations (UNESCO-UNEP, 2002). Increasing concern about the role of higher education is recorded in a number of international and national declarations, especially following the United Nations Conference on Environment and Development (UNCED) and the adoption of Agenda 21 at that conference often referred to as the Earth Summit held in Rio de Janeiro, Brazil, 3-14 June, 1992. Agenda 21 is a comprehensive plan of action intended to be taken globally, nationally and locally by organisations of the United Nations (UN), governments and all major sector groups in every area in which humans' impact on the environment. The United Nations Commission of Sustainable
Development (UNCSD) was established in December 1992 to monitor and report on implementation of the agreements at all levels: local, national, regional and international. Since then, a series of UNESCO conferences have been held, including the World Conference on Higher Education in the Twenty-first Century (UNESCO-UNEP, 2002).

UNESCO has continued to advocate for changes in human attitudes and behaviours, leading towards a more sustainable future. Ten years after Agenda 21, implementation and commitments to the Rio principles were strongly reaffirmed at the 2002 World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa. At that time a call was made for a stronger focus on education for sustainable development, leading to the United Nations declaring 2005-2014 to be the United Nations Decade of Education for Sustainable Development –UNDESD (Bode, 2009).

This decade has seen a rapidly rising number of conferences focusing on education for sustainable development (or sustainability), including debate on the perceived lack of progress being made in learning for sustainability, in institutions of higher learning. Claims are made by scholars and educational practitioners in the field of sustainability that universities have a professional and ethical obligation to become much more explicitly and effectively involved in contributing significantly to learning for sustainability. There is an imperative for universities to address how to begin implementation or to enhance their current sustainability initiatives, in order to meet societal expectations.

Environmental Education in its traditional forms is limited in meeting the immense challenges posed by unsustainable patterns of development and unsustainable life-styles. New educational approaches are required to motivate people to act upon awareness to achieve the necessary changes of life-styles. These should further provide the basis for mobilizing support for public and private initiatives in developing a new ecological vision and fostering a sense of global solidarity (Otieno, 2009)

However, a new educational approach is required to motivate people to act upon awareness to achieve the necessary changes of life-styles. These should further provide the basis for mobilizing support for public and private initiatives in developing a new
ecological vision and fostering a sense of global solidarity. Faced with the named challenges, there is an urgent need to reorient current teaching about the environment with Education for Sustainable Development (ESD). The Kenyan population needs to be sensitized on the importance of using available natural resources sustainably to cater for present and the future generations.

According to ESD document, this requires policies, legislation and regulations to be enforced to ensure economic production processes based on respect for natural and cultural capital resources. It is also notable that in order to promote ESD, high quality information is essential. Formal and non-formal ESD along with civic education is fundamental in developing respect for nature and an understanding of cultural values. To coordinate this and ensure effective implementation, a national framework (strategy) is important to affirm that Kenya places ESD at the centre of the national agenda, prepares action plans and allocates adequate resources for the programmes (Environment and Natural Resources Team, 2002).

In a further pursuit to attain the goals, the ESD document outlines that, the nation identifies capacity building as a viable response within the interplay of political, economic, social and technological hurdles. Additionally, ESD for all levels is a strategic approach to meeting this requirement. This, therefore, has called for a shift from EE to ESD indicating a change of focus from concern primarily for nature and the non-human environment, to an approach emphasizing the interdependence of human welfare and a healthy environment. SD will therefore be the main goal of the whole education system, both formal and non formal, from pre-school to higher education and adult education.

Kenya should seize the opportunity to use the UNESCO-UNEP Decade of Education for Sustainable (DESD), 2005-2014 to set the pace towards improved delivery of ESD. The National Environmental Management Authority (NEMA) has recognised the need to develop a national framework. The Document called ESD: Strategy for Kenya 2005-2010, proposed mainstreaming of ESD in Kenya’s education system (NEMA, 2009b). The strategy focuses on key domains of ESD namely: basic education, reorienting existing education programs, developing public awareness and understanding of sustainability, and training in achieving SD. The strategy also focuses on pertinent issues
that need to be addressed in order to achieve SD in Kenya. According to NEMA, these include overcoming poverty, achieving gender equality, health promotion, environmental conservation and protection, rural transformation, sustainable production and consumption, intercultural understanding, peace and disaster preparedness.

In the ESD document, the strategy also aims at achieving the following specific objectives: raising the level of environmental awareness and building capacity to enable all Kenyans to engage in the achievement of the goals of SD; promoting the co-ordination of ESD activities; recognizing the special relationships that local communities have with the environment and ensuring that their perspectives are represented in ESD initiatives; and enhancing and supporting the integration of ESD into all learning programmes, projects and initiatives. Other objectives include developing partnerships between stakeholders, including the private sector, to promote and increase the level and quality of ESD; promoting technical cooperation: networking and information sharing; and providing Kenyans with a framework within which to develop effective ESD programmes.

The Environmental Management and Coordination Act (EMCA), 1999 also establish a link between environmental protection and the right to a healthy and clean environment for all. Education apparently is the primary agent of transformation towards sustainable development (SD) as highlighted by the Act. National Environment Management Authority (NEMA) is mandated to supervise and coordinate environmental issues and also encourage the public to participate in environmental conservation initiative through education and awareness programmes (NEMA, 2006). According to NEMA, education not only provides scientific and technical skills, but it also provides the motivation, justification, and social support for pursuing and applying them.

The ESD strategy has drawn upon existing educational initiatives in the Kenyan system. However, according to Otieno (2009), mainstreaming of environmental issues in the curriculum at primary and secondary schools in Kenya, dates back to the colonial days before 1963. The Kenyan government has, since the publication of the Report of the National Committee on Education Objectives and Policies (NCEOP) in 1977, made deliberate attempts to mainstream environmental issues in all curricula at all levels. The
commitment was reiterated when Parliament adopted Sessional Paper No. 6 of 1988 on *Education and Manpower Training for the Next Decade and Beyond*, with a call to make environmental studies part-and-parcel of the trainings and also to be integrated at all levels of education.

At the Early Childhood Development and Education level, EE is integrated in the curriculum using a thematic approach while at the primary and secondary school level; environmental issues are mainstreamed in the existing subjects using a multidisciplinary approach. However, all teacher-training colleges in Kenya currently offer courses in EE. The same case applies to university level education where faculties/departments of Environmental Studies exist. Some universities use an interdisciplinary approach. Nevertheless, both the formal and non-formal sectors in Kenya have clearly lacked a strategy to guide the implementation of EE. These sectors are critical in achieving goals of SD. The Government, Non-Governmental Organizations, Community Based Organizations, the private sector and individual initiatives can collectively achieve the goals of SD (Otieno, 2009)

### 2.3 Formal, Non-formal, and Informal Environmental Education

Environmental Education (EE) is often put into three categories: (1) Formal EE, referring to environmental education through the formal education system like schools, training institutions, universities and other educational institutions; (2) Non-formal EE, referring to EE provided through extension services, NGO, officers, community development, church organisations, etc. This is where the EMC concept is categorised; (3) Informal EE refers to environmental education which is acquired 'in passing', through conversations, news, and/or personal experience (NEAP, 2009)

**a) Formal Environmental Education**

This is EE which is purposefully planned to achieve specific objectives and outcomes. Curriculum is designed for a specific target group for a definite purpose. Training programmes are generally designed to raise the level of knowledge and skills, and to influence attitudes of the participants.
Currently in Kenya, environmental education is being integrated into the formal environmental education system primarily through general studies, science and agriculture at primary level, through geography, biology and agriculture at secondary level, and through various individual subjects at tertiary level. This fragmented approach has resulted in 'overcrowding' the curriculum by simply adding new information and also in some cases in repetition or overlap between different topics and/or levels. For example, the issue of soil formation and composition in primary agriculture overlaps to some extent with biology at secondary level. Some of the information could be removed without seriously compromising the knowledge base required for successful primary-level agriculture. Better still; the opportunity could be used to introduce techniques for detection and soil erosion control in the early stages, thus empowering students to take action (NEAP, 2009)

To date, there has not been a concerted national effort to integrate environmental education systematically, with specific desired outputs, across all levels of school curricula and into all teacher-training and university programmes. There is an imperative need to do this if Environmental Education through the formal education system is to be effective (Otieno, 2009)

According to Otieno (2009), although the Government is primarily responsible for formal education, NGOs and the private sector can play a larger role in supporting special areas, e.g. the provision of low-cost supplementary materials, specialised in-service training sessions for teachers, and involvement of students and teachers in community initiatives in order to build closer school-community links.

b) Non-formal Environmental Education

The NEAP report (2009) states that EE can be planned with specific target groups in mind to achieve certain desired outputs, but for that part of the population which is outside the formal education system and Non-formal environmental education may be provided through special EE activities, or by integrating environmental considerations into extension services, literacy programmes, income generating strategies, and other development activities.
Currently in Kenya, non-formal environmental education is being provided by government, NGOs, and also by the private sector. From community based organisations to large international organisations, there is a wide range of non-formal EE activities taking place. With the increasing realization that development projects have environmental impacts and implications, most projects and programmes are building EE elements as part of their activities. Unfortunately, in many cases, they are built in as 'additional' components and implemented by technical staff in other fields, not by EE specialists (NEAP, 2009).

Through the EMC concept and experiences from Korr Location, opportunities exists for NGOs to work closer with the formal education system, including vocational institutions, so that they can draw on their technical resources, and in turn contribute pragmatic perspectives for longer-term EE programmes in the formal system (NEMA, 2006).

c) Informal Environmental Education

The NEAP report further highlights that, people are constantly learning by picking up bits of information here and there, through advertising and conversations. The media and social institutions (beginning with the family), in the country play a large role in informal environmental education. There are opportunities for capitalizing on this, and improving the quality of this type of education.

However, the integrating factor in all forms of environmental education is communication. Effective, meaningful exchange and dissemination of information is a requirement of every EE strategy, and a pre-requisite to public participation, because it is only to the degree that people are aware and concerned about their environment that their attitudes and behaviour will change. Thus, the challenge exists to study target audience characteristics, needs and interests in order to improve the effectiveness of existing communication channels. With the multiplicity of players, another challenge lies in avoiding uncoordinated and often contradictory messages to the local communities (NEAP, 2009).
2.4 Gender Considerations in Environmental Conservation in Pastoral Areas

Men and women play different roles in the environment, thus there is need to be gender-sensitive with respect to environmental education and Awareness. In the development and implementation of Community Environmental Education Programme, several issues should be considered. Some of these are as follows: Women, particularly rural women, play a large role as natural resource users and managers, especially with respect to the collection of water and fuel wood. Thus, special efforts should be made to ensure that they are provided with skills and practical alternatives which will ensure that basic needs will be met with least harm to the environment; (Brook and Barbara, 2004)

In Rendille community, women are engaged in production activities, such as milking of cows, goats and camels, milk sale activities to supplement household income, and household tasks. Thus, there is need to develop and disseminate information with regard to environmentally-friendly income-generating activities e.g. plastic paper recycling and briquette making; (NEMA, 2004)

Women are also the child-bearers and the first 'teachers' of the children. The women represent a key sector of the community for EE as they, in turn, have a multiplier effect for the promotion of environmentally-friendly behaviour in their homes;

Presently, although initial enrolment of boys is higher than for girls, the drop-out rate for girls is much higher and by Standard 8, the proportion of girls in school is only 28.2%. Therefore, environmental education and communication strategies must be developed to reach girls and women through other means as well, e.g. adult literacy materials and radio programmes; (NEMA, 2006)

Currently, Elders/Herdsmen play a larger role at all levels of decision-making about natural resources than women. EE should give priority to facilitating greater participation of women at decision-making level in natural resource management;

The NEMA report showed that Women and children in pastoralist communities are very vulnerable to the effects of environmental degradation. To ensure that EE is gender sensitive, it is recommended that all future EE and Awareness projects and programmes incorporate gender considerations at the design and all other stages of the
project/programme cycle. It is also recommended that ongoing EE projects and programmes carry out gender analysis and modify their activities accordingly.

a) Children and Youth Considerations

The population structure of Korr, where the youth between 10 and 19 years old represent 53% of the population, strongly suggested that special consideration be given to this age group. If one includes all the children between five and ten years old, then this group represents a good majority of the population (NEMA, 2006). Children and youth are a unique target group, not only because they make up such a large part of the population, but because it is more likely that they will suffer most from the effects of present day environmental degradation.

