UNIVERSITY OF NAIROBI

INSTITUTE OF DIPLOMACY AND INTERNATIONAL STUDIES

ANALYSIS OF ENVIRONMENTAL SECURITY IN EAST AFRICA

BY

CHARITY MUTHONI MUNYASYA

STUDENT NO: R50/75926/2014

SUPERVISOR

DR. MARTIN OUMA

A Project presented in partial fulfillment of the Degree in Masters of arts in International Studies, Institute of Diplomacy and International Studies, University of Nairobi

MARCH 2015

DISCLAIMER

The information contained in this Study is the result of my academic research carried out by me. The views and/or Observations expressed in this research are my own and they do not reflect/ or represent any way the official position of National Defence College (NDC) Kenya.

DECLARATION

I, Charity Muthoni Munyasya declare that this is my original work and that it has not been submitted to any other Institution for an award of any degree.

Signature _____ Date: 29TH JUNE 2015

NAME: Charity Muthoni Munyasya

Reg No: **R50/75926/2014**

RECOMMENDATION

This Study has been forwarded for examination with my approval as University Supervisor.

Signature _____ Date: 30TH JUNE 2015

DR. MARTIN OUMA

Doctor of International Security Studies

Institute of Diplomacy and International Studies

University of Nairobi

DEDICATION

I dedicate this study to my children Benjamin Mwandi, Melissa Ndanu, Faith Karimi and Elih Nzelu Munyenje for the great support and understanding. I give glory to God for the sufficient grace, care and protection during the course.

ACKNOWLEDGEMENT

I would like to express my gratitude to my supervisor Dr. Martin Ouma for the useful comments, remarks and engagement through the learning process of this thesis. Also I would like to convey thanks to the Government of Kenya and specifically Kenya Forest Service for giving me the opportunity and paying for me to undertake this study. I would also like to thank the National Defence College (NDC) Kenya for the wealth of knowledge that I have acquired during the course.

I wish to express my love and gratitude to my beloved children for their understanding, support and endless love through the duration of my studies. Also I want to thank Dionisia Wanjiru with her family for offering to stay with my family when I was studying.

ABSTRACT

Environmental security is achieved as a result of proper management of the natural resources which ensures that the communities are less vulnerable. This is achieved by ensuring that there is proper environmental management by states, the importance of addressing the socioeconomic factors of the communities and cooperation at all levels of research, policy, implementation and analysis. Environmental degradation, inequitable access to natural resources and the trans-boundary movement of hazardous materials can lead to conflict and pose a risk to national security and human security. Trans-boundary pollution for instance, can disrupt relations between neighboring states which share a common resource base. The study investigated the impact of environmental degradation on the environmental insecurity, the socio-economic factors that lead to environmental degradation, the strategies to manage the natural resources sustainably for posterity. The study focused on how best the states within the East Africa Community can implement their environmental strategies and also co-manage the joint natural resources sustainably. There is a need to identify useful regionally coordinated approaches, regional sharing of experiences and responsibilities, undertaking regional research efforts when the critical mass is too limited nationally, for the natural resources that are shared like waters, watersheds, forest resources and/or when there are positive returns to scale by sharing of information, investment costs, research and development.

LIST OF FIGURES

Figure **Page**

LIST OF ABBREVIATIONS/ACRONYMS

AfDB- African Development Bank

AIDS- Acquired Immune Deficiency Syndrome

ASAL- Arid and Semi Arid Lands

AU- African Union

CBD- Convention on Biological Diversity

CFC- Chlorofluorocarbons

CITIES- Convention on International Trade in Endangered Species

CSD- Commission on Sustainable Development

EAC-East African Community

ECOSOC-United Nations Economics and Social Council

EIA- Environmental Impact Assessment

EMCA- Environment Management Co-Ordination Act

ENVSEC- environmental security initiative

EU- European Union

FAO- Food and Agriculture Organization

GDP- Gross Domestic Product

GEM- Gender Empowerment Measure

HDI-Human Development Index

HIV-Human Immunodeficiency Virus

IFF ï Intergovernmental Forum on Forest

IGAD- Intergovernmental Agency on Development

IMF- International Monetary Fund

IOM- International Organization for Migration

IPCC -Intergovernmental Panel on Climate Change

LVBC- Lake Victoria Basin Commission

LVFO- Lake Victoria Fisheries Organisation

MEA- Multilateral Environmental Treaties

MEAs-Multilateral environmental agreements

MEWNR- Ministry of Environment and Water Resources

MDGs- Millennium Development Goals

NAPAs- National Adaptation Programme of Actions

NEPAD-New Partnership for Africaôs Development

NES- National Environment Secretariat

NTFPs- Non-Timber Forest Products

OECD-Organization for Economic Cooperation and Development

RISDP-Regional Indicative Strategic Development Plan

SAP-Structural Adjustment Programme

SOE- State of Environment

TRIPS-Trade-Related Aspects of Intellectual Property Rights

UNCCC- United Nation Convention on Climate Change

UNCCD- United Nation Convention to Combat Desertification

UNCED- United Nation Conference on Environment and Development

UNCHE-United Nations conference on the environment

UNCLOS- United Nations Convention on the Law of the Sea

UNECA- The United Nations Economic Commission for Africa

UNEP- United Nation Environmental Program

UNFCCC- United Nation Framework Convention on Climate Change.

UNISDR-United Nations International Strategy for Disaster Reduction

VCLT- Vienna Convention on the Law of Treaties

WCED- World Commission on Environment and Development

WED- World Environmental Day

WRI-World Resource Institute

WSSD- World Summit on Sustainable Development

WTO- World Trade Organization

Terminologies and concepts[1]

Climate*:* situation of a climate system, including the statistical description, taking into account averages and variations in temperature, rainfall, winds and other relevant meteorological factors in a given period.

Climate change*:* change of climate attributed directly or indirectly to human activity that alters the composition of global atmosphere which is in addition to natural climate variability observed over comparable period.

Climate variability*:* seasonal shifts in mean climatic conditions such as temperature and precipitation.

Climate change adaptation*:* adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Such adjustment may be preventive or reactive, private or public, autonomous or planned.

Climate change mitigation*:* human interventions to reduce the sources or enhance sinks of greenhouse gases.

Carbon sink: any process, activity or mechanism that removes greenhouse gases, aerosols or precursors of greenhouse gases from the atmosphere.

Coping capacity*:* means by which people or organizations use available resources and abilities to deal with adverse consequences of disaster. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards.

[1] Adopted from Intergovernmental Panel on Climate Change (IPCC), United Nations Framework Convention on Climate Change (UNFCCC) and United Nations International Strategy for Disaster Reduction (UNISDR)

Early warning system*:* is a functional system for generation and provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response

Climate Impact Assessment: the practice of identifying and evaluating the detrimental and beneficial consequences of climate change on natural and human systems

Greenhouse gases*:* gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.

Global warming*:* intensifying greenhouse effect resulting from anthropogenic actions, where the consequence is an increase in the concentration of greenhouse gases, aerosols or their predecessors in the atmosphere, which absorb part of the infrared radiation emitted by the Earthôs surface, thus increasing the average temperature on the planet and causing adverse climatic phenomena.

Sustainable Development*:* Development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

Vulnerability*:* The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.0 Introduction.

A clean and healthy environment is a right of every person. In Kenya, it is a constitutional right. This chapter will focus on the background of the study, the statement of the problem, the objectives, the justification, the literature review, the theoretical framework, the conceptual model, and the research methodology that will be used in the study.

1.1 Background to the study.

In the world over there was lack of interest in environment issues. However this changed in the early 1970ôs as a result of debate that culminated in the United Nations conference on the environment (UNCHE) in Stockholm 1972[2]. Following this landmark conference, environment has now become a political priority in the foreign policy of most countries including the most developed ones. Examples such as the Paris meeting of the group of seven most industrialized countries (G7) in 1989 was dubbed ñGreen Summitò because of the importance it accorded environmental problems.

The Huston G7 meeting of the mid 90ôs also had a final communiqueôthat cited environment as one of its most important responsibility. This change in attitude is in part attributed to nongovernmental ecological organizations and the green parties of the United States and Western Europe. Their activism has to a large part contributed to elevating the importance of environmental issues in the foreign policy agenda[3] . The international dimension of the environment and its impact on security results of the aggression that the environment suffers has

[2] Heraldo munoz(1992) Environmental and Diplomacy in the Americas. Lynne Reiner publishers B O Colorado USA p.1.
[3] Ibid P.!

effects that go beyond the borders of the country where the abuse occurred or environment knows no borders[4]. The interest for instance in relocating in the south industrial plants that produce negative environmental impacts which are unacceptable to the developed countries, are examples of non-military aggression to which the environment in the south is being exposed.

Environmental degradation is determined by environmental change, population size and growth, and unequal distribution (or access to) resources. Examples of emerging environmental change are: depletion and pollution of fresh water supplies, depletion of fisheries, degradation and disappearance of biodiversity, degradation and loss of agriculture lands, food and health safety atmospheric ozone depletion, and global warming. The interaction among and between the determinants of environmental scarcity sets the stage for addressing the environmental security challenges humankind will be confronted with. Our ability (or lack thereof) to make innovative institutional arrangements and/or technological advances for managing the environmental security challenges we face, will increase or decrease global environmental security.

There are environmental problems that are more regional in scope, such as the deterioration of water basins, the ecosystems shared by various countries. For example, deforestation and misuse of land in higher elevations of the basins causes siltation at the lower elevations[5]. The river Nzoia of Kenya floods every now and then at the bundalangi area and this carries a lot of soil sediments that go to Lake Victoria which is a shared natural resource. Such cross borders environmental issues need to be addressed early enough to avoid a future disaster and conflict. The environmental impacts are at times not readily reversible and if not addressed on time, this can cause a conflict between, individuals, agro-ecological zones and states. The Late Kenyan

[4] Ibid P.3
[5] Ibid P.4

environmentalist and the Nobel Peace Prize winner Prof Wangari Maathai said, ñNature is very unforgivingò[6]. Therefore there is need to analyse the potential environmental insecurity issues and address them for protection and sustainable management to ensure that there is no conflict. With the global environmental challenges, even though an individual farm owner, individual factory owner or individual state cannot mitigate the changes in climate, it is their specific actions that will collectively combine to have a positive impact on the climate change. This will also ensure that the natural resources will be used for posterity.

1.2 Statement of the Research Problem

In 2004, The United Nations Environment Programme analyzed some conflicts within Africa and found out that due to high demand of the natural resources caused by the growing population where as the land size and the resource is not expanding, the environmental changes has impact on human vulnerability and this brings or accelerates conflict. This was done in areas like, Darfur region in Sudan, Karamoja in Uganda, the maasai land in Amboseli Kenya among others[7]. Studies have shown the different environmental factors and the impacts of poor environmental management resulting to climate change globally. The study will try to understand the best ways which the governments in the East African Community can sustainably manage the natural resources for current and future generations. The main gap that needs to be filled is the integration of the sustainable management of natural resources. The recent case is where tourist transportation from Kenya and Tanzania has not been harmonized yet the tourists are visiting the same ecosystem. Focusing on the existing policies the study will look on the effectiveness of their implementation and areas of practical cooperation to have the best environmental conservation strategies in order to avoid intrastate environmental conflict and

[6] She repeated this when she officiated the environmental solder program prize awards in Karura forest, Nairobi Kenya on June 2011. The researcher was in that event.

[7] Africa Environment Outlook. (AEO) Case Studies, Human Vulnerability to Environmental Change.

interstate environmental conflict. This will enhance environmental security and peace in the region.

1.3 The Objectives of the Study.

1) To investigate the impact of Environmental degradation on the Environmental security in East Africa Region.
2) To investigate the socio-economic factors that lead to environmental degradation in East Africa Region.
3) To find out the best strategies of managing the inter-related and joint natural resources in the East Africa Region.

1.4 Research Questions

i. What is the impact of Environmental degradation on the Environmental insecurity in East Africa Region?

ii. How does the socio-economic factors that lead to environmental degradation in East Africa Region?

iii. What are the best strategies of managing the inter-related and joint natural resources in the East Africa Region?

1.5 Justification

The increasing land degradation caused by the climate variability, patterns of economic activities, cultural practices combined with policy issues makes people vulnerable. People have limited capacity to cope with the increasing levels of land degradation, causing them to œexportô their ecological problems to their neighbors. This results into environmental conflict. One of the

areas that has experienced this type of conflict within the region are Darfur region in Southern Sudan, Karamoja in Northeastern Uganda and the maasai in Amboseli Kenya.

The findings of this study will benefit the policy makers in the East Africa Community to ensure that there are clear policies and policy guidelines governing the sustainable management of the natural resources so as to avoid any conflicts related to environmental security. The study will also promote the international relations of the member states, the region will have well managed resources. The strategies found would also help the implementers of the policies on sustainable natural resource management.

The findings of this study will benefit the academia by adding to the knowledge. This will also lead to development of theories of protective environmental management as opposed to ócurativeô environmental management.

The general public of the member states and others will benefit from this study because the strategies found will go a long way in ensuring that there is good environmental health that will promote sustainable natural resource productivity and ensure that there is no degradation of the existing resources. This will promote peace because there will be no environmental conflicts at all levels; individual, state and region (interstate), this will contribute to the international peace.

1.6 Literature Review.

The aftermath of the Second World War brought about a genuine retrogression from nationalism in the form of a movement towards the unification of the Western Europe. This movement has thus far to its credit several concrete achievements in terms of working supranational organizations. The restoration of the natural environment, the supply of food and raw materials and problems of this kind cannot be solved by an individual nation competing with other nations

for national advantage. All nations have a common interest in the solution of these problems, which interest ought to be reflected in common policies transcending particular national interests. This testifies that the undiminished strength of nationalism that organizations such as the United Nations and its specialized agencies like United Nations Environmental Programme, were created for the purpose of realizing the common interests of nations of the world[8].

Environmental degradation, inequitable access to natural resources and the trans-boundary movement of hazardous materials can lead to conflict and pose a risk to national security and human health. Trans-boundary pollution for instance, can disrupt relations between neighboring states which share a common resource base. Health risks and involuntary migration due to water scarcity, inequitable access to land resources, uncontrolled stocks of absolute pesticides or other forms of radioactive waste and hazardous substances have been identified as threats to stability and peace. However, common problems linked to the use of natural resources can also bring people to work together towards a common goal; thus environmental cooperation can act as a powerful tool for preventing conflicts and promoting peace between communities and societies.

The environmental security initiative (ENVSEC) an inter agency initiative was created to encourage key public decision makers in Pan European region to act to advance and protect peace and the environment at the same time. The ENVSEC responds to the challenges by supporting pilot inventions on a country and regional level with a span from in-depth vulnerability assessments, international conventions and cartographic tools to capacity building and enhancing of civil society for stronger institutional dialogue and improve environment and

[8] Hans J. Morgenthau revised by Kenneth w. Thompson POLITICS AMONG NATIONS The Struggle for Power and Peace. Reprinted in 2001. Pg 122.

security policies. The main thematic areas include; Natural resources and security risk management, Hazardous Substances, Climate change and information and participation[9].

As security researchers have moved away from narrowly defined military understanding of threat, vulnerability, and response mechanism, ñEnvironmental securityò has become one of the critical areas on the security agenda, reflecting a common concern for the implications of environmental change. However, while the environmental movement has succeeded in providing the world with a new lens through which to look as it seeks to define the requirements for security and development, the term ñEnvironmental securityò has generated considerable confusion and continuous debate about how the environment and security are linked. Research on ôThe environment and securityô has failed to produce a commonly agreed definition or a common policy agenda, with both the traditional security community and the environmental community resisting the use of the term, each for quite different reasons[10].

Exploring the links between the environment and security were first articulated in the 1960s in connection with the problem of human-generated environmental degradation. Giving priority to nature is seen in the ôsecurity of the environmentô concept. This interpretation emphasizes securing the integrity of the environment as both primary referent and security goal and is reflected in the early research. In the 1970s, analysis of effect of war, violent conflict and conflict refugees on the environment emerged. A predominant theme has been that of the significance of the environmental stress as a contributor to, or aggravating factor in conflict in many parts of the developing world. Case studies focused mainly on environmental scarcity: the

[9] www.unep.org/roe/KeyActivities/EnvironmentalSecurity/tabid/54360/Default.aspx on 26/08/2014.
[10] J. Barnett, The meaning of Environmental security: Ecological politics and policy in the New security Ezra, Zed Books, 2001, p 122.

relationship between environmental degradation, depletion of renewable resources like water, land, forests and violent conflict[11].

Research responded to the realization that a great deal of environmental change is directly and indirectly affected by human activities and conflicts, and shifted to examining how environmental stress contributes to conflict in combination with other relevant factors ways in which environmental stress inter-relates with other conflict drivers. More recent research has highlighted the importance of conflict arising from access to/ control over non-renewable resources like gold, oil and diamonds for strategic purposes. The term ónew warsô has been used to capture the changing nature of war, the gradual shift in the causes of conflicts, their duration and the increase in the incidence of regional conflicts. Ostensibly based on identity politics, statehood whether control or secession, or the control of natural and other resources. These conflicts are largely devoid of the geo-political or ideological goals that characterized earlier wars. Implicit in these ógreed or grievanceô debates that are that environmental factors can and should be integrated into traditional security affairs in so far as they threaten the national interest. The issue is not seen to be environmental degradation or scarcity *per se,* but the fact that it poses a security concern because of the potential for violence or conflict.

The óEnvironment and securityô debate only offers a partial broadening of the security agenda. ôWhat is to be securedô remains predominantly the survival of the state and its members. Thus environmental insecurity becomes synonymous with environmental threats to the state. Such an

[11] Africa Environment Outlook, Human vulnerability to environmental change. Case studies of Africa. UNEP 2004.

approach is consistent with conventional notions of national security, which do not necessarily guarantee the security of individuals and communities[12].

In contrast to the statist approach, the argument for a more interdisciplinary and integrative approach sees environmental security as a crucial component of the broader concept of ôHuman securityõ. Human security identifies the individual and by extension, the collective, as the referent object of security. This has not necessarily brought clarity, precisely because the elasticity arising from a broader concept of environmental security. The relationship between the environment and security is a complex one in which many factors play a role. The cause and effect of tensions and vulnerabilities are multi-dimensional, and the links between the various components may be direct or indirect. Vibrant debate also reflects different concepts of nature and environment and what gets counted as environment.

The danger of many approaches is that they risk dichotomizing humans and nature. On one hand, environmentalism is always seen as just another special interest, a ósupposed thingõ out there which requires protection and for which technical fixes are promoted. On the other hand is the pre-eminence of human interests which presumes the environment does not matter yet they depend on it. If one understands the notion of the environment as including humans, then the way we define problems alters and we arise at a reformulation of environmental security in terms of human security, and one which draws on the insights of ecological security.

As the magnitude of human impact on the ecological systems of the planet become apparent, there is increased realization of the intimate connections between these systems and human health, the economy, social justice and national security. The concept of what constitutes ôThe

[12] L. Elliot, The global politics of the environment, Macmillan press Ltd, London, 1998, p 231.

environmentô is changing rapidly examining ways in which the environment is connected to human security is an approach the focuses on social, poverty, inequity and the scope of this insecurity.

What becomes an environmental case cannot be assumed to be simply the extension of scientific understandings. Scarcity, for example, is determined by more than the mere physical limitations of a natural resource. It is often determined by specific political, socio-economic and cultural contexts. This calls for an understanding of how social and political framings are woven into both the formulation of scientific explanations of environmental problems, and the solutions proposed to reduce them. People have always used nature to further their goals and this manipulation has resulted in a series of environmental problems. Our fate is bound up with risks that are deliberately taken for the sake of benefits conceived in advance by means of technological mastery over nature. It is in exploring the significance of the social, political, economic and cultural factors in the production of hazards and risks that we reach an understanding of the structural causes of hazards and risks[13].

Response to, an engagement with nature are highly diverse, ambivalent and embedded in daily life. One culture may perceive nature as a robust, another as fragile and it is on these images of reality that we act. It is a question of interpretation. It is those perceptions that dominate; how they are constructed, and how political decision making takes place in this context that informs and explain why certain actions are taken, and who or what determines whether action is taken.

Two of the key factors that contribute to tension and insecurity throughout the world are poverty and inequity**.** There are close and complex interconnections between people, the environment

[13] J Lubchenco, Entering the century of the Environment: A new Social Contract for Science in Science, Vol 279, 23 January 1998, p 491.

and livelihood opportunities in terms of access to natural resources, and vulnerability to environmental threats which are expressed in their overall impact on human survival, well being and productivity. Environmental change has direct and often immediate effects on peopleôs well being and livelihoods. Insecurity often arises from conditions of inequality and impoverishment, such as seen when political and economic power relations affect society-nature interconnections as evidence by óresource captureô and ócological marginalization.