The NEMA report recommends a special efforts be made to make them aware of the state of the environment, so that they will become concerned enough to take action. Appreciation and concern for the environment are values that need to be inculcated during the early years of development and thus EE for children, youth, women, men and indeed the larger community becomes an integral and important part of the EE strategy of any country. Furthermore, children and youth have a greater capacity to change their attitudes and learn faster than adults. All these features, supported by actual studies, point to the fact that the education and training of youth is a good investment. This certainly holds true for EE. (NEMA, 2006)

According to the report, the youth in Korr have relatively low school retention rates like in most Arid and Semi-Arid areas (ASAL) of Kenya, and are difficult to reach, as many of them drop out of school. Therefore, various channels and media for communication need to be identified and tested. No effort should be spared to reach children and youth both in school and those out of school with the kind of EE which will ensure their knowledge, skills, enthusiasm, and energy will be harnessed and applied to the solution of environmental problems and participation in community development endeavours. NGOs and school committees can play an effective role by linking the school to the community. Further, NGOs can assist the school by providing support to conservation activities and rehabilitation projects undertaken by students.
2.5 The Concept of Community Based Environmental Management (CBEM)

Governments worldwide are working to develop new laws and approaches for strengthening environmental management. These efforts focus on improving public participation in government decision-making, increasing transparency and open access to information, and providing more fair and just enforcement of governance requirements. Governments are also devising new strategies and methods for working collaboratively and sharing power with communities, citizens, environmental groups and business leaders to leverage community resources and market forces to meet environmental challenges. (NEMA, 2004)

Brinkerhoff and Crosby (2002), Brook and Barbara (2004), and Gasteyer et al. (2002), all indicate that empirical evidence on effective environmental solutions globally strongly supports the conclusion that purely top-down, hierarchical approaches do not produce sustainable results in shared-power contexts. Rather, success requires a vibrant civic infrastructure at and across multiple levels of society whereby governments engage citizens, local communities, businesses and non-profit organisations in environmental solutions (Eckerberg and Joas, 2004). According to Banyan (2003), this is best accomplished by creating and sustaining institutions where civil society can take hold and grow. Banyan further notes that these civic institutions are built when local residents, businesses, NGOs and governmental entities collaborate to focus on the common good and mutually beneficial outcomes. To Currie-Alder (2004), and Parenteau and Thong (2005), community engagement encourages citizens to be proactive in their attempts to resolve environmental challenges.

Recent developments in environmental governance go beyond traditional state regulations and market approaches, and place more emphasis on the shared-power role of the community and other stakeholders in environmental decision-making. Community participation in environmental management includes a range of approaches, such as citizen monitoring of environmental pollution, citizen participation in local planning and resource restoration efforts known as Community-Based Environmental Management (CBEM). Unlike traditional state-centric environmental management, which often neglects the political and social dimensions of environmental issues, the CBEM approach holds that local communities are a major stakeholder in environmental decision-making.
In order to shape solutions that ensure environmental protection and economic prosperity, citizens and community play a vital role in CBEM projects by voluntarily participating in the environmental governance process together with government and private sector entities. Core CBEM activities include direct voluntary participation in local planning and resource restoration efforts via consensus-based approaches that contribute to the achievement of integrated environmental, social and economic objectives. CBEM is particularly appropriate in countries that have weak or under-resourced regulatory systems like Kenya. The CBEM approach relies on citizen and community involvement to complement limited governmental capacity and resources. CBEM recognises the transaction costs involved in participatory processes especially in communities that are under-resourced like the pastoralist communities of Northern Kenya. In some of these cases, the costs of participation might be too costly to endure. The success of these programmes will often depend on the commitment and actions of community leaders and government officials in raising public environmental awareness and mobilising support from many interested stakeholders.

Experience has shown that successful CBEM approaches to collaborative environmental management share fundamental characteristics (Adler and Birkoff, 2004; Matarasso, 2003). Taken together, these characteristics can be thought of as an ‘operating system’. These characteristics have proven to be fundamental to successful collaborative and shared-power governance processes. While they do not need to work in sequence, they all need to work together as shown in the model below (figure 2.1).

2.5.1 A classic Example of Community Based Environmental Management Framework (CBEM) -Oregon Solutions Model from Vietnam

The CBEM approach can be depicted as a CBEM conceptual framework as shown in Figure 2.1. As elaborated from the Oregon Solutions Model for Vietnam, the CBEM conceptual framework includes two basic phases: CBEM design and CBEM implementation. This framework emphasises the critical nature of the local policy and legal context. It also recognises the salience of continuous technical and financial support to facilitate CBEM design and implementation. Importantly, a CBEM
Facilitation Entity, placed at the centre of the Framework in Figure 2.1 should lead the design and implementation process at multiple project sites and be responsible for its overall management. The CBEM design process includes a series of steps with clearly defined characteristics. Each step in the process is accompanied with a CBEM tool for completing the step. These CBEM tools were developed and documented in a CBEM toolkit during certain pilot project in Vietnam (Ingle and Halimi, 2005).

Figure 2.1: Community Based Environmental Management Framework
(Adopted from Ingle and Halimi, 2005, pp.100)

The first step in the CBEM design process is the identification of a high priority community needs related to environmental improvement. Communities are usually faced with many challenges and problems that seek solutions. At the beginning of the process, the CBEM Facilitation Entity conducts a community assessment to determine which challenges can be addressed through the CBEM process. The information collected
during the assessment is carefully analysed resulting in the designation of a CBEM site. A neutral convener is then appointed by a recognised, high-level political authority with an interest in solving the problem. In Oregon, the State Governor appoints the convener based on recommendations from the Facilitating Entity. The National Policy Consensus Centre (NPCC) serves as the Facilitating Entity. The CBEM convener, along with a project coordinator, take the lead in building the community team composed of different stakeholders from government, businesses and non-governmental organisations (NGOs). These entities agree to work collaboratively to solve the environmental problem during the CBEM design and implementation process.

The collaborative effort requires decisions to be made through a consensus process. Once the rules of the game have been defined, guided by the convener, the team decides on the objectives of a new CBEM project. One of the strengths of the CBEM is that the identified project is designed to concurrently address environmental, social and economic objectives. The objectives are all linked to specific indicators used to measure success. At the end of the design process which may take from several months to a year to complete stakeholders sign an agreement known as the Declaration of Cooperation. This declaration serves as the governing document and includes commitments of resources from all stakeholders. It also establishes the scope for the CBEM implementation process.

The CBEM implementation process also entails a series of steps and accompanying tools. CBEM implementation involves transforming the Declaration of Cooperation from the CBEM design process into desired and sustained results. When the CBEM project enters the implementation stage, several changes typically occur: new stakeholders join the project, the role of the convener shifts from active to more passive involvement and a project manager is selected and charged with the responsibility of accomplishing the desired results.

At the outset of implementation it is good practice to review the design process documents and check their integrity. This is especially important if a substantial period of time has elapsed since the Declaration of Cooperation was signed. It is Normal for some stakeholders to lose their enthusiasm for a project over time, so it is important to check with all the key stakeholders to ensure that they remain committed to the agreed solution.
Similarly, an implementation stakeholder analysis is useful to determine if new stakeholders should be added to assist with implementation activities. Then, a project manager with demonstrated ability to organise, plan, control, monitor and evaluate should be hired. The manager should be able to call upon the convener when special assistance is required related to gaining consensus or holding stakeholders accountable to their commitments. The manager also assists with establishing a project organisation and assembling an implementation team in cooperation with the CBEM facilitating entity.

The CBEM approach emphasises that project implementation is dynamic and takes place under conditions of uncertainty and partial control. Regardless of how carefully planned in advance, implementation rarely occurs without requiring adjustment in the initial Declaration of Cooperation. This requires a flexible attitude on the part of the implementation team, along with the stakeholders’ acceptance that changes are a necessary part of success. Successful implementation is very much a shared-power endeavour, that depends on the coordinated actions of many people, each with specific responsibilities and different stakes in the outcome. The active involvement of these key stakeholders in the execution and revision of detailed implementation plans and activities is crucial.

Monitoring and evaluation, along with sustainability assessments, are key parts of the CBEM approach. Project implementation that effectively produces sustainable benefit flows to the community requires specific attention to local capacity building and financial planning for benefit continuation. The final step in the CBEM implementation process involves reflection, and the capture of lessons, for improving and replicating the CBEM process. The CBEM facilitating entity along with the manager and convener are all the key parties to a final project evaluation and report. In Marsabit County, European Union (EU) funded, Community Development Trust Fund (CDTF) implemented project was modelled on the above Vietnam example and has had very successful outcomes in implementation of the community projects in rural areas.

The model shows that environmental issues are central in local communities lives because the absence of their solutions is more horrible and unless the environmental issues are solved through education and awareness or taken care of by active participation
by all including local communities, the future generations may find the earth worth not living (Ingle and Halimi, 2005). According to Ingle and Halimi, the need of the planet and the needs of the person have become one.

2.5.2 The Concept of Community-Based Environmental Management in Africa

In the past two decades, environment has attracted the attention of decision makers, scientists and even laymen in many parts of the world. They are becoming increasingly conscious of issues such as famines, droughts, floods, scarcity of fuel, firewood and fodder, pollution of air and water, problems of hazardous chemicals and radiation, depletion of natural resources, extinction of wildlife and dangers to flora and fauna. People are now aware of the need to protect the natural environmental resources of air, water, soil and plant life that constitute the natural capital on which man depends.

Numerous scholars, teaching practitioners and international policy makers have shown that education is central to learning how to re-design our social (including institutional) and individual practices. Furthermore, such education must enable learners to assume responsibility for creating a sustainable future (NEAP, 2009). NEAP stresses that it is imperative, for future inter-generational equity, that humans improve their ability to live sustainably.

Awimbo (2004) note that studies on the present state of environment in Africa indicate that most of the efforts to address environmental degradation have been made by respective government conservation and environmental agencies. However, these efforts have not been able to tackle the immediate problem of land degradation and have resulted in increased hardship for the poor in Africa (Munyao, 2005).

Awimbo (2004) further acknowledge the need to involve local communities in the management of natural resources because the failure of protectionist approaches to safeguard natural resources from degradation and to address poverty has resulted in efforts and more inclusive approaches to resource management. But, Lind and Cappon, (2001) hold different view in that political and cultural constructions at local levels result in dependencies and marginalization regarding access and control over resources, creating winners and losers of environmental and institutional change and of institutional arrangements for its management. However, Milimo et al. (2002), point out that
participatory approach to environmental management through local communities received a great boost during the 1980s after top-down approaches failed. They observe that with respect to resource management, they are based on the assumption that local people possess poor attitudes towards the environment and favours their over-exploitation through short term thinking imposed by high poverty levels which risk sustainability in the long run.

2.5.3 Community-Based Environmental Management in Kenya

Current debates in Kenya show that there is an increased involvement of local communities in the management of natural resources especially around protected areas (Awimbo, 2004). According to NEAP report (1994), specific government policy statements have identified the need for the greater involvement of communities in the management of natural resources. Further, policy statements have acknowledged the linkage between poverty alleviation and environmental conservation with the need to address the social economic status of communities through sustainable management of natural resources. The policies identified include the National Development Plans, The National Environment Action Plans and the Poverty Eradication Action Plans. The NEAP report also acknowledges greater awareness and involvement of diverse stakeholders in the formulation of these policies and legislation, as opposed to the past, when policies and laws were formulated with limited involvement of concerned stakeholders.

Kenya’s Environmental law, Environmental Management and Coordination Act (EMCA, 1999), also acknowledges the need to involve local communities in the management of natural resources by recognizing their traditional and cultural interest and also through representation to the District and Provincial Environment Committees (GoK, 1999a). Today, there is a growing understanding among government officials that the management of natural resources needs to complement the strategies of natural resource development based on national interests. With new strategies focusing on basic needs, equity and popular participation, hence the need for a change in policy statement to clearly accommodate local communities in the management of natural resources in the country.
It was generally agreed that the environment has to be protected and conserved so as to make future life possible. Indeed, man's needs are increasing and accordingly the environment is also being altered. It is worth noting that nature's capacity is too accommodating and too regenerative yet there is a limit to nature's capacity, especially when pressure of exploding population and technology keep mounting. According to Munyao (2005), what was required was sustenance, conservation and improvement of the changing and fragile environment. Munyao additionally indicate that growing concerns about persistent poverty and environmental sustainability have helped invigorate efforts at decentralizing environmental governance throughout the developing world.

The 1992 Earth Summit in Rio de Janeiro also brought widespread calls for greater community participation and equity in natural resources management and sustainable development planning. In recent decades, indices of environmental degradation have been evident everywhere in the country. Milimo et al. (2002), found out that, in an exclusively pastoral society like Marsabit community, where livelihood relies primarily on the use of natural resources, the communities have learnt to manage and protect their resources for decades. However, Otieno (2009), observed that Environmental Education has been conceived as a process of recognizing the value and various conceptions of the environment with the prime aim of determining the skills and approaches necessary for understanding the relationship between man, his culture and the biophysical environment. Indeed, there has been little understanding of the human impacts connected with environmental degradation in pastoral communities of Marsabit County. Increasing population pressure, particularly the growth rate, the loss and deterioration of the quality of water, pasture for their livestock and the loss of biodiversity and resultant land degradation poses serious environmental concerns.

### 2.6 Environment Management in Marsabit County

In the establishment of Environmental Committees at County level, the study found out that appropriate groups (local committees) were identified from existing community-based organisations (CBO). CBOs, like the Locational Development Committees (LDCs), women or farmers groups, or those specifically established to be responsible for environmental management and Education. These committees are expected to ensure that
environment would be taken into account when planning and implementing local development activities. In addition, these committees would mobilise community resources towards the identification, formulation and implementation of solutions to actual local environmental problems, and coordinate activities, at that level. Support for EE through community based-organisations is currently being provided through extension services and through the local NGOs. This would continue, and be strengthened by EE training to extension and NGO field staff. (Haro et al, 2005).

The local committees should link with their respective Area Development Committees (ADC) and District Development Committees (DDC) and the District Environment Committee (DEC) who will, in turn, be responsible for integrating environmental considerations into development activities, and catalyzing EE at the District level. These district structures through the DEC have links to line ministries.

A Project report by a local GTZ office showed that, in October 1995, the Marsabit Development Programme- MDP/GTZ convened an inter-sectoral planning meeting to create close collaboration and planning between lead environmental agencies. In March 1996, the National Co-ordination Committee on Desertification (NCCD) also convened a workshop in which the first District Anti-Desertification Committee (DADC) was established in Marsabit. According to the report, the establishment of local institutions to manage the environment is seen as one mechanism to reverse the unfavourable conditions and also facilitate more sustainable ways of managing resources.

The report shows that the Environmental Management Committee was borne as a result of the two workshops to spearhead environmental awareness activities. It has to be very clear from the beginning that the role EMC is limited to an advisory capacity, including training and spreading environmental information. The general consensus however, is that a clear mandate for EMCs is essential for the functioning of institutions appointed or elected to facilitate resource management at the local level. Haro et al. (2005), reports that coordination among neighbourhood EMC’s continues to be a problem, as does the issue of non-neighbourhood residents being unaware of or not respecting resource management rules defined by the EMC. Consensus about the legitimacy of the EMC rules within the neighbourhood also continues to be voiced according to Haro, who
observes that neighbourhoods designed these as rule-making bodies but the limited cultural precedent for such clearly defined rule-making group’s leads some neighbourhood residents to refuse to accept the authority of the EMC.

More so, EMCs rely in most cases on the authority of the local chiefs, who may not always be willing to enforce EMC rules and sanctions. The question is how many responsibilities can be handled by the EMC who sees their most important task as resource managers at community level. Haro et al. (2005), note that EMC themselves have limited most of the activities to fining and arresting trespassers of their by-laws. Waters-Bayer et al. (1995) also regards it as unlikely that one committee can handle all matters of natural enforces management considering a range of organizations to be more promising. Many EMC members especially women have double functions being members of other committees such as Maendeleo Women Group, Mazingira Women, Hides and Skins Group among others. Example is given of August, 2009 where residents spent a lot of time participating in different meetings and workshops which were convened by CIFA, FARM AFRICA and CDTF. Participants in these workshops complained of not being able to follow and fulfil their other personal duties.

Local NGOs emphasised on improved management skills in the institutions as an additional necessity for the EMCs. Training of the groups should emphasize social capacity building, financial management and transparency of management instead of focusing only on sensitization campaigns and rangeland management. People of Korr Location have been found to be very aware of environmental changes and to have a broad knowledge of rangeland management. However, those management capacity and transparency in handling financial issues are insufficient resulting in mistrust by the Korr town residents, especially the youths (NEMA, 2006).

2.6.1 Establishment of the Environmental Management Committees (EMC)
In 1996, a bilateral donor project of GTZ in Marsabit County with other stakeholders as stated earlier spearheaded the establishment of the EMC to initially deal with the problems of land degradation and dwindling water resources and pasture caused by overstocking and settlements around the water points and trading centres (Haro, 1999a). Haro contends that the committee is charged with mobilizing and raising environmental
awareness for user groups by helping organize community meetings to elaborate and disseminate environmental management protocols aimed at minimizing natural resource-related conflicts and also facilitate participatory approaches to environmental conservation measures. However, Munyao (2005) indicates that in most other parts of Marsabit County where this model is used, the EMC mainly deals with pastoralists and settled communities near water points and trading centres that comprise only one ethnic group. He calls for inclusion of all ethnic groups in the resource management structure to reduce resource-based conflict.

Milimo *et al.* (2002), conducted an in-depth comparative study of the EMCS in North-Horr town where the committee was reported to be active. They reported that, by 1999 the majority of the residents surveyed accept the authority of the EMC and agree that the committee is contributing to the environmental rehabilitation of the degraded area of North Horr. Haro (1999a) agree that EMC have been active in encouraging natural vegetation regeneration and environmental awareness activities in the lowlands of Marsabit County.

According to NEMA (2009a), the State of the Environment Report for Marsabit County indicates that by 2008, a total of 30 EMCS had been formed and coordinated by the District Environment Committee (DEC). The report further show that established EMCS had a total membership of 600 and 40% of the committee members were female. However, current available information show that EMCS have been established in almost all the Divisions of the larger Marsabit County to spearhead Environmental Education and Awareness among the pastoral population of the District. It was additionally reported that most development agencies in NRM sector are currently working with the EMCS in the county as an entry point into the community for Environmental and Natural Resources Management initiatives (NEMA, 2009a).

The main challenge is EMC dependency on elders or the authority of a local chief is to enforce actions for non-compliance with the environmental by-laws. Enforcement of resource-use restrictions traditionally relied on community elders or *Naabo* to induce compliance out of fear of being ostracized or cursed. Where traditional institutions have been undermined and the support of the elders is not assured, the effectiveness of such
community-based efforts have become doubtful because such sanction mechanisms become less effective as the study found out.

The other challenge is defining the action plans of the committee, the key issues that needs to be clearly addressed in the EMC operational structure: first, the need to clarify borders between Rendille (in Korr) and Samburu (in Ngurunit) as pasture is a trans-boundary resource. There has been continued confusion over which management committee (EMC) was granted authority over a particular resource due to the overlapping nature of resources-use patterns for traditional definitions of neighbourhoods. Second, there is lack of coordination between EMCs in different neighbourhoods; rules set by one group were not necessarily the same as those set by another group. This especially becomes problematic when the inconsistent rules are applied to a resource for which there exist an overlapping claims. Third, is the apprehension about sanctioning or fining in-laws or elderly people for fear of curses in Rendille culture Fourth, there is also lack of tangible incentives for the EMCs thus, most members feel, they needed to be given some incentives to boost their morale to effectively undertake their role. Finally, the legal status of the management committee is also unclear, particularly as relates to the formal legislative framework such as EMCA Act, 1999 which currently only recognize the DEC at District level but not the EMCs at the location level.

The Environmental Impacts of land degradation in Korr Location of Marsabit County was clearly captured in a film entitled ‘The Last Tree of Korr’ which was produced in Korr Location in early 1990s, where environmental degradation of Korr Location has been depicted as a serious environmental concern by the local communities and the government authorities. The establishment of local institutions like the EMC to manage the environment is therefore, seen as one mechanism to reverse these unfavourable conditions and also facilitate more sustainable ways of managing resources. Institutions like the EMCs designed to facilitate local people’s better understanding and management of their environment, through education and sensitization campaigns, have recently been established everywhere in Africa (Lind and Cappon, 2001). These structures were found to be ideal for resource management at local levels by different organizations operating in Marsabit County.
In the NEMA’s (2009a), State of Environment (SOE) report for Marsabit, it is indicated that Environmental Management Committees have been mandated by the District Environment Committee (DEC) to regulate resource use through control of grazing patterns. The SOE report additionally, show that an information gap exists with respect to resource management which was earlier based on an assumption that local people posses poor attitudes towards their environment and favours overexploitation through short-term thinking imposed by high poverty levels. As an effort to bring about the restoration of biophysical environment, the EMC was reported to have undertaken a number of environmental conservation activities in Korr Location like tree planting activities, promotion of the use of energy saving stove, environmental education, and rehabilitation of degraded sites.

Although these interventions are thought to have been effective in restoring environmental quality, there are allegations that EMCs efforts have neither been effective nor extensive enough to address the problem of environmental degradation in Korr Location. Some community members and stakeholders have the view that, the problem notwithstanding, there has been a recognizable concerted effort by the EMCs to rehabilitate the environment. The present study therefore attempts to find out the role of these committees in the promotion of environmental education and their influence on the biophysical Environmental restoration of Korr Location.

2.6.2 The Traditional Natural Resource Management System in Korr

According to Haro et al. (2005), prior to 1960s, resource management in the larger Marsabit County was largely carried out by the traditional council of elders called *Yaa* (Gabbra), *Naabo* (Rendille), *Gorro Jilla* (Borana) and the resource management systems were sustainable in the sense that they were time-tested and had survived for long period while still maintaining the natural resources. However, the general consensus in the County was that government institutions like Kenya Forest Service, NEMA, Kenya Wildlife Service and others are all based at the County headquarters and are not represented at the community level (grassroots). Therefore, there was need to create an informal structure at the community level to address the issues of land degradation as found out by this study. Haro et al. (2005), report that this gap led to the creation of the
Environmental Management Committee (EMC) which was charged with the responsibility of mobilizing and raising environmental awareness for user groups. According to Haro et al., EMCs helped to organize meetings, seminars, workshops to elaborate and disseminate environmental management protocols aimed at minimizing natural resources-related conflicts and facilitated participatory assessment of implemented actions and measures. This study therefore, assessed the ongoing efforts and activities by the EMC and their influence on the biophysical environmental restoration of Korr Location and also suggests better ways of restoring the ecological integrity of the study area.

Most pastoralists in Northern Kenya traditionally use to cut down a number of *Acacia tortilis* trees for making homesteads and livestock enclosures/Bomas as shown in figure 2.2. The study found out that, lots of trees are usually destroyed season after season for this activity of making livestock enclosure. The use of stone fencing as shown in the text is cheap, readily available in Korr and other areas of Northern Kenya and also long lasting as it can be used season after season unlike the *Accacia* trees enclosure.

Cattle from all household heads around Korr Location are housed together in the shared central Kraal. This is to ensure predators like Hyenas and lions are kept at bay. Individual homesteads also maintain separate enclosures for their own small stock as shown in figure 2.2.
2.6.3 Community Acceptance of EMC

Interviews conducted in Korr centre in 2009 showed that a majority of respondents accepted the EMC as a locational institution for environmental management and generally support the committees’ environmental programmes. However, the herders are suspicious of the committee activities thinking that they are formed to push them away from their grazing areas. This came in the backdrop of a history of suspicion and mistrust dating back to the early years of EMC formation in 1997/8 at least according to the Laisamis EMC coordinator in Korr. However, most town residents stated that EMC members are very committed to their work and have put a lot of effort into that initiative. In Ngurunit Centre, which is in a neighbouring location to Korr, 24 respondents were interviewed on their view of EMC rules and their effectiveness. Out of this, nineteen or 79 percent of the respondents felt that the EMC rules and regulations are an effective in the access and use of local resources.
The acceptance has led credence to a perception that the EMC has contributed to environmental rehabilitation of the area since its formation in 1997. One hundred and two respondents or 72 percent of 140 expressed the opinion that tree population or the vegetation cover had increased by a great extent, achieved mainly by controlling the cutting of trees through use permits issued by EMCs. But, most Mobile pastoralists have indicated that they have heard about the EMC but do not have a clear understanding of its role. Only people living in town and its environs have representative in the EMC.

Generally, the herders have expressed strong negative feelings against the committee but since the EMC is the coordinating group with local council of elders (Naabo) blessings have they have reluctantly accepted their rules and regulations. The consensus is that, there is urgent need to improve the efficiency and effectiveness of the Committee. One way of achieving this is to improve its accountability and transparency in fines management which was lacking. Also, reasonable fines (affordable) could be set for transgressors especially for the herders. This would reduce the chances of friction over the use of fine money collected by the EMC, thus the study clearly recommended the capacity building for the EMCs through trainings on environmental/resource management and accountability of collected funds.