Another focus is that environmental security problems must focus on the eco-system level, not simply within political boundaries. Creative solutions are called for: there is no place for traditional security responses where states can take unilateral action to attain and maintain the security of their own environment. Furthermore, while the challenges of the environment and of security are principally at the domestic level, they are common to a region, as well as for advanced industrialized countries that carry much of the responsibility for a global environmental change.

Environmental change in Africa has focused to a large extent on the declining productivity of the natural resource-base. This decline has resulted in increased poverty and vulnerability of a large proportion of people in the region. More effective environmental management therefore is seen as a key component in reducing or controlling this decline and reducing vulnerability which is quite high. However better environmental management is only possible by including considerations of how political, economic, and social forces impact on the use and over-use of natural resources and how the declining resource base in turn can drive these components of human security.

The livelihoods of people in Africa are closely linked to access to natural resources. The quality and integrity of the resource base impacts on the stability of many societies in the region. A number of issues exacerbate environmental degradation and ecosystem instability. Environmental degradation only heightens human vulnerability because of the dependence by most Africans on natural resources for basic human needs. Rural people suffer the most in terms of poverty, poor access to health services, food insecurity, economic losses and conflict resulting from disputes over natural resources especially with the increased population. Studies have been carried out on environmental change, human vulnerability and security as case studies of specific sites and concrete examples of the impact of the environmental change on human vulnerability and the ways people respond to these impacts, the horn of Africa has been studied.

The importance of self-reliance in achieving sustainable outcomes to development interventions cannot be overstated. Thinking in terms of local examples can underscore the need to shift from external development paradigms to those derived from the examination of indigenous response to problems. Sustainable development takes place in a particular context that is social, cultural and environmental in nature and therefore interventions to promote such development will be more likely to succeed by considering each set of contexts. The case studies however have a challenge of connecting the wealth of resources and abilities found at the local level with policy making at the National, sub regional and regional levels to reduce human vulnerability. It is however clear that integration of indigenous knowledge of resource management in Africa can make a major contribution towards achieving sustainable development in the region[14].

Traditionally, African communities have been able to adapt to their environments and the changes they undergo (both seasonal and in the long term), by shifting their activities and their

[14] Klaus Topfer, Excecutive Director, United Nations Programme, in Kampala July 2002.

locations and relying on a diversity of livelihood and social strategies many of which have to be studied for prober understanding. Unfortunately, the increasingly rapid rate of environment change and loss of resources as well as forces of social economic change have undermined coping capacities in many of these societies. The strategies that were relied on to get by during times of environmental shocks are often no longer viable. As a result, these communities suffer from a reduced set of livelihood options and are at an increased risk of food security as well as threats to their social survival.

Human vulnerability can be looked from a variety of dimensions, including biophysical, social and economic. Biophysical dimensions, this considers the impact of the state of the environment and changes in that state. These includes land degradation, impacts on fresh water management , pollution, impacts on habitat , biodiversity as well as a range of natural disasters. The social dimensions of human vulnerability include, poverty, health, the marginalization of the traditional coping strategies and knowledge, civil strife and armed conflict. Economic dimensions; It considers the fact that the economy is a pressure on the environment but can also be negatively affected by the climate change[15].

Scholars have indicated that the field of environmental security studies is still largely an emerging one. There are ambiguities, but this does not mean that we should not pay more attention to understanding environmental change and its relationship with human security. This is not an argument for a redefinition of international or national security, but for a greater appreciation of the nature of certain threats and of a more comprehensive approach to the politics

[15] Africa Environment Outlook, Case Studies, Human vulnerability and Environmental change.2004.

of security and sustainability. The emphasis also needs to shift away from focusing on conflict as an outcome of resource scarcity.

The focus should be on the prevention of resource scarcity, and being more concerned about social disruptions than about violent conflict as the principal sources of insecurity**.** This calls for the urgent need for mitigation against the causes, and management of, environmental insecurities arising from threats such as degradation and climate change considering there is growing population and the land size is not increasing. Implicit in this is security of the environment, valuable in its own right (not merely as a set of risks), *and* as a crucial component of human security. Implicit in the term ôhuman securityô is that it prioritises achieving freedom from fear and freedom from want urgently. It also implies moving beyond a needs-based focus, to a rights-based focus.

The world is facing a global environmental crisis, and, inseparable from this, a crisis of growing global inequality and poverty. These unprecedented environmental and social changes pose huge challenges, and all the signs indicate a need for societyôs cross-sectoral attention to the environment as an underlying security issue.

We have to adjust our thinking if we are to recognize and come to terms with the new challenges, to recognize that insecurity takes many forms. Approaches must be diverse, multi-dimensional and located at many levels from local through to international. This calls for a critical view of structures, institutions, and processes, where these are seen to threaten or undermine peopleôs security, as well as a more holistic concept of human security. Recognition that security threats cover a far broader spectrum of issues among them resource scarcity,

diseases, global warming, or religious fundamentalism unlike before has increasingly gained credibility.

Traditional security institutions have begun to respond to the validity of this shift in security thinking, a paradigm shift that requires answers to these central questions of whose security, security for what and security how .What we currently have is environmental insecurity. It is arguably impossible to achieve environmental security as an absolute condition, not least because security is a highly relative concept. But what we need to work towards is the goal of sustainable security, which integrates human, state and environmental security ï in other words, making security more human and more sustainable. This is a process of ongoing monitoring and adaptation.

Implicit in a concept of environmental security which does not prioritize national security and the issue of conflict above the needs of those who are most environmentally insecure, is recognizing the importance of environmental cooperation. We should not overlook the potential for trust, harmony and cooperation arising from the nexus of security and environmental issues. Focusing only on threats, we should not overlook the environmentally related opportunities available to improve human security. Insights gained from this debate have important implications for practical action agendas, such as the role that the protection and responsible management of natural resources could play in preventing unequal patterns of resource distribution, of exploring mechanisms of governance, building institutional capacity and empowering local populations.

We need to ‘seize upon the opportunities presented by the environment, in recognition of its inherent value, and its deep connections to human beings, societies and economies[16]. Scholars feel that the future imperative of coping with uncertainty, complexity and change is all we can be sure of. Without substantial changes in institutions and governance, economic policies, technology, knowledge and behavior, the prospects for reducing poverty remain bleak.

1.7 Summary of literature gaps

From the above literature review, the study has established that the impact of the environmental degradation on the environmental security has not been clearly outlined in the region. The socio-economic factors that lead to environmental degradation in East Africa Region are not outlined and the strategies for managing the inter-related resources in the East Africa Region are not clearly outlined.

Therefore the study will investigate the impact of environmental degradation on the environmental security, the socio-economic factors that lead to environmental degradation, the existing policies and strategies to manage the natural resources sustainably for posterity. The study will also find out how best the states within the East Africa Region can implement their environmental strategies and also co-manage the joint natural resources sustainably.

1.8 Theoretical Framework

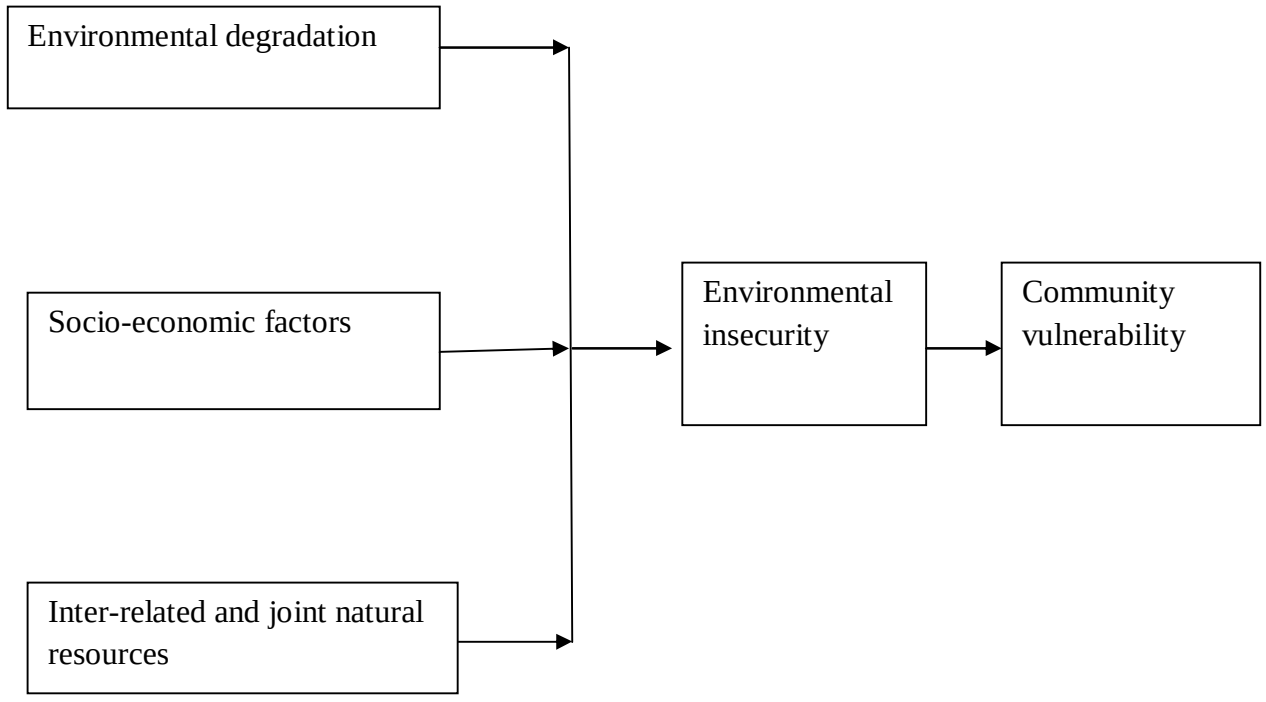
The interdependence theory looks into the interdependency of the states. What happens in one state is likely to affect the other state. Our behavior is affected by this interdependency. This

[16] Khagram, W C Clark, and D F Raad, From the environment and Human Security to Sustainable Security and Development, Journal of Human Development, Vol 4, No 2, July 2003.

theory emphasizes on peace as a result of common trade and economic interdependency. The elements of this theory include; security, economy, culture and environment. These four norms have fluidity, they are of universal concern. States are interdependent on these four elements for example pollution, climate change, affects every state irrespective of its status whether developed or undeveloped.

This theory fits in this study because the issue of environmental conflict would affect all the states in the area directly or indirectly. The interdependence of the environment issues qualifies this theory for this study as per the gaps in the literature review.

Fig 1.1 Conceptual model



Source Author,2015.

1.9 Research Methodology

This study was carried out with the focus on the East African Community states.

1.9.1 Research Design

This research was done using qualitative analysis. The researcher consulted the environmental some policy makers in the East Africa region. The different environmental instruments of the region were studied and analyzed. The state reports, the different environmental policies and strategies of the East Africa Community member states. For the background and literature review, academic journals and articles, various international sites in the internet.

1.9.2 Site of the Study

The study focused on the five East African states that is Kenya, Uganda, Tanzania, Rwanda and Burundi

1.9.3 Sampling Techniques and Sample Size

The study employed purposive sampling techniques. The purposive sampling technique is the deliberate choice of an informant, due to the qualities the informant possesses. It was used because the study was targeting specific groups of environmental policy makers from the East Africa countries.

1.9.4 Research Instruments

An interview guide was used to collect the information. This enabled the researcher to collect as much information as possible. See attached **ANNEX (I).**

1.9.5 Data Collection

Environmental policy makers were visited and with the study guide, then the environmental policies of the countries in the region were accessed

1.9.6 Data Processing and Data Procedures

All the information obtained was translated, transcribed and synthesized. The data is presented in line with the objectives of the study to guide in making recommendations for the best strategies and further research

1.9.7 Data Management and Ethical Consideration

All ethics of research were adhered to for instance the researcher did not force anyone to participate; it was a voluntary exercise. Nobody was tricked to participate and confidentiality was ensured.

1.10 Chapter Summary

Chapter one introduces the study, its aim, the approaches and the scope. It clearly explains what the study is all about and how the study will be carried out.

CHAPTER TWO

THE IMPACT OF ENVIRONMENTAL DEGRADATION ON ENVIRONMENTAL SECURITY

2.0. Introduction

This chapter will address the issues of environmental security. The factors that make the environmental to be unstable and unproductive as it had been originally. The factors include environmental degradation and deforestation.

2.1 Environmental Security

The study observed that environmental security examines threats posed by environmental events and trends to individuals, communities or nations. It may focus on the impact of human conflict and international relations on the environment, or on how environmental problems cross state borders. The Millennium Project assessed definitions of environmental security and created a synthesis definition: Environmental security is environmental viability for life support, with three sub-elements: preventing or repairing military damage to the environment, preventing or responding to environmentally caused conflicts, and protecting the environment due to its inherent moral value.

It considers the abilities of individuals, communities or nations to cope with environmental risks, changes or conflicts, or limited natural resources. For example, climate change can be viewed a threat to environmental security. Human activity impacts carbon dioxide emissions, impacting regional and global climatic and environmental changes and thus changes in agricultural output.

This can lead to food shortages which will then cause political debate, ethnic tension, and civil unrest[17].

Environmental security is an important concept in two fields: international relations and international development. Within international development, projects may aim to improve aspects of environmental security such as food security or water security. Targets for MDG 7 about environmental sustainability show international priorities for environmental security. Target 7B is about the security of fisheries on which many people depend for food. Fisheries are an example of a resource that cannot be contained within state borders. A conflict before the International Court of Justice between Chile and Peru about maritime borders and their associated fisheries is a case study for environmental security[18].

According to the respondents, environmental degradation is the main cause of the environmental insecurity. This is because it reduces the availability of resources, the accessibility of the resources and the affordability of the resources.

2.2 Environmental degradation

Worldwide the greatest effects on the health of individuals and populations result from environmental degradation and social injustice. The two operate in consort and causes include overpopulation, air and water pollution, deforestation, global warming, unsustainable agricultural and fishing practices, over consumption, misdistributions of wealth, the rise of the corporation, the Third World debt crisis, and militarization and wars. Mining is also a destructive

[17] Dodds, F. Pippard, T. (2005). "Human and Environmental Security: An Agenda for Change, London. Earthscan

[18] Dodds, F. Higham, A. Sherman, R. (2009). "Climate Change and Energy Insecurity: The Challenge for Peace, Security and Development", London. Earthscan.

development activity where ecology suffers at the altar of economy. Scientific mining operations accompanied by ecological restoration and regeneration of mined wastelands and judicious use of geological resources, with search for eco-friendly substitutes and alternatives must provide sensational revelation to the impact of mining on human ecosystem. Consequences include increased poverty, overcrowding, famine, weather extremes, species loss, acute and chronic medical illnesses, war and human rights abuses, and an increasingly unstable global situation that portends Malthusian chaos and disaster.

Unfortunately, most of the worldôs governments, guided by self-interest or self-preservation have adapted too slowly to environmental changes and as such face decreasing internal stability, their health care systems in crisis. The report also estimates that 24% of the global disease burden or healthy life years lost and 23% of all deaths or premature mortality are attributable to environmental factors, with the environmental burden of diseases being 15 times higher in developing countries than in developed countries, due to differences in exposure to environmental risks and access to health care. The major cause of the environmental pollution is modern urbanization, industrialization, over- population growth, deforestation to mention some. Environmental pollution refers to the degradation of quality and quantity of natural resources.

Different kinds of the human activities are the main reasons of environmental degradation. These have led to environment changes that have become harmful to all living beings. The smoke emitted by the vehicles and factories increases the amount of poisonous gases in the air. Mostly, we can see pollution in urban areas where population is increasing rapidly. The waste products, smoke emitted by vehicles and industries are the main causes of pollution. Unplanned urbanization and industrialization have caused water, air and sound pollution. Urbanization and industrialization help to increase pollution of the sources of water. Similarly, the smoke emitted

by vehicles and industries like Chlorofluorocarbon, nitrogen oxide, carbon monoxide and other dust particles pollute air and another cause of environmental degradation is sound pollution. The main causes of sound pollution are vehicles, loud speakers, mills and industries. The excessive use of natural resources diminishes them and creates imbalance of the environment. This results in the over consumption of natural resources, deforestation, over use of pesticides, chemical fertilizer and insecticides, congested housing or unmanaged urbanization, industrialization, production of litters, sewages and garages. These are the major reasons to deteriorate quality of the environment and thus causing human insecurity. Pressure of population is awful in town which results air, water and sound population too.

Deforestation provokes the wildlife and other organism to the verge of extinction. The forest areas have been cleared for agricultural land, settlement and to collect the useful herbs. This results in environmental degradation. Global warming is another result of environmental degradation. The temperature of the earth is rising warmer and warmer and due to rise in temperature, the polar icecaps melting and the ice in the colder regions is not as thick as it was before. Many species are lost day by day due to various activities of the human beings. The life of the creature will be in danger if environment goes on deteriorating in the same way. It is estimated that 24% of the global disease burden (healthy life years lost) and 23% of all deaths (premature mortality) are attributable to environmental factors, with the environmental burden of diseases being 15 times higher in developing countries than in developed countries, due to differences in exposure to environmental risks and access to health care. So, to live happy and prosperous life we must conserve our environment and should emphasize on Environmental Degradation and its effects

Land degradation is, usually, the result of complex inter-relationships between biophysical and socio-economic issues which affect many people and their land, especially in the tropics and developing countries. The term land degradation involves both soil and vegetation degradation. Soil degradation refers to negative changes in the physical, chemical, and biological properties of the soil, whereas vegetation degradation is the reduction in the number of species and the vegetation composition.

Usually land degradation is described in terms of the loss in natural resources that includes soil, water, fauna and flora or in the biophysical process by which it functions**.** Soil can be eroded, salinized, acidified or impoverished. Water can be lost through evapotranspiration, evaporation, infiltration, run-off, pollution, or overuse. As habitats diminish, so also do the abundance, uniqueness and diversity of living things. Many factors contribute to land degradation. Since the essence of the dry lands environment is climate variability, the successful use of dry lands requires a balance of capability, utilization, and resilience. Land degradation occurs when this balance is lost. The causes of dry land degradation are complex, and may be the product of anthropogenic or climatic factors, such as the impact of drought and desiccation on ecosystems, the overgrazing of these rangelands, unsustainable land-tenure rights, the undervaluation of land resources, and pricing failures, and numerous other social and economic processes[19]. This is a receipy for conflict as the communities lack, compete or fail to afford the necessary resources from the natural environment as they had been used to accessing traditionally.

Environmental changes arise from the fact that most natural and artificial earth surface features are in a state of flux. The rate of these changes is quite often not uniformly distributed, but

[19] Coppin P., Jonckheere, I., Nackaerts, K., & Muys, B. (2004). *Digital change detection methods in ecosystem monitoring*: a review. International Journal of Remote Sensing

depends rather on the interactions of the biophysical and human components. The need for resource sustainability through proper management has today prompted timely and accurate monitoring of environmental changes to understand their relationships and interactions within a given ecosystem. However, monitoring environmental changes requires a deep understanding of the relevant environmental attributes over time and space to avoid simplistic representations. Common examples of environmental changes largely witnessed today in the developing countries include changes in forest characteristics due to human induced deforestation processes, ecological changes due to the need for agricultural expansion and land use/land cover changes due to factors related to human influences from increased population[20]. In the last couple of years, significant attention has been given to land use and land cover changes, since they form a major component of global changes with greater impact than that of climate change[21]. Such changes in land cover can be generally differentiated into land cover modification and land cover conversion. Land cover modification generally refers to the full substitution of one cover type by another, as is the case with urbanization.

Unsustainable practices in irrigation and production may lead to increased salinization of soil, nutrient depletion and erosion. An estimated 950 million ha of salt-affected lands occur in arid and semi-arid regions, nearly 33% of the potentially arable land area of the world. Globally, some 20% of irrigated land that is 450,000 km2 is salt-affected, with 2,500ï 5,000 km2 of lost

[20] Corey, J. A. B., Navjot, S. S., Kelvin, S-HP. & Barry, W. B. (2007). *Global evidence that deforestation amplifies flood risk and severity in the developing world*. Global Change Biology
[21] Foody, G. M. (2001). *Monitoring the magnitude of land cover change on the southern limits of the Sahara*. Photogrammetric Engineering and Remote Sensing

production every year as a result of salinity[22]. In South Asia, annual economic loss is estimated at US$1,500 million due to salinization[23].