2.7 Efforts to Increase Environmental Awareness and Education

Literature on EMC shows that the committee have taken a number of actions in a variety of areas to increase environmental awareness and education. Some of these are: environmental legal rights and responsibilities where they have engaged the Public Complaints Committee (PCC) on the dumping of wastes by the Oil exploration companies and associated consequences of emergence of cancer cases in Northern Kenya. EMC with other stakeholders also use the media for awareness raising campaigns especially local FM stations, incorporation of environmental issues in adult classes’ education, increasing awareness and education in specific target groups like women, youths and general encouragement of public participation in environmental matters.

A number of NGOs in Marsabit County are also involved in developing and delivering environmental educational courses and public awareness campaign materials for the EMCs. These include Governmental institutions like NEMA and environmental NGOs
like the Food for the Hungry, Kenya (FHK) among others. It is important to note that, educational and awareness efforts can target practically any sector of society. They can seek to raise public awareness broadly on environmental issues (such as through the media) or they may be a targeted campaign or educational effort focused on a specific sector (or target audience) on a specific issue like land degradation. This is where EMC can play a key role in educating the public on the dangers of a degraded environment.

The main challenge of EMC operation is sustainability of their programmes without a clear funding mechanism. Often, it is uncommon for such initiatives to receive funding directly from the central budget in Kenya, but Some States in Africa have accessed their national Environment Funds to provide partial funding for environmental awareness and education. Environmental education and awareness can be greatly improved in Kenya by adopting any of the following activities: reorienting current education and awareness programmes to include environmental dimensions; that is, basic education and awareness programmes (such as, in schools); adult and community education and awareness programmes; and education, training, and awareness programmes for professional, technical, and vocational personnel.

2.7.1 Classic example of the Use of the Media in Environmental Awareness

The print, broadcast, and internet media can be a powerful ally in educating the public on environmental matters. In order to perform this role effectively, it is often necessary for the Government to work with the media (and sometimes educate the media). This is often done informally, through regular briefings and information centres.

Some States have found that educating the media can be quite effective in building capacity to report on environmental matters. The case study from Bulgaria is but one example of how the Government has worked closely with the mass media to build its environmental reporting capacity through regular press conferences and large public awareness campaigns. Capacity building efforts can provide journalists with basic environmental information on a specific topic or general environmental information. Information centres that are accessible to the media and to the public constitute one such approach. These centres may be run by a governmental agency or Ministry (such as the case in Bulgaria, Croatia, and Macedonia) or by an NGO (such as in Romania). An
information centre may disseminate recent information (such as press releases), have a public library with a range of environmental resources, and actively disseminate information to the local communities through the community structures like the EMCs in Korr Location.

2.7.2 Educating Community and Traditional Leaders

Traditional, religious, and local community leaders can play an influential or even decisive role in how people act. This is particularly true in rural areas like in Korr location where council of elders play a key role in influencing the activities of the EMCs. Therefore, Education of these leaders can assist in facilitating the implementation and domestication of instruments like the Multi-lateral Environmental Agreements (MEAs) which Kenya is party to, at the local levels. In working with such leaders, particular attention may need to be paid to issues of:-

**Language**: educational materials may be more accessible if they are in the local language (*Rendille*). Translation can greatly increase the costs, but it may be necessary to consider whether limited translation might make the material functionally accessible to the majority of the community members;

**Literacy**: posters, radio presentations (local Marsabit FM station), and other approaches may be advisable if the local population (or leaders) are illiterate.

**Clarity and Plain Language**: the materials should be easily understood, particularly if they are written in what may be a person’s second or third language. This means short sentences, simple words, and active verbs. For example, Uganda is reported to be producing simplified versions of environmental laws that will be translated into local languages and disseminated through District Committees. In such instances, education may be limited because certain words or concepts may be lacking in local dialects. In such cases, it may be necessary to agree on specific terms and their meanings.
2.7.3 Other Approaches for Education and Public Awareness Globally

States, Governments and the international organisations like UNEP have adopted a number of approaches to promoting environmental education and public awareness. These include, for example, guiding frameworks for sustainable environmental education, information centres, environmental raffles (which can also be used for fund raising), and environmental holidays. This approach should be cascaded down to the local levels (Lind, 2002).

2.7.3.1 Awareness and Education on Rights, Responsibilities, and Impacts

The link between environmental law and social responsibility in the context of enforcement can best be illustrated through environmental education and public awareness initiatives as reported by NEMA document (NEMA, 2009). The document indicate that Public awareness and participation is important in all aspects of enforcement, not only in understanding basic environment and human rights, but also in fostering a sense of responsibility and a proactive environmental citizenship. The following are highlighted as examples of environmental awareness raising, public participation, and environmental rights.

2.7.3.2 Media Campaigns

As in any advertisement or public awareness campaign, the involvement of people that are well-known and respected public figures like the late Prof. Wangari Maathai in addition to the effective use of the media can be a potent way of increasing understanding of the importance of environmental issues and enforcement. Newspapers, television, radio, magazines, and other media can be used to quickly reach a large number of people. But, the media used should be relevant to the local population. For example, people in rural areas like Korr can hardly access Newspapers or even television.

2.7.3.3 Environmental Awareness Campaigns

Awareness campaigns are often most successful when they are targeted at specific groups because information can be tailored to the activities, needs and challenges of the group. Additionally, involving organisations and communities in environmental protection and
enforcement can create a sense of stewardship towards the environment, ease hardship through the collaboration and provide a forum for new ideas and greater participation. Examples of such collaboration and stewardship are provided in the initiatives of some NGOs and organisations in the private sectors in Kenya and at the community level. They have been active in raising public awareness of environment and development issues and mobilised people to take actions that have contributed to positive changes for the environment. The various environmental holidays can be provided for NGOs and private sectors to organise campaigns to foster environmental awareness national wide. (Lind et.al, 2002)

2.7.3.4 Environmental Awareness in Teaching Programmes

Environmental awareness, although essential to good citizenship, is not always a prominent feature of education programmes in institutions of primary or higher learning. Agenda 21 states that education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues, moreover, education is stated to be an indispensable means of achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and effective public participation in decision-making (Chapter 36). This emphasis has influenced reform of educational systems and practices in many States already where environmental education is being introduced into the curricular of educational institutions for pre-school through institutions of higher learning. Kenya government needs to borrow a leaf and mainstream EE into the curriculum of our education institutions. (Lind et.al, 2001)

Mainstreaming environmental education programmes into schools as a regular part of the curriculum increase public environmental awareness and demonstrates a commitment to environmental protection. Environmental education can be integrated into existing disciplines or it can be taught as a subject in its own right. It can be taught as early as primary school as well as in adult education programmes. Further, Environmental Education Programmes for Women and Youth Chapter 24 of the Agenda 21 suggests the responsibilities and roles of the State in integrating women's role in the field of environment and development and recommends the establishment of national
organisations to evaluate development, environmental policies and programmes related to women.

This responsibility does not rest solely with the State environmental agency like NEMA, however; NGOs (at national and community levels) and universities have increasingly demonstrated their potential, both independently and in collaboration with governments, to assist in mobilizing and unearthing the full potential of women as major contributors in national environmental management through workshops and training programmes. Young people comprise nearly 30 percent of the global population and will be the Decision makers of the future. Their way of thinking about the environment is already shaping the world of tomorrow. The involvement of today's youth in environment and development decision making and in the implementation of programmes has been internationally recognised as critical to sustainable development (UNESCO-UNEP, 2002).

2.7.3.5 Educational Campaigns for Public Involvement in Environmental Compliance

An educated public can be one of the most powerful weapons in the world's battle against harm to the environment as revealed by the various literature reviewed for this study and the ways that the public can assist in enforcement efforts are as numerous as the potential approaches for increasing public awareness. In addition to the EMC example, case studies of public participation in monitoring and enforcements, often involve an element of an aggressive awareness raising and education. The EMC should adopt an aggressive campaign strategy to enforce the provisions of the communities' rules and regulations for accessing and utilizing pasture and water in Korr location and its environs. The rules also define relationship between neighbouring EMCs.
2.8 Environmental and developmental changes in Korr Location

Development projects had a strong impact on the growth of Korr town in the 1980s and the early 1990s (Sun, 2002b). Sun reported that large international development projects, such as the UNESCO-IPAL, invested in both scientific research and development in the Marsabit County between 1976 and 1985. Based on the idea that desertification is caused by human mismanagement of the rangeland in Korr location, and that the pastoralists’ habits of keeping large herds would cause massive overgrazing even in Korr centre as shown by plate 1.

![Plate 1: Korr town Photo in 1996 shown as highly degraded (Photo by GTZ-IVP, 2006)](image)

The UNESCO-IPAL project aimed to reduce herds by promoting livestock marketing and commercialization initiatives with the pastoralists of Northern Kenya. Since the project managers used the town mainly as a base for their activities, and distributed relief foods there during droughts, they attracted pastoralists to the town, and encouraged a cash economy. However, the project did not significantly improve the pastoralist’s lives according to the available project documents.

Although livestock markets and auctions were introduced in Korr town during the IPAL project, so far there has not been any regular market for animal trading. Instead, the town has three butcheries where animals are sold and slaughtered for meat. As noted above,
Korr town is occupied primarily by people working for missions or development organizations, merchants, and by people seeking employment or relief. Compared with the pastoral settlements located outside of town, people who live in town have easier access to wage-paying jobs, education, and relief foods. However, the economy of the town relies mostly on cash, and living in the town is unpleasant and uncertain for people who do not have stable incomes. (NEMA, 2004). With the establishment of the local Environmental Management Committees (EMCs) in Korr location in early 1990s, the EMCs undertook massive awareness programmes at the households level and institutions especially school children in Korr. The photo taken in 2006 (plate 2) showed that Korr centre has undergone marked improvement in terms of vegetation cover especially regeneration of *Acacia tortilis* species of trees.

*Plate 2: Korr Town, in 2009 (Source: Author, 2009)*

Most regeneration of the *Acacia tortilis* tree species is reported to have occurred in EMCs protected conservation areas and also in disused cattle Kraals/Bomas. This was due to the large volumes of livestock manure in these sites and also protection through marking of the Acacia trees with red paints to keep people away.

In 2000, the population of Korr was approximately 14,500, half of the total population of the Rendille people. This number includes about 2,500 people living in the town, and
about 12,000 people living in more than 50 pastoral settlements called manyattas outside the town as shown in Fig 2.2.

Plate 3: Rendille Settlement near Korr centre (source: photo by M. Kshatriya).

Aerial photograph of a village (manyatta) near Korr settlement:
“A” represents boundary mark of the village using cuttings of tree branches, “B” the kraals, commonly used at night to house livestock and “C” the huts, which lie along the boundary of the settlement (approximately 32 huts in total)

2.8.1 Continuity and Change in Pastoral Subsistence among the Rendille

The Rendille’s pastoral settlements had spread widely and they moved throughout the region. However, due to the government sedentarization policy, development projects, and drought relief efforts, most of pastoral settlements moved closer to towns. In the Korr region, approximately 50 pastoral settlements are located in a less-than-15 km radius around the town. Plate 3 clearly illustrates the distribution of settlements around Korr town, with an aerial photograph showing the Manyattas (villages). This change in residential patterns is one of the biggest changes in Rendille land in recent years (Sun, 2002b)

In Rendille language, the word gela means enter. The phrase used by people to express the present residential pattern, especially the settling of pastoral settlements around the town, is taun gele or entered the town. According to Sun, a man who belonged to the
Irikimaniki age-set (estimated age of 65 years) was asked about the current settlement, and he reported that, “when I was a warrior, the settlement was always moving. When rain fell in Mt. Kulal region, our settlement moved (to that place). When rain fell in Mt. Marsabit region, we moved again to that region. But now that we have entered the town, only the livestock keeps moving”.

As previously mentioned, the emergence and growth of towns, the rise of development projects, and the sedentarization of pastoral settlements to towns are among the major socio-economic changes that the Rendille had during the last three decades. The influence of these changes on pastoral subsistence includes two elements. One is the influence of changing residential patterns on the practice of pastoral adaptive strategies. As noted in the previous section, the high mobility of humans and livestock is one of the most important adaptive strategies in pastoral subsistence. After the sedentarization of settlements, movement patterns of both people and animals tend to be reorganized, and management of both labour and livestock must be readjusted (Sun, 2002b).

The other influence involves the encroachment of marketing and cash economy on the livestock-based pastoral economy. Though the Rendille used to exchange their livestock products with farmers and traders for agricultural products and utensils, their livelihood remained based on livestock products. However, money has become more important and necessity, not only for buying food but also for school fees and medical expenses (Sun, 2002b).

2.9 The Summary and identification of research gaps

There is widespread acknowledgement of the need to involve local communities in the management of the natural resources, but there are general scepticisms that this will result in a more sustainable use of natural resources, this study has attempted to address this through legal empowerment of the local communities through creation of the local environmental committees. The challenge noted was the limited co-ordination and cooperation between government and non-governmental agencies working in the County on the extent and mode of use/access of natural resources.

Also, strategies for incorporating positive cultural practices that promote sustainable and equitable resource management should be developed. Additionally, Political good will is
key in that, the government authorities should recognize and support such grass root organization for effective environmental management at the community level. One way of demonstration of support to such local group would be to facilitate the registration of the EMC as a legal entity and linked up with the District Environment Committee (DEC) which is fully recognized by the Environmental Management and Coordination Act-EMCA, 1999.

This study has shown that local knowledge and synergy can be used to enhance sustainable resource use regimes to reduce and discourage unsustainable use. However, it is also possible to develop, as this study found out, more appropriate natural resources management systems like deferred grazing as promoted by the committees.

The study has also addressed the issue of knowledge of appreciating the value of local resources to meet the livelihood needs of local communities and contribute to the national economy. This was due to the extensive capacity building programmes undertaken by the EMCs. Most training for the local communities focussed on the value of natural resources and the impact of the depletion and/or conservation of these resources on the livelihoods and well being of the local communities in Korr location.
Figure 2.3: Map of the Study Area showing Pastoralist Communities of Marsabit County (Source, IFRA, 2012)
CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This Chapter provides the specific location of the study with the description of the research design, target population, research instruments and methods of data collection and analysis. The study was conducted in Korr Location, a small settlement in Marsabit County in Northern Kenya.

3.1 The Study Area

Korr location is in Laisamis District of Marsabit County. Laisamis District covers an area of 20,265.7 km² and is situated between longitudes 36°40 East and latitudes 0°15 South. The District borders Marsabit central District to the east, Turkana District to the West, Chalbi District to the north, Isiolo District to the southeast and Samburu District to the southwest (GoK, 2009b) as shown in Figure 3.1.

Administratively, the District is divided into three Divisions of Laisamis, Korr and Loiyangalani. The District is further subdivided into 11 Locations and 30 Sub-locations. Loiyangalani Division is the largest area in the District while Korr Division is the smallest with an area of 11,584.7 km² and 2,836.3 km² respectively. (GoK, 2009b).
Figure 3.1: Map of the Study Area, Korr Location (Source: GoK, 2009b)
3.2 Climate and Vegetation of the Study Area

Precipitation is strongly influenced by elevation and season. The Marsabit town, the County headquarter is at the top of Mt. Marsabit, at an altitude of 1600 m; while the Korr town in the central lowlands is at an altitude of 500 m. Rainfall patterns are relatively stable in the mountainous areas, with the maximum annual rainfall averaging more than 1000 mm. By contrast, rainfall patterns in the lowlands are both low and unpredictable, with an annual rainfall averaging less than 200 mm (GoK, 2009b).

The settlement pattern of the district is influenced by rain and pasture availability. Areas, which receive less rainfall, have a more scattered settlement pattern compared to those with ample rainfall. Majority of the populations are found in the high potential areas of Laisamis, while the rest are distributed in Korr, Kargi and Loiyangallani depending on economic potential prevalent in the area (GoK, 2009b).

Seasonality in the study area is determined by rainfall, and the Rendille recognize four seasons: the short dry season (*nabahai-ki-gaabany*) starts in January and ends with the long rainy season (*guu*) from March to May; the long dry season (*nabahai-ki-deele*) commences in June and lasts until November; following this, the short rainy season (*yeel*) follows from the end of November to the end of December (Sun X, 2002a).

Vegetation in Korr and the larger Rendille land is influenced by both elevation and precipitation. Generally, five vegetation zones are distinguished: forest, wooded grassland, bushland and thicket, semi-desert grassland, and desert (Sun X, 2002a). The forest zone extends throughout the mountainous regions that are more than 1500 m above sea level, and occupies approximately 5% of Rendille land. The vegetation is a mixture of needle-leaved trees and broad-leaved trees. The relatively low temperature and high humidity, as well as the thickly wooded forest, make herding livestock difficult in this region. In the 1970s and 1980s, agriculture was introduced to the Mt. Marsabit and Mt. Kulal regions by international development agencies, and small villages with farms were built near the tops of the mountains (GoK, 2004).
3.3 Continuity and Change in Pastoral Subsistence among the Rendille

Changes within the target population environment are occurring rapidly and may or may not be in line with their cultural or traditional lifestyle. However, these changes are directly influencing their daily lives. Lessons and experiences of the past on which they could rely on for so long are becoming less and less applicable in today’s changing world. Decisions bearing on the future of the Rendille are being taken at all levels of society by; themselves, policy makers and development agencies. In responses to these on-going socio-economic, environmental and political changes, the Rendille have gradually adapted to the changing circumstances through various strategies to sustain their livelihoods.

Wooded grassland is found at altitudes of 1200-1500 m above sea level in the mountains and valleys, and occupies approximately 5% of Rendille land. *Acacia tortilis* (*dahar*) is prominent in the upper strata, while the middle strata are fairly clear of vegetation, and grasses dominate the lower strata. Cattle and small stock (goats and sheep) are herded in this vegetation zone, but camels rarely come to these places owing to the high humidity and altitude.

The bush land and thicket zone extends from an elevation of 600 to 1200 m above sea level, and is found both at the foot of the mountains and in the lava area. *Acacia tortilis* and *Cordia sinensis* (*gaeer*) are conspicuous in the upper strata, while the lower strata are covered with shrubs such as *Sericocomopsis pallida* (*giib*) and *Duosperma eremophilum* (*yabah*). This vegetation zone covers approximately 40% of Rendille land, and is used by all species of livestock. Unfortunately, a large area of bushland and thicket around Mt. Marsabit is covered with lava boulders, which makes it difficult for both humans and livestock to move. Semi-desert grassland extends from an elevation of 400 to 600 m, and covers most of the central lowland of Rendille land. Trees more than 3m high can be found only along the stream beds. Thorny trees less than 2m (*Acacia* spp. or *Commiphora* spp.) are scattered throughout the middle and upper strata. The lower strata include sandy lands stippled by patches of bushes and herbs, such as *Sericocomopsis pallida*, *Duosperma eremophilum*, *Indigofera spinosa* (*kholo*) and *Blepharis linariifolia* (*lemaruk*). This vegetation zone accounts for approximately 40% of Rendille land, and is mainly exploited by camels and small stock (GoK,b).
The Chalbi Desert, located on the northern boundary of Rendille land, occupies nearly 10% of the total area and has very little vegetation. Though the desert itself is not useful to the Rendille, the Korolle Spring (*wor-ti-magad*) is a major surface water resource that can be used throughout the year, is located in the southern part of the desert. With the exceptions of the regions on the top of the mountains and in the desert, more than 80% of Rendille land is used for pasture. As both the types and quantities of plants are strongly influenced by topography and rainfall, plant ecology is important to a study of the Rendille's livestock management strategies (GoK, 2009b).

Laisamis town, the newly created district headquarter, is located in the southeast area of Rendille land, along the main road that leads to Marsabit town. In 1995, the annual rainfall recording was 188 mm, and most of the rain fell during the long rainy season in March and April. In 1996, a total of 100 mm of rain fell during the short rainy season from October to December. Thus, a short-term drought (or single-year drought) occurred between May 1995 and October 1996. From 1997 to the first half of 1998, more than 1,000 mm of rainfall, owing to the influence of the El Nino weather pattern. But during the second half of 1998 the area had only 25 mm of rainfall, followed by only 65 mm of rainfall in 1999. This shortage led to a severe drought between 1999 and 2001, which has been recorded as one of the worst droughts in Kenya's history. In addition, rainfall patterns in the lowlands are usually short-lived and do not cover large areas (GoK, 2009b).

Most of the Rendille population live in the central lowland, which is known as the Kaisut Desert. The average high temperature in the shade is 39°C and the average low is 22°C, with little annual variation. The extensive daily sunshine leads to a great deal of global radiation and low humidity.
3.4. Resource Potential of the Study Area

3.4.1 Geographical Features
The main physical features of Laisamis District are Mount Kulal (2,355metres) which is a designated United Nations Biosphere site with an indigenous Forest cover of 45,729ha. The topography is often characterized by steep ridges and valleys, occasionally interrupted by hills such as Ndotto and Sori Adi (GoK, 2009b).

3.4.2 Water Resources
The major sources of water in the district are sub surface water resources such as springs, dams and shallow wells for domestic and livestock development. A Major river is Malgis River which flows through Kaisut desert between Marsabit and Lenkiyoi (Mathew Ranges). Laaga Urr River originating from Mathew ranges, drains through Korr and ends up in flood plains of Halisurwa (GoK, 2009b).

3.4.3 Livestock Production
Livestock is a major economic activity in the district. Approximately, 80 percent of the district population is engaged in livestock production, thus a major source of employment for the locals. Common livestock species kept are shoats, camels and cattle. The potential can be harnessed to produce sufficient stocks for export. Lake Turkana shared waters has over forty eight species of fish. However, only about seven species are commercially utilized (GoK, 2009b).

3.4.4 Education Facilities
The District has 23 primary schools and only 2 secondary schools. However, the trend is expected to increase with the introduction of the free primary and secondary education (GoK, 2009b).
3.4.5 Health Facilities

The District lacks adequate health facilities and medical personnel. Currently, Laisamis has only one hospital and five dispensaries while the doctor to patient ratio is low at 1:1000. The average distance to health facilities is about 30km (GoK, 2009b).

3.5 Data Collection and Analysis Procedures

3.5.1 Research Design

The study adopted an exploratory approach using a descriptive survey design to investigate the roles of environmental committees in the promotion of environmental education to bridge the inherent gaps of lack of environmental awareness in Korr Location of Marsabit County. Two category of respondents were key, namely, key informants and community groups or resource users. Consequently, this study targeted government officials, development agencies in the area to represent informed specialists while community members, environmental groups, herders and opinion leaders represented resource users.

The sampling unit was the households and simple random sampling technique was used to select households represented in the sample.

The research team (two field assistants and the researcher) conducted interviews with environmental committee groups, elders, community leaders and government officials. The interviews were conducted in the local dialect (*Rendille*) for illiterate members of the local community and translation done in Swahili and English by field assistants. The questionnaires were used to collect information from government officials and development agencies while semi-structured interview schedules and focused groups discussion guidelines were used for getting information from opinion leaders because they were found to have varied literacy levels. Some of them may not be able to read, interpret and react to a questionnaire, thus semi structured interview schedule was used to obtain in depth information from opinion leaders. Focused Group Discussion (FGD) forum was used obtain information through face to face interviews. The Focus group discussions (FGD) interviews and key informants were used in the survey to collect primary data.
The use of secondary data and information was another important aspect of the methodology. The researcher also visited the District Documentation Centre and GTZ resource centre to complement information gathered with existing literature review of environmental management initiatives in the County. Information was also sought from district officials, research and development agencies in the area.

3.6 Sampling Procedures

The sample unit in this study as stated is the household. The total number of households (population) in the study area under research was established to be 6,750. This number constitutes both the sample population and sample frame for inclusion in the final sample. A sample size of 193 households was therefore taken from this sample frame through simple random sampling technique. To perform a simple random sample, each household in the sample frame was allocated a number. A table of random numbers was then used to select the household. Through simple random sampling technique the Korr population was sampled. The household heads were the respondents for the questionnaires.

3.6.1 Sample Size Formulae

The sample size, for simple random sampling without replacement was determined by the following formula adopted from Nassiuma (2000).

\[
 n = \frac{n'N}{N-1+n'}
\]

Where:

\[ n = \text{Sample size for simple random sampling without replacement} \]

\[ N = \text{Population size} \]

\[ n' = \text{Sample size estimate for simple random sampling with replacement.} \]

But, \( n' \) is given by the formula:

\[
 n' = \frac{Z}{a/2} P (1-P)
\]

\[ d2 \]
Where:

\[ Z_{\alpha/2} = \text{degree of confidence taken as 1.96 at 95} \% \text{ confidence.} \]

\[ d = \text{Degree of accuracy taken as 0.05} \]

\[ P = \text{Variability of the characteristics to be measured in the population taken as 50\% or 0.5} \]

From the calculation, \( n' \) was found to be 196. Therefore, with a total population of 6,750 household in Korr, sample size for simple random sampling without replacement was found to be 196.

### 3.7 Data Collection Instruments

#### 3.7.1 Research Instruments

The research instruments administered in collecting data from the field were questionnaires, key informants interviews and participants' observations.