The factors that lead to environmental degradation can individually account for over 50% in loss of the yield in a given ñbadò year. The interactions among these variables, compounded by management systems and society, are highly complex. A changing climate will affect evapotranspiration, rainfall, river flow, resilience to grazing, insects, pathogens and risk of invasions, to mention a few. In the following section we attempt to provide for each variable, rough estimates of how much environmental degradation and loss of some ecosystem services could contribute to reducing yields by 2050. This is based on peer reviewed studies, models and expert judgment, and with the understanding that conditions and estimates vary considerably and relationships are highly complex. Nutrient depletion as a form of land degradation has a severe economic impact at the global scale, especially in East Africa.[24]

According to the respondents, environmental degradation and loss of ecosystem services will directly affect pests inclusive of weeds, insects and pathogens, soil erosion and nutrient depletion, growing conditions through climate and weather, as well as available water for irrigation through impacts on rainfall and ground and surface water. This affects the major resources for agricultural production which affects the social economic factors.

[22] UNEP, (2008).. ñAfricaôs Natural Wealth Key to Economic Prospects.ò *Africa Environment Outlook* Just 27, 2007 press release

[23] UNEP: United Nations Environment Program (2006). AEO: *Africa Environment Outlook*. Nairobi, Kenya: UNEP, and London: Earthscan

[24] Sombroek, W. G.,. Braun, H. M. H. & van der Pouw, B. J. A. (2010). *The explanatory soil map and agro-climatic zone map of Kenya. Report No. E.1, Kenya Soil Survey*, Nairobi, Kenya.

2.3 Deforestation in East Africa

The Food and Agricultural Organisation report indicated that in 2010 there were about 73 million hectares of forest in East Africa and the annual loss of forests was around 0.7 million hectares[25]. Kenya still remained a deforestation rate of about 0.3 % per year. Large loss of forest area was indicated in Tanzania and Uganda about 1.2% and 2.7% per year, respectively. At the same time, several research projects have been carried out to map the distribution pattern of deforestation in East Africa. Remote sensing data were frequently used as a main source of data. Landsat satellite images acquired from several periods were used in studies conducted in Kenya to identify forest areas and land cover change.

These researchers classified satellite images into different classes to identify forest areas. Vegetation indices were also used in some of these studies as an auxiliary data to determine changes in forest [26] the results all showed that forest loss has been severe in these countries during the last decades. He indicated that soil erosion caused by deforestation in Lake Baringo catchment of Kenya damaged the Lake ecosystem and affected the biodiversity in this area. Agriculture expansion, population growth and logging for charcoal were indicated as important reasons for deforestation

According to these studies, remote sensing data is a good tool that can successfully map the pattern of deforestation in East Africa. However, the process and possible drivers of deforestation in East Africa are very complex. Information about forest resources is still lacking

[25] "Food and Agriculture Organization of the United Nations. *(2010) Crop evapotranspiration: Guidelines for computing crop water requirements – FAO Irrigation and drainage*

[26] Malinverni and Fangi, (2010) Ecological Sustainability in a Developing Country such as South Africa: A Philosophical and Ethical Inquiry", 6(2) *The International Journal of Human Rights*,

for East Africa to establish well forest management [27] More research using remote sensing data covering more areas and acquired over longer periods are required to completely monitor the spatiotemporal distribution of deforestation and further clarify the interrelations between deforestation and possible drivers. Therefore, a longitudinal study was implemented in this study to monitor deforestation in East Africa using high resolution satellite images.

The respondents felt that even though all the states have a put the policies and laws in place to ensure that the deforestation is not taking place, there is serious need by all the states within the region to ensure that these laws are properly implemented. The importance of this is to ensure that the major catchment areas are well conserved and this will affect more than one state. For example the mau watershed in Kenya is the major catchment area of rivers supplying water to lake Victoria which is a resource of three states. Therefore if one state fails to prevent deforestation, the effects will be to all the states.

2.4 Factors Responsible for Environmental Degradation

This section addresses the factors that cause environmental degradation which one of the main causes of environmental insecurity. They include among others poverty that leads to over reliance on the natural resources, public awareness and participation, law enforcement, institutional capacity and political support.

[27] FAO, 2001). *Soil Map of the World, Revised Legend. FAO World Soil Resources report no. 60*. Food and Agricultural Organization of the United Nations, UNESCO, Rome, Italy.

2.4.1 Poverty

Poverty is prevalent in Eastern Africa region. This can be seen from the fact that the bottom 25 spots of the United Nations (UN) quality of life index are regularly filled by Sub-Saharan African nations, while Eastern African nations usually constitute one-third of the 50 nations on the UN list of least developed countries. Poverty as used in this article is multidimensional, and goes beyond lack of income to include as proposed by the United Nations Development programme (UNDP), ά the denial of opportunities and choices most basic to human development - to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others.[28] The NEPAD Environmental Action Plan (NEPAD-EAP) has identified poverty as the main cause and consequence of man-made environmental degradation and resource depletion in Africa. Thus, it can be argued that environmental degradation and poverty are inextricably intertwined. The consequence of this linkage is a vicious cycle in which poverty causes the degradation of the environment, and such degradation in turn perpetuates more poverty. Poverty and environmental degradation are often bound together in a mutually reinforcing vicious cycle and thus human rights abuses related to poverty can be both cause and effects of environmental problemsô

The effects of poverty in perpetuating environmental degradation and non-realisation of the right to environment can be seen at both public and private levels in East Africa. At the public level, it adversely affects the stringency of environmental regulations in order to attract more investments into East African countries; the amount of public fund spent on environmental protection by these countries; and in extreme cases, encourages States complicity or active participation in the degradation of their environment as evidenced by some sub-Saharan African governments

[28] United Nations Development Programme (UNDP) (2007), *Human Development Report: Human Development to Eradicate Poverty* 5 (New York

signing agreements with American or European companies to dispose hazardous wastes in their territories. At the private level, it leads to the poor being forced to rely heavily on the ecosystem for their nutritional and energy needs, thereby leading in most cases, to the degradation of the environment.[29] As aptly observed by Johnson, ó[t]he very poor were driven to destroy the environment because they had no other possibilities.

It was a question of sheer survival and this is a threat to human security. The only hope is to improve their lot dramaticallyô The issue of deforestation in Africa exemplifies the effect of income poverty on the environment. Rising demand for fuel wood and charcoal for energy needs has been identified as one of the major causes of deforestation in the region.[30]

Such rising demand is due to the inability of the poor in Africa to access modern and cleaner energy sources caused principally by lack of income. It should be noted that the adverse effects of the rising demand for fuel wood and charcoal for energy purposes is not restricted to deforestation alone, as it has equally led to loss of biodiversity as well as increased atmospheric air pollution in Africa. With regard to the latter, in Kenya for example, charcoal production and consumption are believed to be emitting more Green House Gases (GHGs) than the industry and transport sectors combined.

The effect of income poverty is not restricted to overexploitation or degradation of the environment as it equally affects demand for better environmental quality by citizens from their governments. This is based on the assumption that at low levels of income, people in poor

[29] New Partnership for Africaôs Development (NEPAD), (2003) Action Plan of the Environment Initiative of the New
Partnership for Africaôs development.
[30] Graham & Trotman, (2003)*The Earth Summit: The United Nations Conference on Environment and Development (UNCED)* (London:).

countries are more likely to be preoccupied with sustenance and achieving their basic needs than to bother with environmental quality. However, the reverse is the case when such countries became high-income economies as such high income would lead to citizensô demand for stricter and better environmental control from their policy makers.[31]

The issue of access to court by litigants exemplifies the relationship between a rise in per capita income and demand for environmental quality. It should be noted that legal remedies constitute one of the means by which environmentally conscious citizens can force their government to adopt more stringent environmental regulations or to strictly apply existing environmental regulations and standards. However, access to legal remedies is dependent on the litigants being able to afford it. This invariably means having the financial ability to hire lawyers and use legal institutions as well as offsetting the opportunity cost generated by being away from income-generating activities in the course of the litigation. Such resources are not available to poor people.[32]

Generally the respondents felt the need for the governments to ensure that the communities especially those live near or within the fragile ecosystems should be supported to be able to meet their basic needs which are the causes of the overdependence on the natural resources.

2. 4.2 Lack of Access to Information and Public Participation

The rights of public access to information and participation in governance decision-making process are essential for empowering poor people as such rights enhance their abilities as well as opportunities to participate in the decisions that affect their well-being and livelihood. Thus, in

[31] David Hunter, James Salzman and Durwood Zaelke (eds), (2002) *International Environmental Law & Policy* 2ed,

[32] World Resources Institute, (2005) *The Limitation of Law in Promoting Synergy Between Environment and Development Practices* in Developing Countries:

the absence of these procedural rights, the prospects of achieving sustainable development objectives such as environmental protection and poverty reduction and sustainable development will be adversely affected. Presently the situation in East Africa where access to information held by public authorities is restrictively regulated under the guise of safeguarding public security and safety. As aptly complained by Longe Ayode of Media Rights Agenda (MRA), a Lagos-based non-governmental organisation (NGO), this veil of secrecy makes it difficult to get information from any state agency in East African states.

The research established that lack of access to information contributes directly and indirectly to the degradation of the environment in East Africa. It is direct where it limits the ability of the poor to protect the environment upon which they depend for their sustenance by affecting either their ability to be effective players in environmental policy and decision-making processes that affect them; or their ability to mobilise support to demand sustainable solutions to their environmental problems. The indirect effect of lack of access to information on environmental degradation is through its contribution in exacerbating poverty which as earlier identified in this document, is the main cause of environmental degradation in Africa.

The above is evident from the fact that lack of access to information affects the ability of the poor to make informed livelihood choices, as they are unable to access information regarding market prices for their crops, alternative cropping or pest control options, availability of government assistance or training programs, or opportunities for developing new products or markets for environmental goods. Thus, it can be argued that lack of access to such information affects their prospects of escaping the poverty trap since they are unable to take advantage of new opportunities for generating income and increasing their assets.

In addition, lack of information exacerbates poverty as it affects the peopleôs knowledge of their right to land and its resources. As aptly observed by UNDP *et al*, or the poor, it is their rights and the enforcement of those rights within the law that usually determine whether they will plant, husband, harvest, and successfully manage the natural resource base for environmental income and environmental wealth or work on the margin of subsistence.[33]Furthermore, lack of access to information also affects peopleôs ability to fight corruption that deepens poverty by demanding transparency and accountability in governance from their government. This is due to the fact that in countries where their citizens are uninformed or lacked access to information, there is generally low awareness of what the governments are doing and how they spent their national resources.

The low awareness in turn promotes corruption as governments have little incentive to improve performance, deliver on their promises, or even provide basic services at adequate levels, as the possibility of holding them accountable may not be very possible. Coupled with the issue of lack of access to information in exacerbating the degradation of the environment in sub-Saharan Africa, is lack of public participation especially by the poor in the decision-making process that affects both their livelihood and well-being including decisions on how government resources are to be distributed, and the environment on which they depend for their sustenance. With regard to the latter, it should be noted that their participation in the policy and planning process is essential to ensuring that key environmental issues that affect their livelihoods and well-being are adequately addressed.

In the absence of such participation, not only will development projects such as industries and dams adversely affect the poor through displacement and loss of livelihood, but also rules,

[33] UNDP, (2005) Assessing Environmentôs Contribution to Poverty Reduction New York.

intervention and processes otherwise designed to protect the environment, may end up depriving poor people or communities of their livelihood by denying them access to environmental resources or undermining their traditional tenure rights. This in turn stimulates resentment and low support for the environmental rules, interventions and processes from the affected surrounding communities. Such resentment and low support will adversely affect the implementation or long term viability of the environmental rules and processes, as the affected communities will resort to undermining them.[34]The Kenya constitution has ensured that public participation is applied in all the processes of the decision making and at all levels[35].

Even though the issue of public participation is incorporated in the laws, the respondents felt that the implementation has not been fully achieved. If the communities are empowered they will be able to value the conservation agenda and this will contribute to the environmental conservation.

2. 4.3 Lack of Access to Justice

The study observed that the right of access to justice when oneôs right is infringed or threatened is as much important in empowering people as the rights of public access to information and public participation. The absence of this right contributes to ólawlessnessô in a society, and this in turn, causes or exacerbates poverty with adverse consequence for the protection or conservation of the environment and its resources in Africa. Lack of access to justice may be due to either corruption or procedural injustices in the legal or court systems. With regard to the former, citizens especially the poorest may be denied access to justice when they are unable or unwilling

[34] Transparency International, (2007) Report on the Transparency International Global Corruption Barometer
[35] The constitution of Kenya, 2010.

to cough up the money needed to speed up the judicial proceedings or to influence its outcome. When this occurs, the ability of the judiciary to render impartial and fair decisions is usually compromised while justice is for sale to the highest bidders or the haves. In such a situation, the enjoyment of the democratic right to equal access to courts guaranteed in most African constitutions becomes a mirage. As aptly stated by De Swart, Transparency International Managing Director, as long as the machinery of law enforcement remains tainted, there can be no equal treatment before the law -as stated in the Declaration- nor can there be any real guarantee of human rights more broadlyô.[36] The poor are made insecure by this lack of affordability to negotiate for their resources or right to the clean and healthy environment.

The procedural injustice in the legal systems in Eastern Africa that affects access to justice is evidenced by the procedural requirement of *locus standi* in public law litigation. This rule of *locus standi* has been employed by the governments or their agencies to frustrate the challenges of their citizens who have resorted to the courts to demand accountability. The effect of this denial of access to judicial remedy is rampant abuse of power and corruption, as public officials are not legally bound to be accountable to their citizens. As observed by Odje regarding the effect of lack of access to justice on corruption in the countries.

Lack of access to justice contributes to the degradation of the environment in Eastern Africa as it affects not only the ability of the citizens especially the poor to demand for the protection of the environment that is essential to their sustenance, but also, hampers the efforts of persons or organisations interested in the protection of the environment. This is more critical where the environmental resources being degraded are national resources for which no particular person

[36] Neema Pathak, Ashish Kothari and Dilys Roe, (2010) ócConservation with Social Justice? The Role of Community Conserved Areas in Achieving the Millennium Development Goals

can claim a specific tenure rights such as forests and water resources. This leads to the tragedy of commons which is environmental insecurity.

The lack of access to justice in such a scenario may not be unconnected with the procedural requirement of *locus standi* as most people interested in protecting their national environmental resources may not be able to discharge its onerous requirement. [37]Lack of access to justice also contributes to environmental degradation in East Africa by undermining the enjoyment of property right especially for the poor. It should be noted that when the poor cannot access the machinery of justice in order to defend themselves against the polluting or degrading activities of individuals, multinational corporations or State sponsored companies, it constitutes a disincentive for them to either take action against persons whose actions degrade their property values, or invest in natural resource management.

The latter may lead to poor people prioritising short-term gains in the face of uncertainty over long-term sustainability, thereby causing environmental degradation and exacerbating their poverty. As observed by the World Resource Institute (WRI), appropriate property rights regimes are central to encouraging the poor to invest in their land or in resource management in ways that bring economic development and poverty reductionô. Lack of access to justice contributes to environmental degradation in East Africa by promoting corruption that deepens in the region, as it affects the ability of the poor to fight corruption by demanding political accountability from their leaders. This is due to the fact that access to administrative or judicial justice is vital if citizens are to challenge abuse of power and corruption by their public officials.

[37] Akpo Mudiaga Odje, (2007) óAbuse of Power and Access to Court in Tanzania

It should be noted that administrative justice is obtained by way of petitioning the appropriate agency for redress or sanctions against the corrupt public officials, while judicial justice is by way of petitioning the courts. With regard to the latter, Anderson has identified two important functions of the courts or judiciary with respect to ensuring political accountability vis-à-vis answerability and enforcement.[38] The former refers to the obligation placed upon public officials to make information available about their activities and to give valid reasons for their action. The latter refers to the ability to impose sanctions on political leaders and other public officials who have acted illegally or otherwise violated their public duties, or to give an authoritative pronouncement on which government actions are legal and which are not. The judiciary exercises these accountability functions principally by means of judicial review of either legislation or administrative actions. Judicial review is vital to curbing corruption by acting as a check on the excesses of legislative and executive arms of government.

In the region the legal recourse has been seen as the preserve of the rich and therefore the communities have not been empowered to ensure that they get environmental justice especially where the big companies pollute the environment. According to the respondents, there is need for the awareness creation. The judicial system reforms are being undertaken to ensure that all cases are heard without preferences.

2. 4.4 Lack of Political Will

The research established that another important factor responsible for causing the environmental degradation in sub-Saharan Africa is the issue of lack of political will on the part of African governments to enforce environmental regulations or to adopt new and proactive regulations that

[38] Daniel H. Cole (2008), *Pollution and Property: Comparing Ownership Institutions for Environmental Protection* 6 (Cambridge University Press);

will safeguard the environment from degradation. This reluctance may be due to the economic benefits derived from the activities of the degrading industries in form of revenues and employment opportunities. With regard to the latter, it should be noted that many polluting industries have threatened job cuts when forced to adhere to environmental regulations like changing to cleaner production methods, as it would involve heavy financial expenditure that will render their operations uneconomical. The use of this threat is implicit in the statement of the then Group Managing Director of Shell International Petroleum Company at the parallel annual general meeting of the Company held in the Netherlands in May 1996, when he asked should we apply the higher-cost western standards, thus making the operation uncompetitive and depriving the local work force of jobs and the chance of development Or should we adopt the prevailing legal standards at the site, while having clear plans to improve ôbest practiceô within a reasonable timeframeõ[39]

Regarding the reluctance of the governments in East Africa to enforce or adopt more stringent environmental regulations due to economic reasons, it is more pronounced where the activities of the polluting or degrading industries is vital to the economy of the country in question. Thus, the fear that the polluting industries may pull out of the country if required to pay huge environmental costs or adopt more stringent environmental procedure is enough to deter the government. As observed by Professor Onokerhoraye with regard to the enforcement of environmental regulations against oil companies in Nigeria, ó[a] number of environmental laws geared towards protecting the environment exist but are poorly enforced. The economic importance of petroleum to national development is such that environmental considerations are given marginal attentionô. This is more pronounced where the government is actively involved as

[39] Adegoke Adegoroye, (2009)óThe Challenge of Environmental Enforcement in Africa

a major player in the polluting activities through its agencies or public companies. In such a situation, the government will have less incentive to adopt a rigid and effective enforcement of environmental regulations against itself or its joint venture partners. [40]

The study observed that the governmentôs reluctance to strictly enforce or adopt new and proactive environmental regulations may also be driven by the need to attract foreign investments. The quest to attract foreign investments in this manner may be motivated by the need to increase the revenue base of the government as well as to provide jobs for citizens. It may also be motivated by the need to comply with its mandatory economic liberalisation and deregulations requirements, the centre piece of the structural adjustment programmes (SAP) imposed on debtor countries of which most sub-Saharan African countries fall into the category, by the international financial institutions spearheaded by the International Monetary Fund (IMF) and the World Bank. Whatever the reason or reasons for attracting foreign investments into sub-Saharan Africa in this manner may be, the end result is that it has led to the transfer of environmentally polluting or ódirtyô industries and technologies into Africa with adverse consequences for its environment.[41]

Furthermore, the reluctance to strictly enforce or adopt new and proactive environmental regulations may be due to corruption. This corruption is mostly in the form of either grand or compromise. The former affects environmental policy-making while the latter affects environmental policy implementation. The effect of corruption on environmental policy-making

[40] J.K. Wilson and R. Damania, (2005)óCorruption, Political Competition and Environmental Policyô, 49(5) *Journal of Environmental Economics and Management*

[41] Edward B. Barbier, and Daniel Leonard, (2007)óCorruption, Trade and Resource Conversionô, 50 *Journal of Environmental Economics and Management*

is that it affects the stringency of environmental policies or regulations. Thus, the higher the rate of corruption or rent-seeking, the lower the stringency of the environmental policies adopted by the State. This situation subsists despite the fact that citizens as a result of an increase in their per capita income levels may have demanded for improved environmental quality from their government. The reason for this state of affairs is that the ability of the citizens to influence higher environmental quality as their income increases is dependent on the responsiveness of their governments.[42]

When corruption or rent-seeking influences the stringency of environmental regulations or policies, it leads to a form of ôState captureõ. State capture refers to the actions of individuals, groups, or firms in both the public and private sectors to influence the formations of environmental laws, regulations, decrees and other government policies to their own advantage as a result of the illicit and non-transparent provision of private benefits to public officials. This evidenced by the decision of the government in Tanzania to open up its remaining pristine forest reserves for surface mining irrespective of the ecological consequences. According to Darimani, the intense corporate lobbying of five multinational mining companies in Tanzania principally influenced the governmentôs decision. Compromise on the other hand, affects the enforcement of environmental policies or regulations.

Such compromise occurs mostly at the level of environmental inspections and policing of illegal acts such as poaching, illegal logging, resource trafficking, discharges and emissions. Several studies have shown that environmental regulations are ineffective and unlikely to be enforced if the bureaucrats and political office holders are not transparent and very strict. Therefore, it will

[42] J.K. Wilson and R. Damania, (2005)ôCorruption, Political Competition and Environmental Policyõ, 49(5) *Journal of Environmental Economics and Management*

appear that the implementation of environmental regulations cannot thrive in a polity where there is pervasive dishonesty. As stated by the Environmental Public Prosecutor of Madrid, ćthe non-compliance with environmental laws has its roots in the corruption of the political system Non-compliance with environmental laws is the best barometer of corruption in a political systemĉ

The effect of compromise in the implementation of environmental regulations is evidenced by the controversy surrounding the building of the NGLG project in Uganda. It should be noted that the mandatory EIA procedures before a project of such magnitude can be carried was not done while none of the regulatory environmental agencies intervened. While it has been argued in this article that the lack of regulatory intervention is motivated by the need to protect government revenue earning capacity, recent events have shown it goes beyond that. This is due to the recently uncovered evidence of massive great compromise by political office holders including the then Military Head of State with regard to the awarding of the contract for the construction of the NGLG facility.

This corruption even though on a grander scale, may best explain the reason why officials of both the erstwhile Federal Environmental Protection Agency (now National Environmental Standards and Regulations Enforcement Agency), which was then an integral part of the presidency, and the Department of Natural Resources, which is under the supervision of the Environment minister, did not intervene.[43] This shows that the laws and regulations on environment within the East Africa region exist and there is need to have them implemented appropriately to ensure environmental security.

[43] Ernest M. Makawa, (2010) Experience of Kenya: Public Role in Enforcement, Fifth International Conference on
Environmental Compliance and Enforcement,

The governments in the region should fully support the implementation of the environmental policies. The respondents expressed that it takes time for the major companies to comply with the environmental laws because most of them were established before the laws were formed. It is therefore not automatic to have these laws implemented immediately. However the plans on how they will gradually conform to the laws have been put in place as per the environmental audits. A country like Rwanda is shifting its industrial area which was set up on a wetland. Itôs a very expensive activity but it is happening.

2.4.5 Weak Institutional Capacity

The research found out that even if there is the political will, the ability of the government to enforce environmental regulations or to adopt new and proactive regulations may be affected by the weak institutional capacity of its regulatory agencies. Such weak institutional capacity is manifested by their lack of scientific and technical expertise. It should be noted that institutional scientific and technical expertise are necessary to monitor compliance with environmental regulations by the regulated industries, or to adopt new regulation as the need arises. Where such expertise is lacking, the regulatory agencies may be forced to rely on self-monitoring by the regulated industries or on the expertise of the regulated industries that can hardly be expected to give honest assistance.[44]

As observed by the Special Rapporteur on toxic waste with respect to the illicit trafficking of toxic waste: ôWaste tends to move towards areas with weak or non-existent environmental legislation and enforcement. Many developing countries [including Africa] are unable to determine the nature of substances crossing their border.

[44] O.A. Bowen, (2000)ôThe Role of Private Citizens in the Enforcement of Environmental Lawsô,

Developing countries often lack adequately equipped laboratories for testing and evaluation and the requisite specialised data systems or information on the harmful characteristics of wastes. In a number of cases, offers made to developing countries by waste traders either did not divulge vital information on the nature of the wastes, or the information was distorted; waste brokers mixed one toxic waste with others, or redefined the waste as resource ógoodôô.[45]

In addition, such expertise is necessary for a successful prosecution of those found infringing environmental regulations, as it will enable the discharge of the stringent burden of proof in criminal cases. As stated by Kidd, discharging this burden involves proving technical and scientific facts where it involves failure to meet prescribed standards, of *mens rea* unless expressly excluded by legislation, and *actus reus*, which might be difficult especially in cases of multiple polluters.

The weak institutional capacity of most environmental regulatory agencies may be caused by the lack of adequate funding by their various African governments. Lack of adequate funding is mostly due to the fact that African nations like other developing nations with developmental needs and declining national revenues most often push environmental issues down to the bottom of their national policy agenda while attaching a higher priority to economic and social issues. In such a situation, the funding of environmental management, conservation, and enforcement institutions is usually insufficient. When underfunded, these regulatory agencies lack the ability to acquire and retain the requisite scientific and technical skills. Furthermore, it may lead to corruption by creating a situation where poorly paid and unmotivated officials have an incentive

[45] Wilson M.K. Masilingi, (2008) ó Social-Economic Problems Experienced in Compliance and Enforcement in Tanzaniaô, Fourth International Conference on Environmental Enforcement.

not only to exploit loopholes in laws and regulations, but also, to take bribes during environmental inspections and the policing of illegal environmentally related activities.[46]

In addition, weak institutional capacity may due to corruption by public officials. This usually occurs when public officials divert fund allocated for environmental programmes or projects. Such fund may be from budgetary or statutory allotment, donations and grants from other bodies. Finally, armed conflict contributes to low institutional capacity in most African countries by diverting funds mostly to war efforts as well as facilitating loss of enforcement personnel through either death or displacement.

According to the respondents, the physical environment within the East Africa region had been degraded, the communities that depend on the environmental based resources have little access, the resources are not sufficient. This has resulted to strain on the existing resources. The states have formulated regulations which are not being implemented to ensure that there is environmental protection. The institutions are in place and they have the technical capacity to ensure that the set rules are implemented.

2.5 Chapter Summary

The physical factors leading to environmental degradation are increasing with the increase in population and development. The extraction of the natural resources in increasing as a result of industrial demand amidst lack of sufficient information on sustainable extraction and legal support to regulate the processes. The implementation of the existing laws is also a challenge and this really complicates the sustainable management of the resources for the use by current generation and for posterity.

[46] United Nations Development Programme (UNDP), (2010) Governance for Sustainable Human Development

CHAPTER THREE

SOCIO-ECONOMIC FACTORS THAT LEAD TO ENVIRONMENTAL INSECURITY IN EAST AFRICA REGION

3.0 Introduction

The social economic factors lead to environmental degradation which eventually causes environmental insecurity. Human beings are supported by the ecosystem. Therefore the social and economic activities of man affect the environment where man lives.

3.1 Environmental Change and population

The research observed that drivers of environmental change vary in nature and scope but can be broadly grouped together as demographic, economic and social, science and technology, conflict and governance. Critical social dimensions include poverty and health. Policy and institutions, although most often thought of as the response to mitigate such change, may also drive environment change and impact directly on human vulnerability. Although each driver is discussed individually, there are links between the different drivers - sometimes acting in concert to maximize negative impacts and sometimes producing positive change.

People in Africa are at the centre of sustainable development in rural and urban areas. Although still largely rural, the region has been experiencing major transformation in terms of population composition and distribution, with positive and negative implications for the environment and development. The challenge is not to arrest development but to use the available resources in a

more productive and efficient manner, ensuring better and more equitable returns to people while at the same time lessening pressure on the environment.[47]

Changing demography and particularly the changing age structure of the population, a high rate of urbanization, and a faster rate of population growth in relation to economic growth are major drivers of environmental change in Africa, with significant impacts on the natural resource base. Due to this, it is imperative that population growth and its structural changes are addressed to reduce environmental degradation. Each year, the number of people increases, but the amount of natural resources with which to sustain this population and to improve the quality of lives and to eliminate poverty remain finite, increasing the challenge of sustainable development. Demographic change is the major driver of land cover change: its primary and most direct impact is through opening new land for agricultural, settlement and infrastructural development although other extractive activities such as logging and mining are also significant Environmental State-and-Trends, 20-Year Retrospective assesses the state of Africaôs environmental assets and some of its chapters also consider the relationship between human settlement and environmental change.

The total population of Africa was about 118 million, accounting for 7.4 per cent of the global population. From 1980 to 2000, it grew from 469 million to 797 million, representing 13 per cent of the world population in 2000. By 2020, the urban population is expected to be 646 million up from 302 million in 2000. While insufficient data exists to accurately ascertain the magnitude of urbanization, available statistics indicate a current rate of urbanization in Africa of around 3.5 per cent per year. This rate is the highest in the world, and is resulting in the rapid growth of

[47] Cohen M.J., Brown M.T., and Shepherd K.D, (2006). Estimating the environmental costs of soil erosion at multiple scales in Kenya using emergy sunthesis. Agriculture Ecosystems and Environment

urban agglomerations throughout the region. By 2030, the proportion of Africaôs urbanized population is expected to reach 53.5 per cent, compared to 39 per cent in 2005. This fast rate of urbanization places strain on infrastructure and other services. Many of the newly urbanized live in slums. There is a growing and urgent need for integrated approaches to environmental planning and management even in the urban areas in order to have proper services.[48]

The research established that in the absence of alternative livelihood opportunities and strategic management of the environment, this rapid population growth and urbanization has resulted in environmental degradation and resource depletion. Between 1990 and 2000, Africa lost 52 million hectares of forests: this amounts to a decrease of 0.8 per cent per year and 56 per cent of the global total. It is estimated that 60 per cent of the tropical forest areas cleared in Africa as a whole between 1990 and 2000 were converted to permanent agricultural smallholdings. However, migration to urban areas is not inevitably destructive, nor does it necessarily lead to the formation or growth of dangerous and unhealthy slum areas. It is important to recognize the valuable role urbanization can play in stimulating the economy. The challenge lies in reversing the current pattern, and enhancing the efficiency of and the value derived from natural resource use.[49]

Over the last 20 years, East Africaôs population has got younger, primarily as a result of the impact of HIV/AIDS, but also due to other setbacks. In 2003, more than 40 per cent of the regionôs population was below the age of 15 years. Given this, the youth are becoming increasingly important in natural resource management. The lack of employment and other

[48] World Resources Institute. (2007). Natureôs Benefits in Kenya: An Atlas of Ecosystems and Human Well-Being. Washington, DC, USA

[49] Jensen, J. R. (2000). Remote Sensing of the Environment: an earth resource perspective. Prentice Hall series in geographic information science. Upper Saddle River, NJ, USA

livelihood opportunities, as well as setbacks in education, health and other capabilities, may mean that this generation will have increased natural resource dependence and pose new threats to the sustainability of marine and terrestrial ecosystems. Degraded environments may spur further social and economic conflicts and hardships.[50]

Population growth presents a major challenge because of the patterns of production and consumption that shape the world, as well as the problems of pervasive poverty. Population growth affects the natural resource base in many ways. First, it causes increased demand for food, water, arable land and other essential materials, such as firewood, in all areas. Second, expanded agricultural activities encourage encroachment into forest and woodlands. These consequences are more pronounced in the context of high levels of poverty. Third, the degradation of the natural resource base in turn impinges on the livelihoods of all, but particularly rural, communities. More small farmers are forced to work harder, often on shrinking farms on marginal land, to maintain household incomes.

The option of migration to new lands is virtually closed. In most cases, the impacts vary for men and women depending on the gender relations within the social unit (household, community, livelihood system) that regulates access to and control over resources and management responsibilities. Fourth, global population growth and the increasing demand for fossil fuels and other resources, also places new stress on Africaôs environment. This continous decrease of resources can result to conflicts. Conflict affects population distribution and is a leading cause of internal migration.

[50] Food and Agriculture Organization of the United Nations. (2007) Crop evapo-transpiration: Guidelines for computing crop water requirements ï FAO Irrigation and drainage paper 56, Rome, Italy.

East Africa now has more than 2.3 million refugees, 2 million more than in 1990[51]. This places new pressures on environmental resources. In crisis situations, a large number of people may be displaced in a short period of time, causing a high level of environmental stress in the place where they are relocated due to increased demand and lack of preparedness. The depletion and deterioration of the areas in which camps are located are often related to the high demand for wood for shelters and energy. The inherent competition between local groups and forced migrants over access to natural resources may polarize social relations in refugee settlement areas and undermine opportunities for collaborative environmental management[52]. State initiated resettlement initiatives to make way for development and conservation, such as dams and national parks, may also result in large scale displacements that impact negatively on environmental resources and well-being more generally. This affects social cohesion and in areas where there is no homogeneity it can cause ethnic conflict.

Migration has important implications for development, both positive and negative. Although it contributes to the transmission of disease, the introduction of alien species and the loss of skilled personnel, it may also bring new economic opportunities. The United Nations Economic Commission for Africa (UNECA) and the International Organization for Migration (IOM) estimate that between 1960 and 1975 more than 27 000 highly skilled Africans left the region for industrialized countries. This rose to 40 000 between 1975 and 1984 and then almost doubled by 1987, representing 30 per cent of the highly skilled labour stock.

---

[51] FAO (2003). *Crop evapo-transpiration: Guidelines for computing crop water requirements* ï FAO Irrigation and drainage paper 56, Rome, Italy.
[52] Barnett, J (2001) *The Meaning of Environmental Security: Ecological Politics and Policy in the New Security Era*, Zed Books.

It is estimated that since 1990, at least 20 000 highly skilled and qualified persons leave the region annually. Although the loss of skilled people has negative impacts on the economy and other sectors, it also contributes to development through significant remittances and the enhancement of capacity of those that have left, in terms of skills and experience, potentially building an important human resource for Africa. Internal transnational migration in Africa is significant the profile of such migration has changed from being unidirectional and permanent to being increasingly temporary, seasonal and circular. Africa has the most mobile populations in the world: there are many reasons for migration one important motivation is to cope with ecological and economic problems[53] .

The respondents expressed that population pressure on the resources is increasing. The population is growing and the land is not growing. There is also substantial industrial growth in the region and this is contributing to increase in solid and liquid waste. Rural urban migration is causing strain on the infrastructure in the urban areas.

3.2 Socioeconomic Factors

The research observed that various human factors drive, influence and affect environmental change at the global, regional, national and local levels. Drivers of environmental change vary in nature and scope but can be broadly grouped together as demographic, economic and social, science and technology, conflict and governance. Critical social dimensions include poverty and health. Policy and institutions, although most often thought of as the response to mitigate such change, may also drive environment change and impact directly on human vulnerability. Although each driver is discussed individually, there are links between the different drivers -

[53] Agrawal, A. (2012). *Common resources and institutional sustainability*. In E. Ostrom, *The drama of the commons* (pp. 41ï 85). Washington DC: National Academies Press.

sometimes acting in concert to maximize negative impacts and sometimes producing positive change[54].

3.2.1 Demographic Change

The research established that there is rapid demographic change, by 2030, the proportion of East Africaôs urbanized population is expected to reach 53.5 per cent, compared to 39 per cent in 2005. People in Eastern Africa are at the centre of sustainable development in rural and urban areas. Although still largely rural, the region has been experiencing major transformation in terms of population composition and distribution, with positive and negative implications for the environment and development. The challenge is not to arrest development but to use the available resources in a more productive and efficient manner, ensuring better and more equitable returns to people while at the same time lessening pressure on the environment.

Changing demography and particularly the changing age structure of the population, a high rate of urbanization, and a faster rate of population growth in relation to economic growth are major drivers of environmental change in Africa, with significant impacts on the natural resource base. Due to this, it is imperative that population growth and its structural changes are addressed to reduce environmental degradation. Each year, the number of people increases, but the amount of natural resources with which to sustain this population, to improve the quality of lives and to eliminate poverty remain finite (WCED 1987), increasing the challenge of sustainable development. Demographic change is the major driver of land cover change: its primary and most direct impact is through opening new land for agricultural, settlement and infrastructural development, although other extractive activities such as logging and mining are also significant.

[54] Agrawal, A. (2012). As above.

Environmental State-and-Trends: 20-Year Retrospective assesses the state of Africaôs environmental assets and some of its chapters also consider the relationship between human settlement and environmental change.[55]

At the beginning of the 20th century, the total population of Africa was about 118 million, accounting for 7.4 per cent of the global population according to United Nations Population Division 1996. From 1980 to 2000, it grew from 469 million to 797 million, representing 13 per cent of the world population in 2000. By 2020, the urban population is expected to be 646 million up from 302 million in 2000[56]. While insufficient data exists to accurately ascertain the magnitude of urbanization, available statistics indicate a current rate of urbanization in Africa of around 3.5 per cent per year. This rate is the highest in the world, and is resulting in the rapid growth of urban agglomerations throughout the region.

By 2030, the proportion of Africaôs urbanized population is expected to reach 53.5 per cent, compared to 39 per cent in 2005. This fast rate of urbanization places strain on infrastructure and other services. Many of the newly urbanized live in slums. There is a growing and urgent need for integrated approaches to environmental planning and management. In the absence of alternative livelihood opportunities and strategic management of the environment, this rapid population growth and urbanization has resulted in environmental degradation and resource depletion.

Between 1990 and 2000, Africa lost 52 million hectares of forests: this amounts to a decrease of 0.8 per cent per year and 56 per cent of the global total. It is estimated that 60 per cent of the

[55] Bandura, A. (2008). *Environmental sustainability by sociocognitive deceleration of population growth*. In P. Schmuck & W. Schultz (Eds.), *Psychology of sustainable development* (pp. 209ï 238). Norwell, MA: Kluwer

[56] FAO (2003)

tropical forest areas cleared in Africa as a whole between 1990 and 2000 were converted to permanent agricultural smallholdings[57]. However, migration to urban areas is not inevitably destructive, nor does it necessarily lead to the formation or growth of dangerous and unhealthy slum areas . It is important to recognize the valuable role urbanization can play in stimulating the economy. The challenge lies in reversing the current pattern, and enhancing the efficiency of and the value derived from natural resource use [58]

Over the last 20 years, Eastern Africaôs population has got younger, primarily as a result of the impact of HIV/AIDS, but also due to other setbacks. In 2003, more than 40 per cent of the regionôs population was below the age of 15 years. Given this, the youth are becoming increasingly important in natural resource management. The lack of employment and other livelihood opportunities, as well as setbacks in education, health and other capabilities, may mean that this generation will have increased natural resource dependence and pose new threats to the sustainability of marine and terrestrial ecosystems. Degraded environments may spur further social and economic conflicts and hardships.

Population growth presents a major challenge because of the patterns of production and consumption that shape the world, as well as the problems of pervasive poverty[59]. Population growth affects the natural resource base in many ways. First, it causes increased demand for food, water, arable land and other essential materials, such as firewood, in all areas. Second, expanded agricultural activities encourage encroachment into forest and woodlands. These

[57] UNEP(2008)
[58]FAO. (2009). Food and Agriculture Organization of the United Nations. Crop evapotranspiration: Guidelines for computing crop water requirements ï FAO Irrigation and drainage paper 56, Rome, Italy
[59] Ness and Golay (2007). ñ*Moving to Greener Pastures" Multinationals and the Pollution-haven Hypothesis*, Journal of Development Economics

consequences are more pronounced in the context of high levels of poverty. Third, the degradation of the natural resource base in turn impinges on the livelihoods of all, but particularly rural, communities. More small farmers are forced to work harder, often on shrinking farms on marginal land, to maintain household incomes.[60] The option of migration to new lands is virtually closed. In most cases, the impacts vary for men and women depending on the gender relations within the social unit (household, community, livelihood system) that regulates access to and control over resources and management responsibilities. Fourth, global population growth and the increasing demand for fossil fuels and other resources, also places new stress on Africaôs environment.

HIV/AIDS has had a significant impact on human capacity with severe economic, social and environmental consequences. Of the 45 most affected countries globally, 35 are in Africa and More than 25.8 million Africans are living with HIV/AIDS. Sub-Saharan Africa (SSA) is home to just 10 per cent of the global population but has more than 60 per cent of all people living with HIV. In SSA, the adult prevalence rate has gone down marginally from 7.3 per cent in 2003 to 7.2 per cent in 2005. There is considerable variation between countries. In Zimbabwe, the epidemic is declining (from 26 per cent prevalence among pregnant women in 2002 to 21 per cent in 2004) and there is some suggestion of a similar trend in Kenya, Uganda and Burkina Faso. For other countries the threat continues to grow and is particularly severe in South Africa, Nigeria and Mozambique. In Northern Africa, several countries are experiencing an increase in the prevalence of HIV/AIDS, including Algeria, Libya and Morocco[61]. Life expectancy at birth in SSA has been reduced from 50 in 1990 to 46 in 2002 as shown in Annex 2, Table 1a: Sub-

[60] WCED (2007). *Changing drivers of deforestation and new opportunities for conservation. Conservation Biology*

[61] UNEP. (2006). ñ*Africa's Natural Wealth Key to Economic Prospects." Africa Environment Outlook*

Saharan Africa Region Socioeconomic Indicators. The productive labour sector has been particularly hard hit by the high mortality in the 20-50 age bracket [62]. The loss of productive capacity is monumental and results in a decrease in disposable income, increased food insecurity and an increased dependency on the natural resource sector. At the same time, the loss of the most knowledgeable and productive age groups impacts on environmental managerial capacity. There is a significantly higher prevalence among women, due to unequal education and inequitable gender relations. The disproportionate impact of HIV/AIDS on women is particularly significant from an environmental perspective, as women in many parts of Africa assume major responsibility for natural resource stewardship.