#### 3.7.2 Questionnaires

The collection of information from the study area involved administration of questionnaires from 4-10 participants in focus group discussions (FGD) who were knowledgeable and resource people on the issues under investigation. A discussion session of an hour each was held to address issues and also solicit answers from the participants. A moderator, in this case the researcher posed one question at a time to receive answers from the participants and build on answers to construct a complete and comprehensive picture of the situation.

The participants were selected based on their knowledge about the environmental problems in Korr and their participation in past conservation programmes. The proceedings were recorded on paper and also in a tape recorder.

#### 3.7.3 Interview with Key Informants

Key informants were knowledgeable and experienced resource people well informed on the issues being investigated and consisted of individuals, representative of government
agencies, NGO's, EMC, community leaders and elders in the study area. Twelve representatives from all stakeholders in Korr and its environs were selected and interviewed to supplement the survey. Besides, some key informants from former GTZ Project were also interviewed. The research protocol was used as a guide to obtain relevant information and responses. The work of research team was also made easier by GTZ's previous development work in the study area and large volume of knowledge/information at their resource centre (Source: Author)

3.8 Data Analysis

The researcher edited the data collected from the field and the questionnaires were numbered in the case of quantitative data before the data was entered into an appropriate computer programme such as the statistical package for social sciences (SPSS) to aid in data analysis. For testing of hypothesis appropriate inferential statistics were used in the study.

3.8.1 Descriptive Analysis

Frequency distribution analysis was run for the households' characteristics and the variable in the three hypotheses, to generate frequency distribution table. This was specifically used for data measured in discrete, ratings and ordinal scales. Measures of central tendency, namely the mode and measures of variation and the range statistics were determined to describe the variables in the study.

3.8.2 Inferential Procedures

The variables measured in the continuous scale such as the status of environmental restoration were broken into ordinal grouping to allow a contingency table and its associated chi-square statistics to be used. This was used to determine if there were relationships between adoptions of energy saving *jiko* on the status of the environmental restoration.
CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction
This chapter presents findings of the research undertaken in Korr Location that address the objectives and test the three hypotheses earlier stated. The chapter is divided into two parts: the first part presents findings of the survey and the second part presents information about the general household phenomena as described by the informants and interviewees, and from the recorded observation sheets. Photographs have also been included in both sections to give a pictorial view.

4.2 Socio-Economic Characteristics of the Sample Households
The socio-economic characteristics of the respondents were presented and discussed below. These include household size, domestic energy and educational level. The sale of milk has become one of the most popular income-generating activities for women living in settlements near the town. More than 30% of married women from these settlements sell milk, and the money they earn is spent primarily on food (Nduma et al., 2001). However, such economic activities were not confirmed during my fieldwork in the settlements around Korr centre. It seemed that only some of the women who lived in settlements close to the town sold milk. Sale of firewood around Korr centre is also another major economic activity of women; firewood is collected from quite a distance from Korr in areas close to Ngurunit and illaut areas which is over 40Kms. This shows that more time is used in looking for firewood and also water than engaging in other productive social-economic activity that would have generated income for the households.

Some development agencies in Korr like the GEF-funded, Indigenous Vegetation Project (IVP) have supported building of stores for women groups for value addition to livestock products like skins, hides to get more income for the women groups in Korr location.
4.3. Educational Level and Household Size

Figure 4.1 shows that sixty five percent (65%) of the respondents had not been to formal school, 5% attained tertiary level education while the remaining 17.5% and 12.5% attended formal education of secondary and primary education respectively.

However, 12.5% of the household heads were found to have attained at least primary education level (on average) which in this study is equated with a mean of 3, and the mean household size was found to be 5 persons, as shown in Table 4.1.

Table 4.1: Frequency of Education Level of Households' Heads and Household Size

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Medium</th>
<th>Maximum</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Educational Level of Household Heads</td>
<td>3.24</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>2. Household size (No. of persons)</td>
<td>4.89</td>
<td>1</td>
<td>16</td>
<td>1</td>
</tr>
</tbody>
</table>

The educational level of the households' heads could have a direct bearing on the comprehension of environmental education programmes fronted by the EMC, because few would be able to appreciate the importance of their environment and take action and participate in environmental restoration in Korr. However, pastoralist communities have
indigenous knowledge for access, use and management of the scarce pasture and water resources.

World Bank report (2010) suggested that learners from nomadic pastoralist communities face peculiar difficulties in accessing continuing with education programmes whose designs suit sedentary communities. Standard curriculum delivery services which are designed for the majority are tailored for ‘static’ situations where children learn in classrooms in permanent locations. The importance of mobility and young people’s labour to pastoral production, the low population density of many arid areas, and the challenge of ensuring that a national education system is relevant to pastoralists’ needs and values are just some of the reasons why educational participation and achievement is often much lower in pastoral areas of many countries in Africa than the national averages. The report adds that situation was worse for girls.

4.4 Source of Domestic Energy for the Households

The main sources of domestic energy used by the households in Korr location were firewood and charcoal. Generally, more households (70%) who are EMC members use charcoal than firewood, while 100% of the mobile nomadic herders use the readily available firewood while, only 5% of the households relied on other sources of energy such as paraffin which is not readily available in Korr town and was also quite expensive (Ksh 40 per litre of paraffin). It was imperative to note that the use of a particular source of domestic energy was determined by various factors, such as availability of the resource, financial endowment, in addition to the household size, and the education level of household. Families with large households tend to use more firewood than those with few members and the more educated household heads, more income opportunities to access other sources of domestic energy due to financial endowment.
Table 4.2: Proportion of Households Using Various Types of Domestic Energy

<table>
<thead>
<tr>
<th>Actors</th>
<th>Charcoal (%)</th>
<th>Firewood (%)</th>
<th>Others (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC members</td>
<td>70.0</td>
<td>20.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Mobile Herders</td>
<td>0.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Non-EMC members</td>
<td>34.4</td>
<td>40.0</td>
<td>25.6</td>
</tr>
<tr>
<td>Town Dwellers</td>
<td>50.0</td>
<td>28.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

4.5 Household Scores in Various Constructed Indices

Indices were constructed by summing up scores of the various indicator variables. The indices were: Environmental Awareness (Constructed from true/false questions). The correct answer scored 2, while false answer earned 0. The EMC efforts (each environmental activity carried by EMC and felt by the household was scored 2), and the status of Environmental Restoration were asked to the Households to state if the conditions were Better= 3, Moderate= 2, or Worse= 1.

Table 4.3 shows that Environmental Committee Members (EMC) and Korr town dwellers led in Environmental Awareness with means were 18.4 and 18.0 respectively. Herders, (mobile nomads) scored relatively poor on Environmental Awareness.

Table 4.3: Household Mean Scores on Various Indices

<table>
<thead>
<tr>
<th>Actors</th>
<th>Environmental awareness</th>
<th>Environmental Education</th>
<th>Construction Material</th>
<th>Group Efforts</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC Members</td>
<td>18.40</td>
<td>16.20</td>
<td>6.40</td>
<td>15.80</td>
</tr>
<tr>
<td>Mobile Nomadic Herders</td>
<td>12.47</td>
<td>14.26</td>
<td>5.60</td>
<td>17.20</td>
</tr>
<tr>
<td>Non-EMC Members</td>
<td>17.29</td>
<td>12.85</td>
<td>5.18</td>
<td>15.79</td>
</tr>
<tr>
<td>Town Dwellers</td>
<td>18.0</td>
<td>11.0</td>
<td>4.00</td>
<td>19.50</td>
</tr>
</tbody>
</table>
The higher status of environmental awareness among Korr town dwellers had led to their adoption of non-wood construction materials for livestock enclosures like use of stones instead of the use of usual acacia trees branches as shown in Plate 4.

Plate 4: Stone Fencing used for Livestock Enclosure/Bomas, Instead of Cutting Acacia trees as shown in Plate 5 below. (Source: Photo, by Author, 2009)

It was found out that the use of stone fencing as shown above has helped in reduction of the harvesting of acacia trees in Korr area. EMC was found to promote the concept in other Arid and Semi Arid areas of County like Bubisa location due to abundance of the stones/rocks in those areas unlike the traditional use of acacia enclosures as shown in Plate

Plate 5: Rendille homesteads/Manyatta with Accacia enclosures (photo:Author,2009)
On the other hand, the EMC's higher status of environmental awareness had been more useful in the adoption of energy saving stoves as shown in plate 6, and thus improved household health and hygiene. The poor status of environmental awareness among the mobile nomadic herders could have contributed to their poor performance in the adoption of energy saving stove as promoted by the EMCs in Korr.

![Plate 6: Typical Energy Saving Stove (jiko poa) Being promoted by the EMC (photo: Author, 2009)](image)

The high levels (88%) of poverty (GoK, 2009b) in Korr location have also meant that most of the energy needs by the local communities are met from wood fuel. A combination of these factors, coupled with low levels of community awareness on the importance of vegetation and environment in securing people's future, led to degradation of vegetation cover. In essence, communities need to meet their energy needs without compromising their own ability and that of the future generations to meet the same needs.

In this regard, EMC initiated community energy saving projects to help conserve and minimise the impact of household energy needs on vegetation cover. In order to increase and conserve vegetation cover, EMC implements this project at two levels: the first level involves horizontal learning where communities in different landscapes are taken to other areas to learn from novel conservation measures other communities have taken, especially the use of energy saving jikos; and the second level is planting of indigenous trees to increase forest cover. To ensure multiplier effect, those community members
taken on horizontal learning experiences are given instruction to become trainers to propagate the exercise. Through the afforestation programme, mainly done by women in the cultural villages, Government Lead Agencies like KWS, KFS, NEMA and also local NGOs are encouraged to sponsor a tree and the funds raised from sponsorship are used for sustaining the project.

4.6 EMC Perception of Different Resource - User Group in Korr

Mobile Nomadic pastoralists do not have any representation in the EMC and often know little about them. They are however directly affected by EMC regulations which are designed to regulate livestock movement in general and restrict their access to key resources like protected water point near Korr town as shown in plate 7.

Plate 7: A Protected livestock Trough with Regenerated Vegetation of *sueda monoica* (Source: Photo by Author, 2009)

Nomadic pastoralists are widely held responsible by town dwellers for causing environmental destruction, mainly because they bring in large herds of livestock at watering points thereby causing massive degradation. They also cut young trees for livestock fodder without the permission from the EMC. The impacts of land degradation and desertification include a reduction in crop and pasture productivity and fuel wood and non-timber forest products, which are closely linked to poverty and food insecurity. The damage to soil, loss of habitat, water shortages, and siltation reduce biodiversity and ecosystem services and has economic consequences (Milimo *et al.*, 2002)
It was observed that in Korr Location land degradation manifests itself in many forms; among them are soil erosion, increased sediment loading of water bodies, see plate 8 and loss of soil fertility, salinity, reduced ground cover, and the reduced carrying capacity of pastures.

Plate 8: Massive Degradation near Korr Centre Attributed to Overgrazing by Livestock (Source: Photo by Guyo Haro, 1999)

Nomadic pastoralism has traditionally been the backbone of the economy in Northern Kenya, with herds moving across large expanses of rangeland to access adequate food and water. The area sees frequent droughts usually accompanied by livestock diseases. Recent droughts and the resulting reduction in herd size have reduced the viability of a purely pastoral livelihood (Haro et al., 2005).

The government, non-governmental organizations, and multi-lateral donor organizations have created boreholes, wells, and earthen dams to provide water in the most arid districts. Boreholes surrounding Korr Centre have attracted permanent settlements and increased livestock populations causing serious land degradation as shown in plate 8 above.
The satellite images from 1973 and 2000 at Illaut near Korr showed that vegetation cover was estimated at 73.04% in 1973 of the total land area (plate 9) and this declined to 58.60% (by the year 2000) in the intervening period of 32 years. The decline was estimated to be 13.95% of the total land area. This degradation poses a new threat to local people’s livelihoods as the land’s capacity to support rangeland decreases.

**Plate 9: Satellite Map showing Korr Location in 1973 (source, UNEP, 2010)**

**KEY**

- **Area showing Vegetation Cover (1,312 ha.)**
- **Area showing Lack of vegetation cover (688 ha)**
Plate 10 showed that vegetation cover in Korr location has reduced from 1,312 ha to 688 ha of the total land area. Changes in the vegetation cover have been driven by increasing demands of pasture, water and livestock enclosures. Local communities have quite often perceived that forests and natural resources belonged to the state (serikali) and they only have consumption rights. Thus, to some extent their participation in the management of the environment and natural resources is that of a reluctant owner.