The above demonstrates the importance of meeting MDG 3, to promote gender equity and empower women, not only from a rights perspective but also because of its environmental significance. The realization of this goal is closely related to MDG 2 on achieving universal primary education. Health, food security and environmental degradation are closely linked, and a negative change at any of these levels may have implications for the others. Conflict affects population distribution and is a leading cause of internal migration. Africa now has more than 7.3 million refugees, 3 million more than in 1990[63]. This places new pressures on environmental resources.

In crisis situations, a large number of people may be displaced in a short period of time, causing a high level of environmental stress in the place where they are relocated due to increased demand and lack of preparedness. The depletion and deterioration of the areas in which camps

[62] FAO (2003) Global Forest Resources Assessment 2003. Main Report. *FAO Forestry Paper.* Food and Agriculture Organization of the United Nations, Rome
[63] FAO (2003) Global Forest Resources Assessment 2003. Main Report. *FAO Forestry Paper.* Food and Agriculture Organization of the United Nations, Rome

are located are often related to the high demand for wood for shelters and energy. The inherent competition between local groups and forced migrants over access to natural resources may polarize social relations in refugee settlement areas and undermine opportunities for collaborative environmental management[64]. State-initiated resettlement initiatives to make way for development and conservation, such as dams and national parks, may also result in large-scale displacements may impact negatively on environmental resources and well-being of the affected communities. Environment for Peace and Regional Cooperation discusses the complex relationship between conflict and environmental change, and how the environment can be used as a vehicle to improve cooperation.

Migration has important implications for development, both positive and negative. Although it contributes to the transmission of disease, the introduction of alien species and the loss of skilled personnel, it may also bring new economic opportunities. The United Nations Economic Commission for Africa (UNECA) and the International Organization for Migration (IOM) estimate that between 1960 and 1975 more than 27 000 highly skilled Africans left the region for industrialized countries. This rose to 40 000 between 1975 and 1984 and then almost doubled by 1987, representing 30 per cent of the highly skilled labour stock.

It is estimated that since 1990, at least 20 000 highly skilled and qualified persons leave the region annually. Although the loss of skilled people has negative impacts on the economy and other sectors, it also contributes to development through significant remittances and the enhancement of capacity of those that have left, in terms of skills and experience, potentially building an important human resource for Africa. Internal transnational migration in Africa is

[64] Ertegun (2002) *Natural Resources, Development And Conflict: Channels Of Causation And Policy Interventions*, World Bank, Washington DC.

significant ï the profile of such migration has changed from being unidirectional and permanent to being increasingly temporary, seasonal and circular. Africa has the most mobile populations in the world: there are many reasons for migration ï one important motivation is to cope with ecological and economic problems[65].

The research established that improved human well-being is a crucial objective of sustainable development and is closely linked to environment goods-and-services. Human well-being is multidimensional and requires access to resources to live a good life in good health, such as income, food, clean water and energy; personal security through the absence of conflict, the ability to mitigate environmental disasters and good governance; good social relations which include all people and promote fairness and equity; and the opportunity to make choices. This implies a condition in which people are not just physically well, but have choices and live in dignity. The extent of well-being, as reflected in income, health, education and inequity, is an indication of how successful or unsuccessful development policies have been. In turn, the well-being of people affects their ability to effectively and sustainably manage resources. How these social factors impact on the environment is a product of a complex cultural milieu.

The Human Development Index (HDI) measures the state of human development at the global, regional and national levels and offers an opportunity to make comparisons over time. It looks specifically at the state of development in terms of the goal of increasing peopleôs choices and their ability to live a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living. Other human development indicators look at the extent of inequality between rich and poor as well as between men and women; the consumption of

[65] World Bank and IMF, (2008). *Global Monitoring Report 2008 - MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

environmental resources such as energy; the level of personal security through measures related to refugees, armaments, violence and crime; and the existence of good social relations through the enjoyment of human and labour rights. Between 1990 and 2003, globally, 18 countries, 12 of which are in Africa, experienced reversals in human development, affecting some 240 million people[66]. There has also been an increase in the number of African countries identified as having low human development, from 17 countries in 1990 to 30 countries in 2005. Extending human development achievements requires not only reducing income poverty but also making improvements across a broad range of areas.

The respondents felt that high population, the quality of population, the youth, the education levels of the population contribute to the poor environmental management. Planning for the population and the availability of the resources for the population is very important in order to have proper environmental management.

3.2.2 Gender and divisions of labour

Gender implies the different roles of males and the female in any set up. Gender relations and the divisions of labour are important factors in the economic development, human well-being and environmental stewardship in Africa and therefore need to be part of an integrated environmental management approach. Gender inequity, and its impact on resource management, is shaped by many factors including unequal access to basic facilities, such as education and health care, differences in income, the extent of social and political inclusion, as well as social and cultural factors. All these impact upon the choices and opportunities women have, and ultimately on how they use and manage natural resources.

[66] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

African countries generally rank very low on the Gender-related Development Index (GDI): they constitute 35 out of the 40 countries with the lowest GDI ranking. However, African countries perform much better in the Gender Empowerment Measure (GEM) with, for example, several African countries having higher rates than the global average for participation of women in parliament. The differential access and control of natural resources by men and women determine how much influence they have on environmental management. In many African societies, productive and parenting roles are clearly divided along gender lines.

Gender roles, however, are complex and shaped by other factors, such as age and position in the family. For example, rural women in many parts of Africa are responsible for child rearing, the nutritional and health needs of the family, food production and weeding of crops, while men open up the land. In many places, women are the primary custodians of environmental resources by virtue of their position in the household, giving them responsibility for managing energy, water and farming among other things. They are often the repositories of indigenous knowledge and the promoters of biodiversity conservation and environmentally-friendly management [67]

The research observed that labour division is at times gendered. In rural Africa, for example, women and girls are almost always the exclusive suppliers of water for household use[68]. They play a lead role in the provision of water for animals, crop growing, and food processing. It is often women who decide where to collect water, how to draw, transport and store it, what water sources should be used for which purposes, and how to purify drinking water. Women make a disproportionately high contribution to the provision of water for family consumption in

[67] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

[68] (Drakenberg, Olof, Wilfred Nyangena and Razack Lokina, (2007). Environmental Policy Brief for the Lake Victoria Basin. Göteborg University.

comparison to men. In many countries, women and children spend much time on water collection, effectively reducing the time for other valued activities as observed by Gordon et al 2004.

Gathering non-timber forest products (NTFPs), such as edible foods, is predominantly children and womenôs responsibility. For example, in the mountain areas of east Africa, women expend close to a third of their daily calories in collecting and supplying water to their homes and communities[69]. Degradation, deforestation or the extension of prohibitions on resource extraction may further penalize women in rural areas who already have to travel long distances to collect water or fuel-wood. Collection activities compete for time spent in food preparation, child care and providing for the householdôs nutrition notes Picard 1996 and reduce free time and thus limit the opportunity for women to pursue other interests.

Technological developments are changing the gender landscape of labour. Where water collection involves long distances, men may now use bicycles or carts for water transportation, freeing women from this task. In some instances, however, the division of labour and the respective roles give to men the opportunity to be custodians of some environmental knowledge. Among nomadic pastoralists, it is the men who take the cattle out on two-day watering regimes and to far-off grazing lands, and deal with predators and raiding.

In urban areas, many women are involved in urban agriculture to supplement household food security and income. Many also participate in markets, selling produce and other wares derived from natural resources. Given the multiple ways environmental management is gendered, policies and technologies must be gender sensitive. Respondents confirmed that women need to

[69] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

be empowered to be able to participate more effectively in policy processes and environmental decision making because in most cases they are the main actors in the implementation of the environmental.

3.2.3 Health

The research observed that good health is essential for people to maximize the opportunities available and is closely linked to the state of the environment. Poor environmental management exacerbates the incidence and negative health impacts of many ñnatural occurrencesò such as floods, droughts and cyclones. Degraded environments also place strain on the ability to meet needs for medicines, food and energy which are all central to health. Certain development activities, including agriculture and industry, may strain environmental systems through pollution and environmental degradation, which in turn affect human health.

Environmental hazards comprise a significant portion of the health risks facing the poor, and children bear the brunt of this. Although children constitute only 10 per cent of the worldôs population, they suffer 40 per cent of the environment-related burden of disease (WRI and others 2005). This disease burden is closely associated with environmental management practices and the opportunities available to poor people. Malnutrition is a crucial contributing factor to the impact of disease and is linked to land management and productivity, which in turn are related to environmental changes such as salinization and climate change. In SSA, infant mortality showed a decline from 143 per 1 000 in 1970 to 105 per 1 000 in 2003[70]. However, in parts of SSA, child mortality is still increasing.

[70] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

The overall reduction is largely due to a decrease in deaths from diarrhea diseases and the increased use of vaccines. Acute respiratory infection and malaria, alongside neonatal mortality, remain primary causes of death for children under five. Inadequate sanitation and unclean water are still major threats, causing the deaths of an estimated 1.8 million people worldwide each year, of which 1.6 million are children[71]. Improving water quality can have major improvements on child mortality. In most of Africa, more than 75 per cent of households depend on biomass for energy for cooking; in some countries this rises to as much as 90 per cent of households. Indoor air pollution presents a major health risk for poor people dependent on fuel-wood for energy, and children under five account for more than half of the 1.6 million deaths per year.

Although Eastern Africa has some of the lowest per capita emissions of greenhouse gases that cause global warming, it carries the greatest burden of climate- sensitive diseases. Vector- borne diseases, such as malaria, dengue fever, schistosomiasis, and chagas disease, could expand their ranges as temperature and rainfall patterns change. Malaria is a major cause of death in Eastern Africa. Mosquitoes are among the first organisms to expand their range when climate conditions become favourable, so cases of malaria and dengue fever may increase their already heavy toll among the poor. Higher temperatures and humidity may promote the growth of diarrhea organisms increasing health risks and reducing human well-being. This high disease burden is in part due to Africaôs low capacity to adapt to the new risks and the challenges associated with a high incidence of poverty. Global climate change not only presents new region-specific health risks, but also a global ethical challenge [72]

[71] Campbell, J. B. (2002): Plant sciences. *Introduction to remote sensing.* The Guilford Press**,** New York,

[72] McSweeney, C., New, M. & Lizcano, G. (2008): UNDP Climate Change Country Profiles-Uganda. UNDP

The study established that many Eastern Africa countries prioritized the development of health services from as early as independence. Efforts included the expansion of access to primary health-care facilities, increased spending in the health sector and investment in human capacity. This prominence has continued with the implementation of health sector strategies and, since 2000, programmes to meet the MDG health targets. In many countries, significant improvements have been made in selected health-care indicators, like infant mortality rates and life expectancy. However, cutbacks in health budgets, privatization of health services, and structural adjustment programmes which diverted public spending away from social sectors have reversed the gains made over the past two decades in many countries.

In addition, many Eastern Africa countries have lost health professionals to the developed countries where they are able to obtain better benefits, this is brain drain. It is estimated that 23 000 health-care professionals emigrate annually from Africa. For example, between 1993 and 2002, Ghana lost 630 medical doctors, 410 pharmacists, 87 laboratory technicians and 11 325 nurses; in 2002 alone, 70 doctors, 77 pharmacists and 214 nurses left Ghana .Zimbabwe, South Africa and Nigeria have all suffered significant losses of health personnel. The 27 most powerful countries also members of the Organization for Economic Cooperation and Development (OECD) saved a ñstaggeringò US$552 000 million by employing professionals trained in developing countries [73]

Unless there are significant inflows of external financial support to complement national health budgets, the situation is likely to worsen considerably, especially given the unabated threats from malaria and HIV/AIDS. Health challenges are monumental given pervasive poverty, the high

[73] UNHCR. (2005) Key Principles for Decision Making, Engineering and Environmental Services Section

rates of fertility, maternal and childhood mortality and malnutrition. Africa has two-thirds of the worldôs known HIV/AIDS cases, 90 per cent of the worldôs yearly malaria fatalities, and half of its female population is illiterate. The ability of African governments to meet the demands for providing basic services and utilities has decreased tremendously, aggravating social conditions as reflected in the low HDI status of many countries [74]

According to the respondents, the health care of the citizens is government agenda. This is because a healthy nation will be more productive and participate in nation building and also participate in environmental conservation. The use of the natural resources as foods should be encouraged to promote preventive health. However the feeding habits have changed due to changed life styles.

3.2.4 Education, knowledge and information

The study observed that knowledge and access to information are essential for effective environmental management and have significant impacts on the economy and the livelihood choices people make. Indigenous knowledge systems based on centuries of observation and continually developed in response to changing social and environmental conditions are an important resource for many rural people. This knowledge base offers opportunities not only for conservation but also for the commercialization of wild resources, as demonstrated, for example, by the increasing markets for NTFPs, such as *Prunus africana*, *Harpagophytum procumbens* (devilôs claw) and *Kigelia africana* (African sausage tree) among others. Trade in devilôs claw, a traditional medicinal plant, supports a US$100 million industry, but most benefits go to processing and transformation actors along the marketing chain, and only a very low proportion

[74] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

goes to domestic producers. This pattern will continue as long as there is low investment in improving community skills and access to relevant information Literacy and the level of formal education is also an important factor affecting the kind of information people have access to, and thus the range of opportunities at their disposal.

The adult literacy rate is 67 per cent for people above 15 years of age, with women having a higher illiteracy rate compared to men. There is considerable variation between literacy rates in African countries, with Zimbabwe having 90 per cent adult literacy, Morocco 50.7 per cent and Burkina Faso 12.8 per cent. Improved literacy increases the capacity of people to communicate and to be reached through the electronic and print media, the capability to effectively participate in their communities and in broader governance issues, and provides new opportunities to engage effectively in the productive sector and the market.

In the absence of improved access to formal education, a considerable reduction in illiteracy rates, and accessible environment-related and functional education, opportunities available to most people will continue to be limited, with possible negative influence on the environment. Choices made in one sector may have a direct bearing on the environment. UNAIDS suggests that gender inequality in knowledge about HIV transmission is a key factor in the high levels of infection among African women[75]. Given the important role women play as managers and as custodians of indigenous knowledge, this has ramifications for environmental management[76].

Environmental degradation can affect access to education as children, especially the girl child, will spend more time collecting firewood and fetching water instead of attending school. In

[75] Ochego, H. 2003: Application of Remote Sensing in Deforestation Monitoring: A Case Study of the Aberdares (Kenya**).** *2nd FIG Regional Conference.* Marrakech, Morocco.

[76] Ngigi, T. G. & Tateishi, R. (2004): Monitoring deforestation in Kenya. *International Journal of Environmental Studies*

Malawi, for example, where more than 90 per cent of households use firewood as their main source of energy, children in fuel-wood-scarce districts are 10 to 15 per cent less likely to attend secondary school. The restoration of traditional forests in some areas has been shown to reduce collection times for fuel-wood by on average several hours per day a direct benefit to poor families.

Respondents were of the view that the more knowledgeable the people are the better the management of the environment. The education system has addressed the conservation issues from an early age in schools .The rural population older population that had did not access school are trained on environmental conservation through the community meetings and other forms of public education like radio or television.

3.2.5 Poverty

The study observed that pervasive poverty and social inequities remain major constraints to sustainable development. Poverty is a cause and an effect of environmental degradation. The equitable, efficient and productive use of natural resources offers important opportunities for sustainable livelihoods which can contribute to reducing poverty.

Poverty is multidimensional: it is more than just the lack of access to financial resources ï even though income is the most commonly used indicator of poverty - and material resources. It includes the lack of capabilities that enable a person to make choices to live a life that she or he values. This includes access to income, health, education, empowerment and social inclusion, and human rights. Poverty may be synonymous with powerlessness, with a lack of access to information, institutions and voice. There is considerable variation among poor people and the extent to which they are disempowered. This is affected by various factors including gender,

location (urban or rural), culture and ethnicity. Global inequity, particularly in trade, continues to be a major contributor to continued poverty in Africa.

The Millennium Project identified the improvement of small-scale agricultural production, through the use of techniques which preserve natural assets, the restoration and improved management of desertified lands, and the protection of surrounding natural habitats, as an important strategy for addressing the MDG target 1 of halving the proportion of people living on less than US$1 a day (UN Millennium Project 2005a). It also recommended actions in forest management, freshwater resources, fisheries and marine ecosystems, and climate change that could make a contribution to addressing this target [77]

Across Eastern Africa, poverty is more prevalent in rural than in urban areas. The link between environmental resources and the livelihoods of rural people is widely acknowledged. Rural people rely on the environment for a range of goods-and-services. These services include provision of food, medicines, energy and regulating services such as water purification and air purification. Environmental goods may have important cultural and aesthetic values. Natural resources may serve as important safety nets during periods of stress. However, poor people are also more vulnerable to environmental disasters and risks, such as insect-borne diseases, including malaria, and unsafe water. Social and economic shocks from conflict, ill health, falling market prices and so on, exacerbate overall vulnerability.

Poverty may contribute to unsustainable resource use. Policies and institutions are major factors which limit the value poor people can obtain from a resource, effectively forcing them to harvest or use more in order to meet basic needs. Policies and laws that restrict use to subsistence, deny

[77] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

poor people access to value-adding activities which could generate significantly more income. Bureaucratic measures and inefficient economies may limit access to markets, financial resources and other support. Moving towards a regime which acknowledges natural resources as assets of poor people and which empowers people to use these resources efficiently and productively can have positive impacts on equitable growth and for sustainable development.

According to the respondents, poverty is a key cause of the environmental degradation because those who have no means of livelihood, they result into use of the available natural resources for use and for sale in order to have a livelihood. This has led to resource overuse like tree cutting resulting to deforestation.

3.2.6 Economic Change

The study observed that equitable and environmentally sustainable growth can improve human well-being and increase the range of opportunities available to people, including those who are most disadvantaged. Africa has experienced its best economic performance in many years. In 2010 Eastern Africa grew at 5.1 per cent [78], up from 3.7 per cent in 2003. Between 1990 and 2003, Africaôs economies grew at an average of 2.6 per cent annually. This improved growth has had a mixed bag of consequences, increasing opportunities to meet key MDG targets and improving human well-being, which can have positive spin-offs for the environment as options increase. However, SSA must grow on average at 7 per cent per year to reduce income poverty by half by 2015. Only six African countries, mostly in North Africa, are likely to meet the MDG goal of halving the number of people living on less than a dollar a day. The MDGs remain underfinanced ï by more than US$40 000 million overall.

[78] AfDB (African Development Bank), 2008. *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank.

There is considerable variation between the economic achievements of countries in the region ï with prices of oil and metals, low cotton and cocoa prices, dollar depreciation and euro appreciation, the locust plague in the Sahel region, rainfall, corruption, and political conflict and instability being important contributing factors. Solid growth was expected to continue between 2005 and 2007 at an average rate of 4.7 per cent as the effect of new oilfields in Central Africa wears off. The high level of vulnerability to external shocks such as prices and the loss of preferential treatment, environmental factors such as weather conditions, and conflict make these key areas for policy focus and collaborative initiatives. This close relationship to the environment is indicative of the need for better environmental monitoring and, in particular, risk and disaster warning systems to support greater preparedness and more effective responses.

Respondents were of the view that systems for monitoring environment in relation to the economic development need to be developed to ensure that both grow simultaneously. This will ensure that the environmental conservation systems will be put in place and this will enhance environmental security.

3.2.7 Production and consumption

The study established that there are changing production and consumption patterns, globally and in Africa, and the way in which growth is achieved have direct implications for Eastern African livelihoods and their sustainability. Global economic policy dealing with tariffs, import quotas and crop subsidies has direct impacts on the livelihoods and opportunities of people in Africa.

At the national level, growth of the economy can result in both positive and negative effects on well-being and environmental resources. For example, economic expansion may provide new livelihood opportunities to more people through job creation as well as through diversifying livelihood options. Growth must be equitable and specifically focus on delivering benefits to

poor people. However, growth may endanger the sustainability of livelihoods depending on how it is carried out with respect to environmental integrity. For instance, when fishing is done in an unsustainable manner, short-run benefits will be accrued, but at the same time sustainability of catch will be impaired through depletion and, therefore, affect long-term benefits.

Although in 2000 Africa accounted for 13.6 per cent of the world population, its gross domestic product (GDP) was just under 1.7 per cent of the worldôs GDP. For SSA, GDP per capita, using purchasing power parity (PPP), amounted to US$1 856 compared to the average for countries with high human development of US$25 665. This is significant for purchasing power, savings and investment growth rates as well as resources available to governments and individuals, making them more reliant on the natural resource base for their basic needs. The GDP per capita (PPP) across the region varies considerably, with Equatorial Guinea having an average GDP per capita of US$19 780, South Africa US$10 346 and Sudan US$1 910[79]. Inequity within a particular country is clearly important for how this benefit is actually spread. Unequal growth remains a major challenge for Africa ï income distribution is highly skewed, with 40 per cent of the population receiving only 11 per cent of income, while the richest 20 per cent gets 58 per cent of income. Income inequality is particularly evident across the urban-rural divide.[80]

Export of natural resources remains a major factor in the economies of many countries. Instability and adverse price trends drive countries to exploit more resources to meet their domestic and foreign obligations, including debt servicing, at the expense of long-term sustainability of the resources.

[79] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

[80] (World Bank, 2009. *Africa Development Indicators 2008/09*, The World Bank, Washington DC

Eastern Africaôs economies are more reliant on agriculture than those of any other region, with around 70 per cent of Eastern Africans working in the agricultural sector. About three-fifths of African farmers are subsistence farmers tilling small plots of land to feed their families, with only a minimal surplus that can be sold. Although agriculture is a major employer, employing 56.5 per cent of Africaôs total labour force [81] it contributes only 14 per cent of GDP, while industry and services contributed 29 per cent and 57 per cent respectively

In terms of mining and drilling, Africaôs most valuable exports are its minerals and petroleum. These activities are concentrated in only a few countries. South Africa, Namibia, Botswana and the Democratic Republic of the Congo have substantial reserves of gold, diamond and copper. Nigeria, Angola, Gabon, Libya, Algeria and others export significant amounts of petroleum. These areas make up the vast majority of mineral and petroleum exports from Africa. This has been the focal point for foreign direct investment (FDI) which has been driven primarily by developed countriesô needs.

With respect to manufacturing, Eastern Africa is the worldôs least industrialized region. Despite large local supplies of cheap labour, almost all of the regionôs natural resources are exported elsewhere for secondary processing. The lack of value-adding activities means that the full potential from natural resources is not being earned within African countries. Only about 15 per cent of employment is generated by the manufacturing sector. Industrial sector restructuring and reform measures have led to a collapse of industries in some countries and hence the declining share of manufacturing to total economy. While industrial development offers important opportunities, it also creates certain risks, particularly in the management of pollution and human

[81] FAO 2004), Global Forest Resources Assessment 2004. Main Report. *FAO Forestry Paper.* Food and Agriculture Organization of the United Nations, Rome

health. There is evidence that developed countries are relocating their chemical industry to developing countries.

The 1980s and early 1990s witnessed serious economic decline or stagnation in most African countries. Agricultural productivity failed to keep pace with the growth of population and suffered particularly from falling productivity in the export sector and from declining markets and prices. Population growth rates in the period 1990-2003 were higher than the growth of GDP per capita in 2003 at 2.5 per cent and 1.3 per cent respectively[82]. Food imports were and still are essential in most countries to maintain an adequate total food supply and, in certain cases, to keep food costs down. Debt has mounted and pressures on resource use have increased.

In response to the economic hardships of the 1980s, many African countries undertook programmes of economic reform with guidance from the International Monetary Fund (IMF) and the World Bank. These reforms, spearheaded by the Structural Adjustment Programmes (SAPs), aimed at stabilizing the economies, liberalizing exchange rates, freeing the productive energies of the private sector and opening up to trade and investment. As the negative impacts of these policies were realized, new approaches to economic planning and development have been adopted, including the now widely used Poverty Reduction Strategies (PRS).

The above has resulted into high demand for the raw materials and high levels of solid and liquid waste due to high consumption. This therefore calls for the plans to ensure that the raw materials demands have been met and the management of waste is better planned for so as to ensure that the environment is well conserved and sustainably.

[82] World Bank and IMF, 2005. *Global Monitoring Report 2005- MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

3.3 Impacts of economic change on livelihoods and land degradation

The study established that macroeconomic reforms in Africa, epitomized by the SAPs, have had mixed impacts on the environment, mainly through the processes of livelihood diversification and increased human mobility. A key response to the poor performance of the formal sector has been the diversification into an intensification of informal sector activities as people try to make ends meet. Many of these activities are based on natural resources and include carpentry and craft production, charcoal manufacturing, collection and trade of NTFPs, artisan mining and metal works. Although entry into many such activities is easy, their profitability and efficiency is undercut by bureaucratic controls, lack of investment and inadequate support for market engagement. There is little incentive for users to invest in technologies and to manage resources sustainably as was found by FAO in 2003. Since the 1990s, there has been a growing focus on other livelihood activities that could more effectively combine conservation and development interests, such as ecotourism and community-based conservation initiatives.

Livelihood diversification has always played some part in providing a ñpathwayò out of poverty for poorer groups of people[83]. Since the mid-1980s, it has become evident that livelihood diversification has increased as a response to economic and social changes. These changes have led to a saturated agricultural labour market, reduced access to common property and increased mobility. In general, these programmes resulted in an increase in the number of people living in poverty and decreased access to social services, such as health and education.

[83] Collier, Paul, 2003. *Natural Resources, Development And Conflict: Channels Of Causation And Policy Interventions*, World Bank, Washington DC.

Within the agricultural sector, many rural dwellers have sought to intensify their agricultural activities. Pastoralists in Tanzania, for instance, have adopted crop cultivation to supplement livestock keeping. Other activities include trading in a range of products including milk, firewood, animals and honey; wage employment, both local and outside the area, including working as a hired herder, farm worker and migrant labourer; renting property; and gathering and selling wild products, such as gum arabic, firewood, game trophies, bush meat, live animals or medicinal plants. Market failures and the need for consumer items have become an important force pushing pastoralists into diversification using wildlife, ecotourism and consumptive utilization.

Good as these activities are in sustaining household livelihoods in the short run, if poorly managed they may have detrimental impacts on environmental resources. The indiscriminate felling of trees for agricultural expansion and timber products has laid watersheds bare, threatening the water catchment functions of forested watersheds. Pressure on water resources for various uses including domestic, livestock and industrial use, among others, has increased due to more extensive economic activities and population congestion in river basins, causing water allocation and use conflicts.

Gold panners use an estimated six tones of mercury annually, of which half is lost during the amalgamation process. The extent of its impact is further spread since the panners dilute the mercury with water to increase quantities. When mixed with water, mercury is lethal to human beings and plants. The problem is that mercury has a long life ï up to 30 years from the time of immersion. It is therefore active in water bodies for a long time, compounding the pollution and human health problems. A study of panners in Insiza District in Zimbabwe identified symptoms characteristic of occupational mercury poisoning: of those sampled, 60per cent had general body

weaknesses, 55 per cent had nausea symptoms, 50 per cent had lost teeth and 45 per cent had a history of respiratory diseases.

Other alternative income activities, such as artisan mining, have also been affected by economic changes. Artisan mining in Africa has been in existence for centuries, but its magnitude has increased since the mid-1980s as a result of livelihood diversification strategies.

3.3.1 Technological Change

The study observed that research and the development of new technologies can drive environmental change in positive and negative ways. They may increase the demand for natural resources, their application may impact on the integrity of ecosystems and they may offer an opportunity for more efficient use of natural resources, cleaner production techniques and improved environmental management. However, new technologies may also pose new risks to human and environmental health. This causes a very high human insecurity.

In the last 20 years, the advances in technology have been monumental. Key areas of development include more effective monitoring and assessment techniques, such as remote sensing, the transformation of ICT, biomaterial engineering, rapid advances in biotechnology and genetic modification, and more efficient and faster transportation. Technological innovation can offer important opportunities for responding more effectively to challenges in areas such as economic productivity, agriculture, education, gender inequity, health, water, sanitation, energy and participation in the global economy.[84]

The pace of technological change in Africa has been slow and is mostly linked to FDI; it has not contributed significantly to enhancing the availability of products and services required by

[84] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

Eastern Africa to promote development[85]. The Johannesburg Plan of Implementation commits the global community to making technological investments in Africa, particularly with a view to increasing the pace of industrialization, but also for improved management of resources, such as water and energy, and the improvement of service provision in these areas. Industrial growth without complementary investment in monitoring systems and health services is likely to create new levels of vulnerability for poor people. Expenditure on research and development activities, as a percentage of GDP, is very low for African countries. However, there are inadequate statistics available for proper analysis. Developing country investment in research averages 0.9 per cent of GDP, compared to 2.5 per cent for OECD countries.

Information and communication technology at the global level have been significant drivers of economic change, but access to communication technology remains very low despite significant growth in this sector between 1990 and 2003, which increased economic opportunities and participation in global markets. In Burkina Faso, for example, in 1990 there were only two telephone main lines per 1 000 people, but by 2003 this had more than doubled to five lines per 1 000 people, compared to Equatorial Guinea where there was a 450 per cent increase over the same period from four lines per 1 000 people to 18 lines per 1 000 people. Other countries, such as Zambia and Uganda, show no growth and Angola has experienced a decline.

Levels of availability of main lines in 2003 varied significantly across the region, with 285 lines per 1 000 people in Mauritius, 156 lines per 1 000 people in Cape Verde and two lines per 1 000 people in the Congo (UNDP 2005). Access to cellular phones has increased dramatically, with an average of 54 subscribers per 1 000 people in SSA. Several countries, including Gabon,

[85] FAO (2003) Global Forest Resources Assessment 2003. Main Report. *FAO Forestry Paper.* Food and Agriculture Organization of the United Nations, Rome

Morocco, Botswana, Tunisia and South Africa, have in the range of 200-400 subscribers per 1 000 people. The percentage of internet users is also very low [86]

The respondents were of the view that if the information technology is used appropriately, it can be of great help to the people. The equivalent of the use of the Mpesa in Kenya, The information would get to the people on real time and act appropriately. The expectation is that as use of information technology and innovation continues to grow, more awareness will be created and this will greatly improve the environmental management hence enhancing the environmental security.

3.3.2 Human Well-Being and Livelihoods

The study observed that improving human well-being is at the core of sustainable development efforts in Eastern Africa. Environmental goods-and- services, including supporting services such as soil formation, provisioning services such as wood, regulating services such as water purification, and cultural services provide important opportunities for meeting human development goals.

Human well-being is multidimensional. It is the ability of all people to determine and meet their needs and to have a range of choices and opportunities to fulfill their potential. It includes tackling a diverse range of challenges ï environmental, social and economic ï and widening the options available to people to make a living and to participate actively in society. Sustainable livelihoods that guarantee access and entitlement to a range of assets and opportunities are essential to achieving human well-being. Such livelihoods are not limited to, for example, a particular level of income, paid labour or ability to meet household food security, but must

[86] UNDP (2005). *From Conflict to Peace-building: the Role of Natural Resources and the Environment,* UNEP, Nairobi

include opportunities for investment and business, national economic stability and reliable and accountable governance systems.

A livelihood comprises the capabilities, assets (including natural, social, human, physical and financial) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks maintain or enhance its capabilities and assets, while not undermining the natural resource base[87]. Environmental and economic changes can introduce vulnerabilities to human well-being and undercut opportunities for development. Improved human well- being is critical to increasing the range of options, choices and responses people are able to make to mitigate and adapt to such changes. Coping mechanisms, in poor communities, often include intensification of existing productive activity, diversification by adopting additional productive activities and migration to develop productive activity elsewhere.

Income and services derived from environmental resources, including land, forests and woodlands, freshwater and wetlands, coastal and marine resources, and wildlife (flora and fauna) are central to the livelihoods of many rural people and to Africaôs economy as a whole. People derive multiple values from natural resources, including use and non-use values. Option values may include use and non-use aspects, and refer to the value placed on the resource as an option for further use. Existence value refers to the benefits derived from knowing the resource exists, such values often being associated with religious and cultural meaning. Bequest value is the value placed on being able to pass natural resource assets onto future generations.

Poor people have not been able to effectively capture the full benefits associated with the use of natural resources. This is partly because resources are used primarily for subsistence and value-

[87] Scoones (2008) *Stern Review on the Economics of Climate Change*, HM Treasury, London.

adding and marketing is neglected. Maximizing the opportunities requires moving beyond a subsistence framework which focuses on minimum or basic needs, to using the available resource in an efficient, equitable, productive and sustainable manner. Increasingly, livelihood approaches have focused on how this resource can be used as an asset for improved human well-being and promoting development. Options for increased investment, employment creation in processing, trade and related services, and small and micro-natural resources-based entrepreneurship are increasingly considered.

The commercialization of wild resources offers important opportunities for improving income and other aspects of well-being. Widening the options for poor people requires promoting opportunities for them to capture a greater share of the value generated through, among other things, better market access, less bureaucratic restraints on trade and better access to capital and other resources. Achieving better opportunities requires complementary policy development in other areas including good governance, tenure regimes and global trade.

3.4 Policy and Legal Responses for Sustainable Development

The study established that Eastern Africa has responded to the challenges posed to sustainable development by committing to and establishing policies for creating an enabling environment at the regional, sub-regional, national and local levels that support sustained economic growth, environmental integrity, efforts for peace, stability and security, democracy and good governance, respect for human rights and fundamental freedoms, including the right to development and gender equality. Although much remains to be done to make this policy objective a reality, Africa (both governments and its people) are committed to and share the

Brundtland Commissionôs vision for a future that is more prosperous, more just and more secure.[88]

Good as these activities are in sustaining household livelihoods in the short run, if poorly managed they may have detrimental impacts on environmental resources. The indiscriminate felling of trees for agricultural expansion and timber products has laid watersheds bare, threatening the water catchment functions of forested watersheds. Pressure on water resources for various uses including domestic, livestock and industrial use, among others, has increased due to more extensive economic activities and population congestion in river basins, causing water allocation and use conflicts.

Multilateral environmental agreements (MEAs), at the global, regional and sub-regional levels, are an important response to these broad policy positions. They seek to take the challenges identified in policies on board and provide for practical responses. Multilateral environmental agreements may establish clear rules or suggest managerial frameworks to resolve problems. African countries are party to at least 30 conventions at the global level, dealing with various aspects of environmental management, and related areas, such as trade, that impact directly on environmental sustainability.

Most African countries have signed the three international conventions adopted at the UNCED in 1992, the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD) as well as the United Nations Convention on the Law of the Sea (UNCLOS). Other MEAs to which African countries are party include those dealing with

[88] Urdal, Henrik, 2008. *Demographic Aspects of Climate Change, Environmental Degradation And Armed Conflict*, United Nations Population Division, Department of Economic and Social Affairs, United Nations Secretariat, New York

international trade in endangered species, the management of migratory species, hazardous waste management, cultural heritage, ozone depletion, bio-safety, invasive alien species and forest management. Also of critical importance are agreements reached in the trade area, especially the World Trade Organization (WTO) and related agreements on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and sanitary and phytosanitary provisions. Several agreements in agriculture, such as the International Convention for Protection of Plants, have important implications for biodiversity and the sharing of benefits arising from its use.

Human rights and development agreements adhered to set the framework for addressing these environmental issues. Additionally, Africa has a growing number of regional and sub-regional MEAs which promote collaboration by establishing an agreed approach to a given issue, which in turn sets the basis for harmonized and coordinated national law. Foremost among these is the ACCNNR adopted by the AU in 2003. This policy and legal approach is reinforced through the establishment of regional and sub-regional organizations. Many sub-regional organizations have spearheaded the development of environmental management policy and law at the sub-region level. In critical areas of sub-regional concern, there have been important multilateral agreements; these include cooperation in the management of shared river basins, wildlife and forests.

These policy and legal initiatives have been complemented by the development of institutions at the regional and sub-regional levels. The African Ministerial Conference on the Environment (AMCEN) is one such initiative which increases opportunities for the development of collaborative approaches to environmental management. Crucial too is the strengthening and reorganization of the African Union. Itôs Constitutive Act provided for the establishment of a specialized technical committee on natural resources and the environment. The Pan-African

Parliament, established in 2004, has a permanent standing Committee on Rural Economy, Agriculture, Natural Resources and Environment. In 2005, the AU launched the Economic, Social and Cultural Council of the AU (ECOSOCC) to facilitate and promote civil society participation in the affairs of the AU.[89]

According to the respondents, all states within the EAC have institutions for implementing the environmental laws and domesticating the international environmental agreements. The` extent of implementation vary from country to country.

3.5 Chapter summary

The socio economic factors affect the environment greatly because itôs the human activities that affect the environment causing it to be insecure. Issues like demography, education knowledge and information, health, gender, poverty, economic changes, production and consumption, livelihoods, technological changes, changing lifestyles. The chapter also expresses the existing laws locally and internationally for the purpose of environmental conservation in order to promote environmental security

[89] Holmberg, Johan, 2007. *Natural Resources In Sub-Saharan Africa: Assets And Vulnerabilities: A contribution to the Swedish Government White Paper on Africa*

CHAPTER FOUR

EFFECT OF INTERRELATION OF NATURAL RESOURCES ON ENVIRONMENTAL SECURITY IN THE REGION

4.0 Introduction

This chapter is focusing on how the natural resources in the region are managed for environmental security, the linkage to the climate change and development. The environmental actors, the challenges, response implementation and follow up.

4.1 Natural Resources for Environmental Security

Africaôs environment is extremely varied, ranging from humid tropical forests in central Africa to dry lands and deserts in Southern and Eastern Africa and the Sahel, to coastal zones and polluted slum areas in and around Africaôs expanding cities. Africa depends on natural resource extraction as a key source of economic growth and poverty reduction. Although Africa and its sub- regions have attained historically high economic growth rates over the last couple of years. Several trans-boundary ecosystems and natural resources are at risk and are subject to depletion and/or degradation[90].

The study observed that in Africa, environment the nature, economic growth the wealth and governance the power are inextricably linked and are essential elements of poverty reduction and enhanced welfare. Al though Africaôs natural resources and the wealth they generate are essential to achieve the MDGs, sustainable development also presupposes good governance, pro-poor growth based on equitable distribution of incomes, capable institutions and a sustainable use of the natural capital.

[90] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

Sustainable natural resource use is highly dependent on the quality and performance of informal as well as formal institutions such as government ministries and agencies, and their capacity to direct, control and monitor individuals and otherså like the private sectorsô actions vis-a-vis nature.

Respondents expressed that at the regional level, the role and capacity of the regional and sub-regional organisations are essential to sustainable management of shared trans-boundary environmental issues such international water resources like lake Victoria.

4.2 Linkages between Environment, Climate Change and Key Development Challenges

The research established that East Africa is faced with a range of serious environmental challenges, where climate change and climate variability will add to the current problem complex. Climate variability is not a new phenomenon in East Africa but climate change will add to existing and recurrent economic, social and ecological stresses, risks and uncertainties. With climate change follows environmental change which is manifested in changing resource abundance or scarcities of natural resources and ecosystem services. Key environmental challenges include climate change and climate variability, wide spread pollution, loss or degradation of ecosystem services, and large- scale natural resource depletion of land, water, forests, minerals and energy resources.

In addition, East Africa experiences significant change and loss of biodiversity resources, which constitutes a key development challenge to the region[91]. Climate change adds to existing environmental, social and economic challenges. Africaôs environmental problems are not

[91] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

isolated phenomena but are linked in multiple ways with other development themes across the region.

Attaining development objectives such as sustained and pro-poor growth, public health, broad-based employment, devolution and strengthening of peopleôs rights in the region as well as sub-regionally presupposes sustainable use of the regionôs natural capital, reduced levels of pollution and equitable management of shared natural resources including trans- boundary water resources, drainage areas and forest ecosystems. Local environmental issues may have broader geographical implications: failing to sustainably manage natural resources in one country raises the risk of negative consequences in neighbouring countries in the sub- region and occasionally in large parts of the continent.

This applies to the quest for water, grazing areas, agricultural lands, precious metals (e.g. gold, diamonds) and may lead to conflicts. Moreover, implementing policies to reduce pollution or natural resource depletion in one country may lead extractive or polluting companies or other actors to move their businesses/activities to neighbouring countries. This applies to pollution control as well as timber logging, biodiversity protection or efforts to control over-fishing. This becomes particularly visible in sub-regional settings where countries share a common resource, such as in the case of Lake Victoria[92]. Political instability, corruption, poor policies, or weak policy implementation at the national level may harm neighbouring countries[93]. Hence, several

[92] Drakenberg, Nyangena and Lokina (2007). *Entering the Century of the Environment*: A New Social Contract for Science in Science,.