Plate 10: Satellite Map showing Korr Location in the year 2000 (source, UNEP, 2010)

- Green: Area showing vegetation cover (886 ha.)
- Gray: Areas showing lack of vegetation cover (1,114 ha.)
4.7 EMC Efforts in rehabilitation activities in Korr

EMC carries out a number of activities that are aimed at environmental education, awareness and conservation. Table 4.4, shows how the local communities in Korr location perceive EMC efforts like advising communities on the importance of utilizing trees sustainably, advising communities on range management issues, planting trees, environmental awareness, supervision and co-ordination of environmental issues and holding meetings/barazas on environmental awareness as core EMC activities respectively. However, majority of the pastoralists were of the opinion that EMC had done very little as regards to coordination of development activities and collection of garbage / clean ups. Only 12.4% and 15.1% of the households had witnessed collection of garbage/clean ups and coordination of development activities in Korr location.

Table 4.4: Roles of the EMCs as perceived by the local Communities in Study Area

<table>
<thead>
<tr>
<th>Number</th>
<th>Activity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental awareness</td>
<td>164</td>
<td>88.2</td>
</tr>
<tr>
<td>2</td>
<td>Planting Trees</td>
<td>148</td>
<td>79.6</td>
</tr>
<tr>
<td>3</td>
<td>Holding meetings/barazas</td>
<td>148</td>
<td>79.6</td>
</tr>
<tr>
<td>4</td>
<td>Provision of energy saving stoves</td>
<td>104</td>
<td>55.9</td>
</tr>
<tr>
<td>5</td>
<td>Collection of garbage/clean ups</td>
<td>23</td>
<td>12.4</td>
</tr>
<tr>
<td>6</td>
<td>Advertising communities on range issues</td>
<td>90</td>
<td>48.4</td>
</tr>
<tr>
<td>7</td>
<td>Collecting fines from illegal resource harvesters</td>
<td>81</td>
<td>43.5</td>
</tr>
<tr>
<td>8</td>
<td>Advice on construction materials for herders</td>
<td>86</td>
<td>46.2</td>
</tr>
<tr>
<td>9</td>
<td>Advice on importance of trees</td>
<td>81</td>
<td>43.5</td>
</tr>
<tr>
<td>10</td>
<td>Supervision &amp; Coordination of Dev't Activities</td>
<td>28</td>
<td>15.1</td>
</tr>
<tr>
<td>11</td>
<td>Report to the District Environment Committee</td>
<td>23</td>
<td>12.4</td>
</tr>
</tbody>
</table>

N = 193  100%

From table 4.4, Local communities perceived the major activities of the EMCs as that of Environmental Awareness (88.2%), Tree planting activities and holding public meetings/Barazas (79.6%).
4.8 Testing of the Research Hypotheses

The discussions in this section are intended to show the outcome from the research vis-à-vis the research hypotheses. These are discussed under the following sub sections:

4.8.1 Relationship between Environmental Awareness and Status of Environmental Restoration

a) Environmental Awareness Index

This was measured as an index constituting the qualification of the following statement as true or false: use of energy saving jiko (jiko poa) on the amount of firewood needed to prepare a meal of Githeri (mixture of maize and beans); over dependence on fire wood as fuel for domestic use is a major cause of environmental destruction; charcoal is the most environmentally friendly source of fuel for domestic use; poor solid waste management (garbage) around homestead causes diseases; trees provide shade and pods (food) for livestock. A correct answer was given a score of 2 while an incorrect answer was a score of zero (0). The higher the score, the greater was the awareness. The variable environmental awareness had a maximum score of 20, a minimum score of 2 and a mean of 14.5 score.

b) Environmental Restoration Index

The variable was measured as an index constituting of the following indicators, rehabilitation of range lands, dusty conditions, and presence of tree cover/shade, problem of garbage collection and provision of energy saving stoves. These situations were rated as better, moderate or worse (scoring) 3, 2 and 1 respectively. The higher the score, the better was the status of environmental restoration. The variable had a maximum score of 21, minimum of 8 scores and a mean of 14.1 scores.
Correlation to Show the Relationship between Environmental Awareness and Environmental Restoration

Table 4.5 shows the relationship between environmental awareness and status of environmental restoration was positive but not significant. \( r = 0.093 \) Significance = 0.207

<table>
<thead>
<tr>
<th></th>
<th>Environmental Awareness</th>
<th>Environmental Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Environmental awareness</td>
<td>1.000</td>
<td>0.093</td>
</tr>
<tr>
<td>2. Environmental restoration</td>
<td>0.093</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Conclusively, from this result, the hypothesis is accepted, which stated that household environmental awareness has no significant effect on the status of environmental restoration. This clearly indicates that environmental awareness did not necessarily lead to higher status of environmental restoration. The implication is that knowledge alone may not make residents adopt sound environmental management practices in Korr location.

4.8.2 Relationship between Type of Domestic Energy and Status of Environmental Restoration

This was measured as a categorical variable. The types of domestic energy used were found to be charcoal, firewood, paraffin and others. The frequency distribution of the variable is shown in table 4.6. Most town households (48.9%, \( n=91 \)) were found to be using firewood and charcoal (47.3% ,\( n=88 \)). However, only 3.8% household used either paraffin or solar energy, which would otherwise minimize the pressure on wood resource in and around Korr. The use of firewood a major source of energy in Korr location is attributed to the fact that they are abundant or are collected either freely or at low cost.
from traders in Korr centre (a bundle of firewood of 12 pieces costs Ksh. 100 in Korr, but
Ksh500 in Marsabit Town).

Table 4.6: Frequency Distribution for Type of Domestic Energy

<table>
<thead>
<tr>
<th>Type of domestic energy</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firewood</td>
<td>91</td>
<td>48.9</td>
</tr>
<tr>
<td>Charcoal</td>
<td>88</td>
<td>47.3</td>
</tr>
<tr>
<td>Paraffin</td>
<td>8</td>
<td>2.2</td>
</tr>
<tr>
<td>Others (e.g Solar)</td>
<td>6</td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td>193</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.8.3 Status of Environmental Restoration

This variable was measured as an index as discussed in section 4.3. The variable was then
broken into ordinal groupings. Table 4.7 shows the frequency distribution of the index.
The index ranged from 8 to 21 scores.

Table 4.7: Frequency Distribution for the Status of Environmental Restoration

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 to 11 (worse)</td>
<td>35</td>
<td>18.8</td>
</tr>
<tr>
<td>12 to 16 (Moderate)</td>
<td>111</td>
<td>59.7</td>
</tr>
<tr>
<td>17 to 21 (Better)</td>
<td>40</td>
<td>21.5</td>
</tr>
<tr>
<td>Total</td>
<td>193</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Relationship between Type of Domestic Energy and Status of Environmental Restoration

The chi-square value found to be 14.995 while the significance level of the chi-square was 0.020. The significance level is less than the critical alpha, which was set at 0.05. This means that the relationship between the type of domestic energy used and the status of environmental restoration was statistically significant (P<0.05).

Table 4.8: Relationship between Type of Domestic Energy and the Status of Environmental Restoration

<table>
<thead>
<tr>
<th>Alternative source of domestic energy</th>
<th>Status of environmental restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Worse</td>
</tr>
<tr>
<td>Charcoal</td>
<td>11 (5.9%)</td>
</tr>
<tr>
<td>Firewood</td>
<td>23 (12.4%)</td>
</tr>
<tr>
<td>Paraffin</td>
<td>00(0.0%)</td>
</tr>
<tr>
<td>Others (Solar)</td>
<td>1 (0.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>35(18.8%)</td>
</tr>
</tbody>
</table>

\[X^2 = 14.995 \quad df = 5 \quad \text{Significance} = 0.020\]

From the results, the hypothesis which stated that there is no significant relationship between the type of domestic energy used and the status of environmental restoration was thus rejected. Households that depend on non-wood based domestic energy (paraffin) were more likely to have better perception of environmental restoration than those who depended on charcoal and firewood. The link between poverty and environmental degradation is complex and difficult to discern (source, Milimo et.al, 2002). Poor people exploit the environment in their struggle to survive. With few economic alternatives, the poor tend to over-exploit environmental resources (soils, water and vegetation). This over exploitation provides a short term method of survival but leads to environmental degradations and even fewer future alternatives. There are also instances where environmental degradation leads to falling pasture productivity or increasing levels of disease that in turn create more poverty (Awimbo 2004).
4.8.4 Relationship between Adoption of Energy Saving Stoves and Status of Environmental Restoration

The type of stove used was established and then categorized as either energy-saving or non-energy saving. Table 4.9 Show the frequency distribution for the two categories of people who adopt energy saving stoves and Non adopters.

Table 4.9: Frequency Distribution for Adoption Status of Energy Saving Stove

<table>
<thead>
<tr>
<th>Status</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopted</td>
<td>79</td>
<td>42.5</td>
</tr>
<tr>
<td>Not Adopted</td>
<td>107</td>
<td>57.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>186</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

From table 4.9, majority of the residents (57.5%) did not adopt energy saving stoves (42.5% adopted the energy saving stoves) as promoted by the EMCs, this could be attributed to the fact that firewood could be readily available in Korr and it may also takes time for communities to fully embrace the new technologies.

4.8.5 Cross Tabulation to Show the Relationship between Adoption of Energy Saving Stove and Status of Environmental Restoration

Table 4.10: shows that there was statistically significant association between use of energy saving stove and status of environmental restoration ($X^2 = 6.780$, df=2 p<0.05) adoption of energy saving stoves generally leads to better status of environmental restoration.
Table 4.10: Relationship between Status of Environmental Restoration and Adoption of Energy Saving Stoves

<table>
<thead>
<tr>
<th>Status of environmental restoration</th>
<th>Adoption of energy saving stove</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not adopted</td>
<td>Adopted</td>
<td>Total</td>
</tr>
<tr>
<td>Worse</td>
<td>15 (8.1%)</td>
<td>20 (10.8%)</td>
<td>35 (18.8%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>63 (33.9%)</td>
<td>48 (25.5%)</td>
<td>111 (59.7%)</td>
</tr>
<tr>
<td>Better</td>
<td>29 (15.6%)</td>
<td>11 (5.9%)</td>
<td>40 (21.5%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>107 (57.5%)</td>
<td>79 (42.5%)</td>
<td>186 (100.0%)</td>
</tr>
</tbody>
</table>

From table 4.10 those who adopted energy saving jikos (42.5%) were not optimistic about status of environmental restoration. This could be attributed to the limited environmental awareness of pastoral communities and livestock herders’ attitude towards environment, where herders like to utilize pasture, water and other resources than caring for the environment.

Therefore, from the result, the hypothesis which stated that there was no significant relationship between adoption of energy saving Jiko and the status of environmental restoration was thus rejected. A relatively higher proportion of energy saving stove adopters was more pessimistic about the status of environmental restoration in Korr than the Non-adopters. The former held the view that the environment of Korr centre was worse than they found it. However, majority of the respondents, irrespective of being adopters or non-adopters, perceived the status of environmental restorations as moderate.
4.8.6 Relationship between Household Involvement in Afforestation Activities and Status of Environmental Restoration

a) Household Involvement in Afforestation Programme Index

This index was constructed from the following indicators: involvement in tree planting activities, number of trees planted at the homestead and attendance of any member of the household to environmental awareness meetings/workshop or seminars. The index ranged from a minimum of 2 scores to a maximum of 49 scores with a mean of 10.3 scores.

b) Correlation to Show the Relationship between Household Involvement in Afforestation Programmes and the Status of Environmental Restoration

Table 4.10: shows that there was a positive and significant relationship between involvement in Afforestation programme and the status of environmental restoration \((r=0.170, p <0.05)\). This means that involvement in Afforestation programmes such as tree planting by the households can lead to a higher status of environmental restoration.