[93] Svensson, U. (2008). ñ*Environmental Security: A Concept." Presented at the International Conference on Environmental Stress and Security,* the Royal Swedish Academy of Sciences, Stockholm, Sweden,

national environmental problems have (sub) regional implications and can only or best be addressed in international collaboration.

East Africa has a wealth of natural capital. The most important renewable resources in East Africa include water resources, forest ecosystems, and agricultural land. Other key renewable resources include grazing lands, wildlife, and fisheries. The most important non-renewable resources include: fossil fuels and minerals like metals and non-metals, of which the most important are, natural gas. East Africa has tropical rain forests and the second largest freshwater lake in the world. Despite widespread poverty, the region offers significant potential for human, social and economic development.

The research established that East Africa has world class biodiversity resources, which contribute to form the regionôs natural capital on which much of the social and economic systems and activities are based. The region currently holds two of the worldôs 25 biodiversity hot spots. These biological resources are local, regional as well as of global importance, in terms of world heritage, and supporting millions of poor people, in addition to maintaining ecosystem functions of global importance. The region has more than 50,000 known plant species, 1,500 species of birds and 1,000 mammals. The biological diversity found in any one area or country varies depending on physical size, local climatic conditions, topography and vegetation and soil types. For example, In East Africa has at least 8,000 species. The coastal regions are equally diverse with more than 4,000 fish species, offering large opportunities for fisheries as well as tourism. Respondents felt that East Africa has great potential that needs to be protected for the posterity in order to ensure continued use.

4.2.1 Key environmental problems and their causes in Eastern Africa

The research established that East Africa faces two inter-related environmental challenges: combining pro-poor economic and social policies with sustainable utilization of the regionôs natural resources and ecosystem services, and appropriate adaptation to climate variability and climate change. Africa has to a large extent built, and continues to build, its economic and social development on unsustainable natural resource use. This development approach can for obvious reasons not be the development model that should guide Africa into the future. An alternative development model has to emerge. However, large forces are in motion, and there is considerable inertia in moving away from natural resource depletion as a growth policy. As indicated this is manifested in depletion and/or degradation of fisheries, forests, water resources, minerals, soils and agricultural ecosystems, rangelands, air wetlands, fossil fuels like oil, gas and coal and biodiversity resources[94]. Causes are found in the production and consumption patterns of individuals, communities, foreign and domestic companies and national governments. A large share of the resource depletion has sub-regional and regional manifestations, which require regional solutions for example international water resources management.

The quest for resources is largely driven by the behaviour of foreign companies and export of raw material/unprocessed natural resources to OECD countries. Recently, the resource depletion is aggravated by companies from, and exports to, China and India and to some extent also Brazil, Russia, Indonesia and Malaysia and OPEC countries. Investments by these countries provide foreign capital, modern technologies and employment, but these social and economic gains run the real risk of being short lived unless the natural capital is adequately sustained across time,

[94] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

and revenues are invested in economic sectors which promote sustainable development, rather than undermining it.

Regarding the second challenge climate change projected regional increases in climate variability and weather such as floods, droughts, storms and heat waves. This is likely to severely affect Africaôs economic performance, food security and livelihoods of the poor causing insecurity. It will also impact negatively on transport infrastructure roads, railways, bridges, ports. The energy infrastructure will be affected, hydropower, thermal plants, transmission and distribution systems, the water irrigation and sanitation systems, and protection infrastructure of coastal zones.

A balanced and appropriate starting point for the identifying key regional environmental challenges is NEPADôs assessment, which also constitute priority program areas for regional environmental cooperation: Combating land degradation, drought and desertification, Conservation and sustainable use of marine, coastal and freshwater resources including wetlands, Prevention, control and management of invasive alien species, Climate change including mitigation and adaptation, and Trans-boundary conservation or management of natural resources, Management of cultural heritage; Sustainable management of sub-soil and non-renewable resources; Sustainable management of cities; Integrated waste management and pollution control; Sustainable energy production and consumption, and Addressing negative impacts of population dynamics including AIDS and war on the environment. [95]

[95] Commission on Growth and Development, 2008. *The Growth Report: Strategies For Sustained Growth And Inclusive Development*, (draft) www.growthcommission.org, World Bank, Washington DC.

In addition to climate change, which is treated partly separately in this Brief, our assessment focus on 4 areas of particular regional and/or sub-regional concern in response to the four key environmental challenges presented above: Loss of ecosystem services and biodiversity; Deforestation and forest resources degradation; Land use change and degradation; and Shared water resources, availability and management:

Loss of ecosystem services and biodiversity**:** Despite significant endowments in natural capital, Africaôs ecosystem services and biological resources/biodiversity are under threat from a number of natural as well as human induced pressures. Examples include land-use conversion due to deforestation, agricultural expansion and livestock production, and subsequent habitat, destruction, pollution, poaching, armed conflicts, introduction of alien invasive species, and population growth. Biodiversity in plant genetic species is under threat due to increasing expansion of mono-cropping in agriculture and a relative reduction of tree species and animal species in forestry and livestock production, respectively.

Projected increases in droughts, floods and other climate-related vulnerabilities are expected to have multiple negative impacts on the ecosystems in large parts of the region. Lakes and reservoirs in arid and semi-arid regions such as the Sahel, lowlands of East and Southern Africa are expected to reduce storage capacity and economic potentials. Changing precipitation patterns could lead to accelerated soil loss, sedimentation and siltation of rivers, dams, lakes and water courses, and reduce the productivity of watersheds. Wetlands, wildlife and biodiversity in

currently fragile areas would be under increased pressure to reduce productivity and economic potential[96].

Deforestation and Forest resources degradation: Eastern Africaôs forest resources are subject to high pressure from demand for firewood and charcoal as energy sources and from the export of forest products such as timber. As a result, African forests are being degraded at alarming rates. The underlying driving force is often population growth. The forest-to-people ratio has gone down considerably in all sub-regions implying that there is relatively less forest resources forest area per habitant to be shared among the populations in Africaôs sub-regions. To exemplify, the forest area per habitant in Africa region has decreased with more than 10% between 2000 and 2005. During the same period the total forest area has decreased with more than 20,000 ha in the region[97]. This decrease is likely to continue with increasing populations, and increased needs for cultivation/food production areas. Moreover, the decrease is likely to accelerate in view of the risks associated with climate change.

The study observed that East Africaôs forest resources constitute a significant share of the worldôs greenhouse-gas emissions originating from forests. Conversely, reducing deforestation reduces greenhouse gas emissions and promotes adaptation to climate change, in addition to other benefits associated with forest resources, such as biodiversity, maintaining hydrological balances, timber and non-timber forest products, etc. However, rising temperatures resulting from climate change are likely to contribute to further degradation of forests. Fires will be an increasing problem for desiccated forests. The ability of forests to provide ecological services,

[96] Holmberg, Johan, 2007. *Natural Resources In Sub-Saharan Africa: Assets And Vulnerabilities: A contribution to the Swedish Government White Paper on Africa*
[97] AfDB (African Development Bank), 2008. *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank

such as protecting watersheds and conserving biological diversity, will be impaired, leading to a negative spiral of ecosystem degradation.[98]

Land Use change and degradation: Climate change constitutes one of the top challenges facing Africa in general and land use and land degradation in particular, during the next couple of decades and beyond[99]. The African region is highly vulnerable to the impacts of climate change, especially its poorer sub-regions highly dependent on land as a source of growth and employment. This is largely due to their geographic exposure, low level of incomes and opportunities to cope and adapt, and greater reliance on climate sensitive sectors such as agriculture. Only a small portion of the costs and other impacts of climate change between now and 2050 can be realistically avoided. This is due to inertia in the climate system as well as inertia in the behaviour of individuals and institutions.

Poor peoplesô agricultural incomes will be under particular threat from climate change; falling farm incomes will reduce the ability of poor households to invest in land and adequately adjust to shocks like drought, pests and floods, which are likely to increase in intensity and in frequency in the years to come. Food production is already very sensitive to climate variability due to the dependence of crop yields on climatic factors such as temperature and rainfall. Agriculture currently accounts for 24% of world output, employs 22% of the global population, and occupies 40% of the land area[100].

---

[98] Holmberg, Johan, 2007. *Natural Resources In Sub-Saharan Africa: Assets And Vulnerabilities: A contri*
bution to the Swedish Government White Paper on Africa
[99] Stern et al, 2006. Commission on Growth and Development, 2008; IPCC 2007a,b;
[100] IPCC (Intergovernmental Panel on Climate Change), 2007a. *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the

Climate change will aggravate this sensitivity and have a wide range of effects on the agro-ecological environment like soil loss, loss of soil moisture and reduced water access in drier regions which could have knock-on consequences for food production. It is expected that the *combined* effect of several factors could be very damaging. Impacts that are particularly important for future food production and loss of essential species, increased incidence of flooding, forest and crop fires, climate-induced outbreaks of pests and diseases, and rising surface ozone. Climate change may affect pollinators and hence pollination, which is essential for reproduction of many wild flowers and crops; its economic value worldwide has been estimated at $30 - 60 billion[101].

The research established that shared Water resources, availability and management: While East Africa generally is well endowed with respect to water resources, the utilization within and between countries and sub-regions is characterized by inefficiency, ineffectiveness and inequity. Potential conflicts between up-stream and down-stream users need to be prevented; inefficiencies and inequity across and within countries need to be addressed. The trans-boundary nature of many of the regional and sub-regional water resources call for reinforcing/instituting international agreements, coordination, management. Hence, international river basin management is of utmost importance to ensure sustained supply and equitable distribution of countries and local water rights.

The number of people suffering increased level of water stress as an effect of climate change this results to reduced rainfall, increased evapo-transpiration and increased surface temperatures

---

Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York.

[101] Stern (2006) *Stern Review on the Economics of Climate Change*, HM Treasury, London.

and the associated risk of more people in hunger are likely to increase over the next couple of years and decades, unless attended to. This is particularly critical in the arid and semi-arid parts of the region. Africaôs sub-regions, particularly in Southern Sahel in West Africa, the arid lowlands of East Africa and in the Kalahari desert in Southern Africa[102].

The causes of environmental problems are poor sustainable utilization of the regionôs natural resources and ecosystem services, and appropriate adaptation to climate variability and climate change.

4.2.2 Opportunities of Resources in Eastern Africa

The research established that East Africa has the lowest greenhouse gas emissions in of any continent, yet it is particularly vulnerable and expected to be hardest hit by climate change; this situation is exacerbated by multiple stresses such as high levels of poverty, complex governance issues, ecosystem degradation and conflict, which limit adaptive capacity[103]. In coming years expected economic losses may range between 1-2% of GDP. Rain-fed agriculture reduction in yields can reach up to 50% in some African countries. Certain groups in society will be disproportionately hit by climate change; women are increasingly vulnerable due to their traditional responsibilities of fetching water and fuelwood, cultivation of drier and/or wetter agricultural lands, and performing household chores.

---

[102] IPCC (Intergovernmental Panel on Climate Change), 2007a. *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York.

[103] Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, R. Tabo and P. Yanda, 2007: Africa. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*

Climate observations in Africa show that there has been a trend of increasing average temperatures across almost all parts of the region since the 1960s, associated with an increase in the number of warm days and nights. The changes in annual rainfall over Africa present a more varied picture. West Africa and much of central Africa have experienced a marked decline in annual precipitation. Southern Africa shows no clear long-term trend, while east Africa shows patterns of increasing rainfall over the northern sector and declining amounts over the southern sector. There has been an increase in the number of droughts, and in southern Africa the number of extreme rainfall events has increased, leading to severe flooding.

Africa as a continent accounts for just 3% of global emissions, so any mitigation activities must have clear adaptation and development co-benefits. Empirical downscaling is a statistical technique to produce station level projections of climate change from global climate models. Projections of anthropogenic mostly human-induced climate change in Africa are still largely based on results from global circulation models, as there have been few studies using regional models or empirical downscaling experiments. Model projections for temperature are better than those for precipitation, as many models find it hard to accurately capture aspects of African climatology that affect rainfall, such as dust aerosol concentrations, sea-surface temperature anomalies, the role of vegetation and land-use change, deforestation in the equatorial region, and soil moisture in southern Africa.

Nevertheless, IPCC projections show that average temperatures are expected to increase in the range of 3-4°C for the period 2081-2099 over most of Africa, with smaller increases in coastal and equatorial regions. These increases are likely to vary locally and seasonally, however, and the possibility of greater increases cannot be ignored. Along with increases in average temperatures, the maximum and minimum temperatures and the numbers of extremely hot days

and seasons are also expected to increase. Uncertainty associated with changes in precipitation make it difficult, for example, to provide any precise estimation of future water runoff, especially in arid and semi-arid regions where slight changes in precipitation can result in dramatic changes in the runoff process. However modelling results do indicate an expected increase in precipitation over East Africa and parts of Central Africa, and a decrease in austral winter precipitation in southern Africa. Projections for West Africa range from a large increase to a large decrease in precipitation, and the IPCC state that projections of precipitation for West Africa should be 'viewed with caution'. Annex 1 provides two tables giving more details of observed and projected climate changes as reported in the IPCC Fourth Assessment Report[104], for each of the four regions of sub-Saharan Africa.

The study observed that impacts of climate change in Africa are increasingly common and even observable. Specific impacts on poor people are reduced access to water in dry regions, declining crop producitivity and thus food insecurity, increasing temperature and heat-wave events, increasing incidence of floods and droughts. Other bio-physical impacts and phenomena include melting glaciers, .decreased river flows, and spread of vector-borne diseases. Many of Africaôs major economic sectors like agriculture, forestry, fisheries, tourism, construction, are sensitive in various ways to weather and climate conditions and large portions of the continentôs population are involved, to varying degrees, in subsistence livelihoods making them highly vulnerable to climate and other environmental changes.

[104] IPCC (Intergovernmental Panel on Climate Change), 2007a. *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York.

Levels of vulnerability to climate change, as socially differentiated across populations, are compounded by existing problems, particularly: developmental challenges, such as endemic poverty, weak governance, limited access to capital and markets, low levels of infrastructure and technology; natural resource management challenges, including land degradation, decreased soil fertility, degraded riverine systems, inequitable access to water resources, and loss of biodiversity; health threats, particularly HIV/AIDS; and complex conflicts.

By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change. The overall increase in numbers of people exposed to water stress will be particularly marked in southern and northern Africa, but important local scale variations will exist; central to this is not just variations in the amount of rainfall received but in the ability to capture and store rainwater. Negative impacts on local livelihoods and national economic productivity will be felt through: the inability to irrigate commercial crops or water livestock; the spread of water borne diseases; the burden of household labour of walking long distances for water collection; limited water for mining and manufacturing purposes; etc. Many of these impacts undermine efforts to reduce poverty, adequately adapt to climate change, and fuel development at both the local and national scale.

Agricultural production and access to food is currently in a poor state in most countries in Africa, with declining food per capita over the last couple of decades. However, agricultural production is projected to be severely compromised by climate change, specifically manifested in changes in the timing and duration of precipitation events, daily temperatures, and levels of soil moisture. This would cause significant and increasing loss of agricultural productivity and food insecurity. In some countries, yields from rain-fed agriculture could be reduced by up to 50% (IPCC 2007b). Unless counteracted, dependence on food imports will increase. Short of financial

capital and foreign exchange, this would further adversely affect food security and exacerbate malnutrition.

Subsistence-based farming systems are expected to be at greater risk than the commercial sector, much of which is under irrigation and thereby able to manage reductions in rainfall. However, food prices are likely to increase, which may have negative repercussions on the urban poor in particular. Increasing food prices may also provide an incentive for increased crop production and thus promote the agricultural sector in the mid- to long-term, which will counteract some of the adverse impacts hitting the urban poor in the short run.

The increase in heavy rainfall events and any change in cyclone activity under climate change, is associated with more frequent and extensive flooding across much of the continent, with crippling consequences for households, communities and be transmitted from the local, through the national to the regional economy. Mobility is reduced, access to food and water is limited, public and private infrastructure is damaged, crops and livestock are lost, and people are often temporarily or permanently displaced. For example, the floods of 2000 in southern Africa had a devastating impact, particularly in parts of Mozambique where the cost of the combined impact of the floods and the cyclones in 2000/2001 was estimated at US$ 600 million and more than 500,000 people were displaced. All such local /national events have sub-regional repercussions. Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations especially in places of rapid urbanisation through permanent or periodic inundation. [105]

[105] IPCC. 2007. *Climate Change Impacts, Adaptation and Vulnerability*, Report of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York

A number of impacts on terrestrial and aquatic ecosystems are being observed, partly attributable to climate change, and more are expected. In mountain, forest, grassland and wetland ecosystems climate change is expected to result in loss of and changes in biodiversity, in particular changes of certain plant, animal and bird species. Also in marine ecosystems and along coastal zones in Africaôs sub-regions particularly in East Africa, increased water temperatures lead to coral and reduction and eventual loss of various fish species. Large-scale losses of species will have negative effects on key economic sectors such as fisheries, forestry and tourism, as well as reduced food security and resilience of ecosystems.

Although specific figures are uncertain, human health is expected to be adversely affected by projected climate change, especially in parts of Africa where the capacity to administer preventative and curative health care is particularly low. Increasing temperatures will extend the habitats of disease vectors such as mosquitoes carrying malaria. More intense droughts and floods will result in more extensive outbreaks of water-borne diseases, like cholera, particularly where sanitation is poor. There are also multiple complex interactions between the prevalence of HIV and AIDS and climate change, both in terms of climate change impacts increasing the likelihood of risky behaviour and exposure to HIV/AIDS, and - as a consequence - a decreased capacity to prevent or adapt to climate change impacts. The links between health and climate change are not yet well researched in the region. [106]

It is important to recognize different levels of vulnerability within communities and households associated with gender, age, HIV status, ethnicity, etc. For example, in peri-urban Malawi, when rains are insufficient and crop yields are low, significant numbers of women resort to sex-for-

[106] IPCC, 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability, Africa, Geneva, IPCC

food transactions to secure food for their families, leading to an increase in the spread of HIV. Moreover, climate change is likely to fundamentally change rural behaviour due to decreased access to household water and fuel wood in several parts of the region. This will impact negatively on womenôs work burden and labour supply in e.g. crop production. The recognition of cultural and social dynamics is therefore of paramount importance when supporting adaptation to climate change.

Climate change is a reality and the region is thinking and planning on how to manage it. Thatôs why the respondents were of the view that these two issues be addressed by mitigating the climate change by tree planting and then processes for adaptation be developed and implemented. The payment of environmental services should be promoted Clean Development Mechanism (CDM), and Reducing Emissions from Deforestation and Forest Degradation (REDD) programs to be domesticated at a large scale. Projects that can earn saleable certified emission reduction (CER) credits in tones of CO2, and this can be counted towards meeting Kyoto targets.

4.2.3 Opportunities of Resources in Eastern Africa

The research established that Eastern Africa has a wealth of natural capital. The most important renewable resources in Africa include water resources, forest ecosystems, and agricultural land. Other key renewable resources include grazing lands, wildlife, and fisheries. The most important non-renewable resources include: fossil fuels and minerals metals and non-metals, of which the most important are crude and petroleum oil, natural gas, diamonds, gold, copper and coal[107]. Africa has the largest tropical rain forests and the second largest freshwater lake in the world.

[107] AfDB (African Development Bank), (2007). *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank

Despite widespread poverty, the region offers significant potential for human, social and economic development. Moreover, Africa has world class biodiversity resources, which contribute to form the regionôs natural capital on which much of the social and economic systems and activities are based.

The region currently holds six of the worldôs 25 biodiversity hot spots. These biological resources are local, regional as well as of global importance, in terms of world heritage, and supporting millions of poor people, in addition to maintaining ecosystem functions of global importance. The region has more than 50,000 known plant species, 1,500 species of birds and 1,000 mammals. The biological diversity found in any one area or country varies depending on physical size, local climatic conditions, topography and vegetation and soil types. For example, In Southern Africa there is an estimated 20,000 plant species; East Africa has at least 8,000 species and Central Africa has more than 15,000 species. The African coastal regions are equally diverse with more than 4,000 fish species, offering large opportunities for fisheries as well as tourism.