**Table 4.11: Correlation Coefficient between Involvement in Afforestation Programme and Environmental Restoration**

<table>
<thead>
<tr>
<th>Involvement in Afforestation</th>
<th>Environmental Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement in Afforestation</td>
<td>1.000</td>
</tr>
<tr>
<td>Environmental Restoration</td>
<td>0.170*</td>
</tr>
</tbody>
</table>

* r value significant at 0.05

The hypothesis which stated that household involvement in Afforestation programmes had no significant effect on the status of the environmental restoration was thus rejected. Thus households actively involved in Afforestation programme were more likely to change their environment for the better.
4.8.7 Relationship between EMC Efforts and the Status of Environmental Restoration

a) EMC Efforts Index

This variable was an index constructed from the following activities that EMC was involved in and were felt at the household level: tree planting, environmental awareness creation, town-cleanup activities, and advising household on the importance of trees, provision of energy saving stoves/Jiko, co-ordination of development activities and reporting environmental issues to the DEC. A score of 2 was given for each activity felt at the household level and the scores summed up to form an index. The index ranged from a minimum of 11 scores to a maximum of 22 scores with a mean of 16.6 scores.

b) Correlations Showing the Influence of the EMC Efforts on the Status of Environmental Restoration

Table 4.12: Correlation Coefficient for Relationship between EMC Efforts and Status of Environmental Restoration

<table>
<thead>
<tr>
<th>EMC effort</th>
<th>Involvement in Afforestation</th>
<th>Environmental restoration</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EMC Efforts</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Involvement in Afforestation</td>
<td>0.421**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>3. Environmental restoration</td>
<td>0.225**</td>
<td>0.170*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**r value significant at P<0.01

*r value significant at P<0.05

Table 4.12 shows that the relationship between EMC efforts and environmental restoration was positive and significant (r=0.225, p<0.05). From the results, therefore, the hypothesis which stated that EMC efforts had no significant effect on the status of environmental restoration was thus rejected. This was an indication that, increases in EMC efforts led to a better environment. EMC efforts are also positively and significantly correlated with household involvement in Afforestation programme. This
implied that Afforestation activities fronted by the EMC had actually borne fruits since household participation had been enhanced.

On the other hand, environmental education and degree of environmental awareness positively affected rehabilitation of the environment as more educated households tends to be more responsive to conservation initiatives. They were also better at receiving and appreciating environmental awareness initiatives by the environmental committees.

4.9 Key Informants and Focus Group Discussion (FGD) Findings

This section answers the following questions posed to the key informants and participants of the focus group discussion: what is the current status of environment in Korr compared to how it was a decade ago? How does households' participation in Afforestation influence environmental restoration in Korr? What is the commonly used source of domestic energy; and from where? What would you propose as the way forward in environmental management in this area?

4.9.1 Activities of the EMC

From table 4.4 the role of EMC was mainly creation of Environmental Awareness (88.2%), participation in tree planting Activities (79.6%) and holding meetings/Barazas (79.6%). They also look into the aspect of water and pasture management and discourage people from cutting trees indiscriminately. All trees in Korr and its environment were to be protected while charcoal burning and firewood collection was to be regulated through permits to only a few deserving (poor) people in Korr (Millimo et.al, 2002).

It was generally observed that pastoralists Communities in Korr are generally reluctant to carry out environmental management activities, preferring to support social infrastructure projects and activities like digging of wells, construction of dams for provision of water which is dear to them. The main challenges cited by communities during the discussions are: Lack of technical support for environmental management by communities are limited, and also lacked technical service agencies/resources to operate effectively and widely, also NGOs and the private sector are not sufficiently strong in Korr to fill the
development vacuum at the local level and are always short lived due to limited funding; Accessing sustainable funds for environmental projects was also limited.

Environmental education and awareness levels are limited at community level; this was exacerbated by low literacy levels and the limitations to environmental management information delivery systems in pastoral communities.

To address the above issues, Government agencies and development partners in Marsabit County should ensure that appropriate interventions are made in the development planning process, both at the micro- as well as at macro- levels. It is in this regards that the development partners and EMCs felt it necessary to undertake Community Based Environmental Management (CBEM) awareness programmes.

4.9.2 Current Status of Environment in Korr Compared to a Decade Ago

4.9.2.1 Vegetation Cover

A decade ago in Korr the area was nearly bare with few remnants Acacia spp. of trees, but now there are many young acacia trees regenerating especially in areas that use to be livestock bomas (kraal). There is much natural regeneration of trees in protected areas and in EMC conservation sites/areas now, than a few years ago.

4.9.2.2 Collection of Garbage and Waste Management

The situation is worse now especially with many plastic materials strewed all over Korr compared to a decade ago. With the population of Korr centre increasing and some mobile nomads settling/ sedentarlised in towns due to persistent drought that led to loss of their livestock and livelihood the situation is likely to go from worse to worst in terms of solid waste in Korr.

4.9.2.3 Domestic Energy

Solar is a promising source of domestic energy in Korr, if it can be harnessed properly. Korr is hot and has plenty of solar radiation which could be promoted at the household level. Some NGO's like GTZ are promoting the use of solar cookers and also training EMC to in turn train community members.
4.10 Way Forward for Environmental Conservation Initiatives in Korr

Experiences has shown that although many environmental management projects in Korr have, and are being undertaken, one of the main reasons for failure, especially in the case of aforestation projects, is the lack of a feeling of ownership by the local communities. Also, many of the new approaches to environmental management, such as community management strategies, wildlife resource utilisation, and micro-projects, require high levels of understanding and commitment by the individual members of local communities. Clearly, the success of such endeavours will depend largely on effective environmental education and communication approaches, and in involving as many implementers as possible in carrying out EE at the community level.
CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

Environmental management committees (EMC) have been founded in Marsabit County to undertake Environmental Education among the Pastoralists communities of Korr Location. This was undertaken through Awareness programmes at the households’ level. The EMC has found growing acceptance within town dwellers but not from mobile pastoralists who feel that their access to key resources like water and pasture is restricted.

EMC in collaboration with other development partners have implemented awareness programmes to enhance adoption and use of energy saving jikos, afforestation activities, town clean ups and holding public meetings to sensitize local communities on the importance of environmental conservation. Moreover, Tree planting activities was seen as a means to stop environmental degradation and to improve the livelihood of people living in Korr. Mobile nomads hardly participate in any tree planting activities but the town dwellers and its neighbourhoods have put a lot of effort to planting trees as individuals or in groups, however, their skills and knowledge looks poor and the environmental conditions do not also favour tree survival in Korr just like in most ASAL areas.

The EMC and non-environmental group members are the most and least active participants in environmental rehabilitation activities respectively. Non-group members have largely not received trainings or advocacy programmes. The major constraints on participation resulted from the breaking of the EMC rules and regulations formulated in consensus during public Barazas by the resource users.

Most residents and herders reportedly fear curses from Council of Elders who have imposed ban on the cutting down of Acacia tortilis species wholly, but allowed only looping of tree branches. This has contributed largely to the conservation of Acacia tortilis in Korr and adjacent locations.
5.2 Conclusions
The following conclusions were made in regard to environmental restoration efforts in Korr Location.

- Environmental awareness programme led to a higher status of environmental restoration. This was observed from the positive attitude of local communities towards their environment and also their level of participation in environmental projects in the area.

- Households that depend on non-wood based domestic energy like paraffin are more likely to perceive a better environmental restoration than those who depended entirely on charcoal or firewood.

- Households who participate in Environmental Meetings, workshops and afforestation activities are more likely to appreciate their environment and take action to conserve and participate in rehabilitation of their environment.

- The use of a ‘red paint’ marks on Acacia trees promoted by the EMC for protection of endangered Acacia trees have contributed greatly to conservation of the *Acacia tortilis* species in Korr and its neighbourhood, Ngurunit areas.

5.3 Recommendations
The research recommendations are divided into two categories namely, recommendation for local communities and the policy makers

5.3.1 Local Communities

- Environmental awareness should be undertaken at the village level where all community members are fully involved in planning and implementation of the awareness programmes. The use of local dialects in dissemination of information and communication of environmental messages should be promoted and enhanced.
• Energy saving technologies like use of solar cookers for domestic use should be adopted and made accessible at households’ level on a cost-sharing basis for sustainability of the project.
• Every village should establish a woodlot and have a protected conservation site where EMC and development partners could organize inter-village afforestation competition where prize for the best managed woodlots are established and promoted by all stakeholders.

5.3.2 Policy reforms

• There is need to harmonize the role of EMCs through legal backing by NEMA County Environment Committees for effective operation at the grass root.
• Environmental Education should be integrated into the nomadic schools curricula and package environmental advocacy programmes to target herders and out-of-school children/youths.
• Policy makers should find mechanisms to give natural resources a focused value for communities, who bear the cost of management to benefit from the local resources. For example, an incentive scheme for good management to reward greater investment with greater benefits to the local communities should found and promoted by policymakers.

5.4 Areas for further research

• There is need to carry out research on the effectiveness of council of elders curses in conservation of vegetation/local resources in Rendille communities.
• Conduct research on Community Based Environmental Management (CBEM) initiatives that are geared towards addressing realities at the grassroots level, especially participation of women and youths in environmental governance.
• There are numerous environmental project activities that could be formulated to validate indigenous people’s knowledge and skills to harness the unexploited potential of the ASAL areas. For example, marketing of tree products such as honey, gums and resins and traditional medicinal herbs for generation of income for
community groups like the EMCs to motivate them conserve the environment as they derive direct benefit from the conservation efforts.

- Conduct further research to establish low status of environmental education and awareness among the various mobile nomadic pastoralist communities in Kenya.
REFERENCES


NAAEE (2000). Non formal EE Programs: Guidelines for excellence. The North American Association for EE, Troy, USA


UNESCO-UNEP.(2002). In Connect: UNESCO-UNEP Environmental Education Newsletter, 26


APPENDIX 1

QUESTIONNAIRE

Introduction

Hello, my name is Mamo; I am a student at Kenyatta University, Kenya. I am conducting research on the role of environmental management committees in promotion of environmental education in this location in order to be able to make some recommendations for policy makers. Your contribution is vital for success of this work. The responses will be kept strictly confidential. The name appears only as identification.

Participants’ information

Case No.---------------------------------------------------------------

Village ------------------------------------------------------------

Age-----------------------------------------------------------------

Sex-----------------------------------------------------------------

Educational level----------------------------------------------------

Household size:------------------------------------------------------

EMC Efforts- *tick as applicable*

Which of the following activities does the EMC carryout?

1) Environmental awareness 1. No 2. Yes

2) Planting trees 1. No 2 Yes

3) Holding meetings / barazas 1.No 2. Yes

4) Digging of dams 1. No 2. Yes

5) Collection of garbage / clean ups 1. No 2. Yes 77

6) Advising communities on range issues 1. No 2. Yes

7) Collecting fines from illegal resource harvesters 1. No 2. Yes
8) Provision of construction materials for the herders. 1. No 2. Yes
9) Advising communities on the importance of utilizing trees sustainably. 1. No 2. Yes
10) Supervision and co-ordination of environmental issues. 1. No 2. Yes
11) Report to the district environment committee (DEC) at the district level 1. No 2. Yes

Environmental Awareness

Qualify the following statements as TRUE or FALSE.

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Statements</th>
<th>Don’t Know</th>
<th>False</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Trees are important in providing shade/pods for the livestock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Using modern jiko saves on the amount of firewood required to cook a meal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Overdependence on firewood as fuel for domestic use is a major cause of destruction of vegetation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Charcoal is the most environmentally friendly source of fuel for domestic use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Trees reduce dusty conditions experienced in dry seasons.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Cutting down of the trees causes’ environmental degradation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Uncovered waste/garbage around homesteads causes diseases.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scoring: Don't know = 0 while correct choices = 2
Community Involvement in Afforestation Activities *(Tick Where Applicable)*

1. Have you been involved in any tree planting activities in your area in the past one year? 1. No 2. Yes

2. Have you protected any conservation sites personally or with groups in your area?
   1. No 2. Yes. Name the sites______________________________________________________________

3. Have you attended any meeting / seminar on environmental education?
   1. No 2. Yes. Who organized the seminar?

ADOPTION OF ENERGY SAVING STOVES

1. Which of the following description best suits your cooking stove?
   a) Three-stone b) paraffin stoves c) improved jiko d) Electric coil e) Others, specify……

2. Which of the following energy sources do you mostly use in your household?
   a) Charcoal b) Firewood c) Paraffin d) solar e) Others. Specify__________________________________________

3. Which of the following energy sources is the second in use for your household?
   a) Charcoal b) Firewood c) paraffin d) Electric coil e) Others, specify__________________________________________
Status of Environmental Restoration

Rate the following occurrences in comparison to the situation at the time you joined the EMC. Year of joining the EMC?

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Occurrences</th>
<th>Worse</th>
<th>Moderate</th>
<th>Suggestions/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Regeneration of trees/trees cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Dust conditions in Korr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Problem of garbage / plastics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Wind related problems / destructions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Livestock conditions and herders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Range and water sources management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Community participation in environmental conservation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scoring: Worse = 1 Moderate = 2 better = 3
APPENDIX 2

GUIDELINES FOR FGD AND KEY INFORMANTS INTERVIEW

1. What are the activities of EMC and other environmental agencies working in Korr?

2. What is the current status of the environment in Korr compared to how it was a decade ago?

3. Where does the Korr community graze their livestock during the dry and wet season?

4. What is the commonly used source of domestic energy for the Korr community?

5. What is the way forward for the environmental management for the Korr community?