Eastern Africaôs water resources are characterized by extreme spatial and temporal variability. While Africa uses only about 4 per cent of its renewable freshwater resources, water is becoming one of the most critical natural resource issues. The continent is one of the two regions in the world facing serious water shortages. Average water availability per person in Africa is 5,720m3/capita/year compared to a global average of 7,600m3/capita/year. The wet equatorial zone produces 95 per cent of Africaôs total flow, while the arid and semi-arid zones produce only 5 per cent. Africa has 17 rivers with catchment areas exceeding 100,000 km2 and more than 160 large lakes, lakes exceeding 27 km2. In addition to freshwater resources in rivers and lakes, the continent is endowed with significant trans-boundary aquifers.

The study established that agriculture is the largest user of water in the region. Water used for irrigation purposes represents around 70% of the total water use in the region. Africa also boasts a huge potential for hydro-electric power generation. Water for household consumption makes up a small fraction of the water usage in Africa. Recent studies indicate that more than 300 million people in Africa lack access to safe water. In sub-Saharan Africa around 50% of the population has access to safe water supply and to sanitation services, respectively. [108]

As indicated above, respondents felt that although Africa is endowed with significant environmental resources, the region is facing enormous challenges. Rapid population growth, rising levels of poverty and inappropriate development practices are the main factors that affect the state of the environment in Africa. Other factors that have led to continued environmental degradation include the impact of drought and other natural disasters, disease, ineffective development policies, unfavourable terms of trade and the debt burden. The issues of concern include, but are not limited to, widespread land degradation and desertification, loss of biodiversity, deforestation and loss of arable and grazing land, declining soil productivity, pollution and depletion of freshwater resources and deteriorating air quality. These have wider implications on food security, sustainable natural resources management, human health and poverty eradication efforts.

4.2.4 Assessment of Environmental Challenges

The research established that Eastern Africa faces the inter-related environmental challenges of combining pro-poor economic and social policies with sustainable utilization of the regionôs natural resources and ecosystem services, and appropriate adaptation to climate variability and

[108] Urdal, Henrik, 2008. *Demographic Aspects of Climate Change, Environmental Degradation And Armed Conflict*, United Nations Population Division, Department of Economic and Social Affairs, United Nations Secretariat, New York

climate change. Although many of Africaôs specific environmental problems have local manifestations, they are typically caused by sub- regional driving forces, which occur across and affect the whole or parts of the region for example labour migration, markets, conflicts etc. [109] Consequently, this requires regional or sub-regional solutions. In our view, the key environmental challenges of regional nature include: loss of ecosystem services and biodiversity, degradation of forest resources and deforestation, land degradation, and inefficient trans-boundary water resources management which includes coastal and marine resources. These challenges are strongly characterized by resource depletion as is explained above and compounded by the other main challenge: climate change. Again, climate change impacts will be experienced locally, but have sub- regional repercussions in many instances. Hence, in addition to local and national approaches, adequately addressing climate change - mitigation as well as adaptation - requires sub-regional as well as regional approaches.

To put this in perspective many responses at local and national levels are being undertaken to land degradation by soil conservation and agro-forestry, to deforestation by afforestation and land tenure reform, to water resource depletion by integrated water management, reformation of allocation of access rights. However, sub-regional approaches may be warranted and indeed necessary in order to scale up good examples and best practices, wider (region-wide!) dissemination of resource management techniques that work in practice, sharing of the cost burden and pooling of knowledge across countries etc. Here, provided that the financial resources are well managed and targeted to its assigned purposes, regional approaches to some of

[109] World Bank, 2008. *The Little Green Data Book Development Indicators 2008/09*, The World Bank, Washington DC

Eastern Africaôs local environmental issues of water, land and forests would speed up and enhance implementation. [110]

Similar to the environmental issues listed above, there is a need to identify useful regionally coordinated approaches, regional sharing of experiences and responsibilities, undertaking regional research efforts in cases when, the critical mass is too limited nationally, the natural resources are shared waters, watersheds, forest resources, and/or there are positive returns to scale sharing of info, investment costs, R&D . In addition to any national efforts, sub-regional and regional interventions in areas of policies, practices are warranted when there is value-added or the issue can only or best be addressed at the international level. Arguably this applies to cases when problem analyses and interventions are more cost-effective at the sub-regional level.

The study observed that legislation needs to be internationally coordinated and harmonized in order to prevent countries from seeking advantages by lax environmental regulation for e.g timber logging, land use, food safety in crop production, fisheries regulation etc. Africa as a region would also benefit from increased regional cooperation and coordinated approaches in the case of accessing funds for capacity building for, and implementation of, international/multi-lateral environmental agreements on biodiversity, desertification, climate. A prerequisite for this is strengthening/supporting efforts to enhance the capacity of key sub-regional and regional institutions, which are charged with the responsibility of managing natural resources and ecosystem services sustainably, energy, water, lands, forests infrastructure. At present, the institutional capacity is clearly insufficient to implement existing policies like NEPADôs

[110] World Bank and IMF, 2008. *Global Monitoring Report 2008 - MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

Strategic Plan to Build Africaôs Capacity to Implement Global and Regional Environmental Conventions, sub-regional environmental strategies formulated and adopted by the RECs. [111]

Supporting institutional capacity building relates to the important issue of sequencing in environmental strategy implementation. Clearly, Africaôs key regional and sub-regional governing bodies have formulated largely adequate policies and strategies pertaining to environment and climate change. This is a necessary first step towards sustainable development. However, in order to take the step and ensure progress and appropriate implementation, it is necessary to strongly enhance capacity among and within the key institutions responsible for implementation.

This challenge is not limited to regional bodies in the ñenvironmentalò sphere, but a shared task among all regional bodies affecting and utilizing natural resources and fundamental ecosystem services in energy, infrastructure, agriculture, water resources management, mining, land use. On sequencing, it is also necessary to ñget the institutions rightò easier said than done, nevertheless of utmost importance, before undertaking major investments in the area of environmental management. Investing heavily in environmental management prior to having adequate environmental institutions for control, monitoring, verification and follow-up drastically increases the risk of failed outcomes.

4.3 Key Actors in managing environmental and Climate Change Problems

It is difficult and not always useful or even possible to distinguish or disentangle local manifestations of natural resource management, environmental change and climate change.

[111] World Bank and IMF, 2008. *Global Monitoring Report 2008 - MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

4.3.1 Actors in Environmental sector

The research established that at the regional level, African Union (AU) has developed Action Plan of the Environment Initiative of The New Partnership for Africaôs Development (NEPAD). This Action plan identifies 11 regional key environmental issues, which are also identified as priority program areas for regional environmental cooperation. They include: combating land degradation, drought and desertification, conservation and sustainable use of marine, coastal, freshwater resources and wetlands, prevention, control and management of invasive alien species, climate change adaptation and mitigation, and trans-boundary conservation or management of natural resources, management of cultural heritage; sustainable management of sub-soil, non-renewable resources; sustainable management of cities; integrated waste management and pollution control; sustainable energy production and consumption, and addressing negative impacts of population dynamics including HIV/AIDS and armed conflicts on the environment. [112]

This agenda of priority environmental issues is not exclusive or controversial, most other key regional actors buy-in to it, and the challenges are largely in line with those identified by other key actors working regionally such as AfDB, EU, UNDP, UNEP and the World Bank. Strategies guiding these actorsô work in the region include AfDBôs Regional Environmental Strategy, the World Bankôs Africa Environment Strategy, EU/European Commissionôs Sub-regional Environmental Strategies, and UNDP/UNEPôs Povertyï Environment Initiative.

Sub-regionally: At the sub-regional level there is a large set of actors, programs and agendas. Key sub-regional actors include: EAC, COMESA, which all have developed environmental

[112] AMCEN, 2008. *Climate Change Adaptation in Africa: Scoping paper for the African Ministerial Conference on the Environment (AMCEN) Expert Group Meeting*

strategies. As an effect of strengthened pan-African leadership creation of AU, formulation of NEPAD, AMCEN, and designated sub-regional responsibilities via the Regional Economic Communities (RECs), sub-regional cooperation on environment and climate change is progressing. Progress is mainly achieved in terms of policy and strategy formulation and financing, and less in forceful implementation on the ground.

The research established that progress varies between sub-regions. Arguably most progressive, EAC Member States have committed themselves to sustainable development and to actively participate in negotiation and ratification of major multilateral environmental agreements. Key guiding documents for action include EACôs Environment and Sustainable Development Policy and Strategy Document and the Protocol on the Environment. The objective on environmentally sustainable development as expressed in EACôs Regional Indicative Strategic Development Plan (RISDP) is to mainstream environmental and sustainable development issues into *all* sector policies, programs and activities at national and regional level. Although the level and quality of implementation remains to be fully assessed, EAC is becoming very active and ambitious with respect to considering environmental and climate change issues in its development work. EACôs commitments and plans constitute a tall order but points at their ambition in this field.

EAC has made considerable progress to enhance sub-regional cooperation, mainly regarding joint management of Lake Victoria and its drainage basin. The EAC member states have signed and ratified a Protocol for sustainable development of the Lake Victoria basin and are also funding the entire recurrent budget of the Lake Victoria Basin Commission, set up to administer the Protocol and coordinate the countriesô activities. However, much remains to be done in practice, in particular when it comes to formulate and enforce joint forest policies, control of pollution into shared waters, trans-boundary water resources management etc.

Regarding regionally shared water resources management, key regional trans-boundary water cooperation and basin organisations include The East African Community (EACôs), States Southern Africa Development Community (EAC), Senegal River Basin Organisation (OMVS), Niger Basin Authority (NBA) and the Nile Basin Initiative (NBI).

The integration of environmental concerns into the policies and actions of NEPAD as well as the sub-regional coordination bodies form important starting points for identifying Africaôs agenda on environment. Many of the environmental concerns may very well be considered and appropriately addressed within associated sectors, in which environmental management is a natural concern. This applies for instance to NEPADôs regional program for agricultural development, and its subsidiary sub-regional strategies and commitments for sustainable land management.

Obstacles to effective environmental management in Africa include; slow environmental policy implementation, inadequate and un-coordinated environmental legislation and institutions at the national and sub-regional levels, poor legal enforcement, and insufficient financial and human capacity at all levels of implementation. Moreover, integration of environmental concerns into key national development plans and primarily Poverty Reduction Strategies has also been poor, which has had implications in the regional and sub-regional for shared natural resources or trans-boundary environmental problems. To ensure adequate environmental management, capacity has to be strengthened and the key environmental challenges ought to be better, mainstreamed in key national and regional development plans and not pursued as isolated efforts. Moreover, over-laps in policies, formulation of strategic objectives and implementation on the ground are currently large. Potentially, increased collaboration across actors would enhance efficiency. Hence, key challenges at present are to scale up promising interventions and activities, increase

coordination, harmonize and collaborate in practical implementation efforts, rather than to re-define and re-formulate policies and operational priorities. [113]

4.3.2 The EAC treaty on cooperation in environment and natural resources management[114]

The research established that the EAC treaty chapter nineteen. The Partner States recognise that development activities may have negative impacts on the environment leading to the degradation of the environment and depletion of natural resources and that a clean and healthy environment is a prerequisite for sustainable development. The Partner States therefore: agreed to take concerted measures to foster co-opera t ion in the joint and efficient management and sustainable utilisation of natural resources within the Community; To undertake, through environmental management strategy, to cooperate and co-ordinate their policies and actions for the protection and conservation of the natural resources and environment against all forms of degradation and pollution a rising from developmental activities; To undertake to co-operate and adopt common policies for control of trans-boundary movement of toxic and hazardous waste including nuclear materials and any other undesirable materials; To provide prior and timely notification and relevant information to each other on natural and human activities that may or are likely to have significant trans-boundary environmental impacts and shall consult with each other at an early stage; and To develop and promote capacity building programmes for sustainable management of natural resources.

The act ion by the Community relating to the environment shall have the following objectives: to preserve, protect and enhance the quality of the environment; to contribute towards the

[113] AMCEN, 2008. *Climate Change Adaptation in Africa: Scoping paper for the African Ministerial Conference on the Environment (AMCEN) Expert Group Meeting*

[114] The treaty for the establishment of the east african community(as amended on 14th December, 2006 and 20th august, 2007)

sustainability of the environment; to ensure sustainable utilisation of natural resources like lakes, wetlands, forests and other aquatic and terrestrial ecosystems; and to jointly develop and adopt water resources conservation and management policies that ensure sustenance and preservation of ecosystems.

Management of the Environment for the purpose of the treaty, the Partner States under take to co-operate in the management of the environment and agree to: To develop a common environmental management policy that would sustain the eco-systems of the Partner States, prevent , arrest and reverse the effects of environmental degradation; To develop special environmental management strategies to manage fragile ecosystems, terrestrial and marine resources, noxious emissions and toxic and hazardous chemicals; to take measures to control trans-boundary air , land and water pollution arising from developmental activities; To take necessary disaster preparedness, management , protect ion and mitigation measures especially for the control of natural and manmade disasters. These include oil spills, bio-hazards, floods, earthquakes, marine accidents, and drought and bush fires; and to integrate environmental management and conservation measures in all developmental activities such as trade, transport , agriculture, industrial development, mining and tourism in the region.

The EAC intends to; adopt common environment control regulations, incentives and standards; develop capabilities and measures to undertake environmental impact assessment of all development project activities and programmes; encourage the manufacture and use of bio-degradable pesticides, herbicides and packaging materials; encourage public awareness and education on the use of agricultural and industrial chemicals and fertilisers; adopt environmentally sound management techniques for the control of land degradation, such a s soil erosion, desertification and forest encroachment; promote the use of non-ozone depleting

substances and environment-friendly technologies; promote and strengthen the utilisation of training facilities and research institutions within the Community; adopt common environment a l standards for the control of atmospheric, terrestrial and water pollution arising from urban and industrial development activities; exchange information on atmosphere, industrial and other forms of pollution and conservation technology; harmonise their policies and regulations for the sustainable and integrated management of shared natural resources and ecosystems; adopt measures and policies to address the existing demographic profiles such a s high growth rates and fertility rates, high dependency ratio, poor social conditions and poverty in order to mitigate their adverse impact on the environment and development; adopt community environmental management programmes; promote enhancement of the quality of the environment through adopt ion of common measures and programmes of tree planting, afforestation and reforestation, soil conservation and recycling of materials; and adopt common policies for conservation of biodiversity and common regulations for access to, management and equitable utilisation of genetic resources.

Prevention of Illegal Trade in and Movement of Toxic Chemicals, Substances and Hazardous Wastes; The partner states under take to co-operate and adopt common posit ions against illegal dumping of toxic chemicals, substances and hazardous wastes within the Community from either a Partner State or any third party. The Partner States shall harmonise their legal and regulatory framework for the management, movement, utilisation and disposal of toxic substances. The Partner States under take to ratify or accede to international environmental convent ions that are designed to improve environmental policies and management.

Management of Natural Resources as per the treaty, the Partner States agree to take concerted measures to foster co-operation in the joint and efficient management and the sustainable

utilisation of natural resources within the Community for the mutual benefit of the Partner States. In particular, the Partner States shall: take necessary measures to conserve their natural resources; conservation of the eco-systems and the arrest of environmental degradation; and adopt common regulations for the protect ion of shared aquatic and terrestrial resources.

Regarding the conservation and management of forests, agree take necessary measures through: the adopt ion of common policies for , and the exchange of information on, the development , conservation and management of natural forest s, commercial plantations and natural reserves; the joint promotion of common forestry practices within the Community; the joint utilisation of forestry training and research facilities; the adopt ion of common regulations for the conservation and management of all catchment forests within the Community; the establishment of uniform regulations for the utilisation of forestry resources in order to reduce the depletion of natural forests and avoid desertification within the Community; and the establishment of Api-Agro Forestry Systems.

For the management of their water and marine resources, agree to co-operate through: the establishment and adopt ion of common regulations for the better management and development of marine parks, reserves, wetlands and controlled areas; the adopt ion of common policies and regulations for the conservation, management and development of fisheries resources; the establishment of common fisheries management and investment guidelines for inland and marine waters; the strengthening of regional natural resources management bodies; the establishment of common rules of origin for flora and fauna; and the establishment of a body for the management of Lake Victoria;

The management of the mineral resources sector, the member states agreed to; to promote joint exploration, efficient exploitation and sustainable utilisation of shared mineral resources; to

pursue the creation of an enabling environment for investment in the mining sector; to promote the establishment of databases, information exchange networks and the sharing of experiences in the management and development of the mineral sector using electronic mail, internet and other means for the interactive dissemination of mineral information; to harmonise mining regulations to ensure environmentally friendly and sound mining practices; to adopt common policies to ensure joint fossil exploration and exploitation along the coast and rift valley; and to establish a regional seismological network whose primary objective is to monitor seismicity and advice on mitigation measures.

4.4 Responses to the Environmental and Climate Change.

The research established that on Environmental Impact Assessment(EIA), the EAC recognizes that development activities may have negative impacts on the environment, often leading to degradation and depletion of natural resources and that a clean and healthy environment is a prerequisite for sustainable development. Therefore, there is need to stablish sustainable environmental management and economic utilization of natural resources. Hence, the EAC Treaty provides for joint management and utilization of natural resources within the Community for the mutual benefit of the Partner States. It also provides for joint development and adoption of harmonized common policies and strategies for sustainable management of trans boundary natural resources within the Community. The Treaty therefore provides the setting and premise for instituting regional guidelines for the management of trans-boundary ecosystems in East Africa, and the Partner States have initiated a number of processes and activities to implement these provisions. It is in this view that, the EAC Secretariat has developed Regional Guidelines on Environmental Impact Assessment of Shared Ecosystems in East Africa.

During the research, it was found that there are specialized activities in the region, for example, Lake Victoria Basin Commission (LVBC) is a specialized institution of the EAC that is responsible for coordinating the sustainable development agenda of the Lake Victoria Basin. The Vision of the Lake Victoria Basin Commission which was developed through a consultative process is to have: ñA prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefitsò. The Mission of the Lake Victoria Basin Commission is to promote, facilitate and coordinate activities of different actors towards sustainable development and poverty eradication of the Lake Victoria Basin.

The other specialized organization in the region is Lake Victoria Fisheries Organisation (LVFO) was formed through a Convention signed in 1994 by the East African Community Partner States of Kenya, Tanzania and Uganda as a result of the need to manage the fisheries resources of Lake Victoria in a coordinated manner. The Organisation is an institution of the EAC whose aim is to harmonise, develop and adopt conservation and management measures for the sustainable utilisation of living resources of Lake Victoria to optimise socio-economic benefits from the basin for the three Partner States.
The fisheries of Lake Victoria are shared between Kenya, Tanzania and Uganda and provide an immense source of income, employment, food and foreign exchange for East Africa. The lake produces a fish catch of over 800,000 tonnes fish annually, currently worth about US $590 million of which US $340 million is generated at the shore and a further US$ 250 million a year is earned in exports from the Nile perch fishery. The lake fisheries support almost 2 million people with household incomes and meet the annual fish consumption needs of almost 22 million people in the region. LVFO is implementing fisheries co-management on Lake Victoria, by

legally empowering fisheries communities to become equal and active partners with Government in fisheries management and development.

LVFO is guiding, supporting and implementing the building of the capacity of communities to participate in management and is making a real difference to their lives. LVFO warmly welcomes you to its website and looks forward to continued partnership in building the sustainable management of the fisheries and to continuously improving benefits from the fisheries for the Partner States, the fishing communities themselves and the consumers both within the region and overseas

National and Regional Initiatives, East Africa Countries have already embarked on preparation and implementation of projects and programmes to address climate change. The projects/programmes focus on both adaptation and mitigation activities. Four Partner States, namely Burundi, Rwanda, Uganda and Tanzania have developed National Adaptation Programme of Actions (NAPAs), which are in various stages of implementation. The NAPAs identified immediate, urgent and priority project activities that are necessary to enhance adaptation capacities to climate change adverse impacts. On the other hand, Kenya has embarked on preparation of the Climate Change Strategy which spells out the priority areas for both adaptation and mitigation activities in the country. Furthermore, the Partner States have identified potential mitigation options which can be used to foster economic development in the region while contributing to globally efforts to reduce greenhouse gas emissions. The potentials in region range from geothermal along the Rift Valley, wind, cogeneration, hydropower, solar, sequestration use of natural gases and methane recovery from waste management in various areas of the region. So far 3 partner states, namely Tanzania,

Kenya and Uganda have registered clean development projects. Initiatives are underway to ensure energy becomes readily available to region at affordable prices to the majority of the people in region.

The East Africa community has developed a climate change mitigation policy with the following objectives. To establish a regional framework to guide the harmonization, coordination and implementation of climate change initiatives amongst Partner States; To identify priority adaptation and mitigation action areas and roles of Partner States and other stakeholders to address climate change in the region; To promote public awareness and socio-economic importance of climate change, including vulnerability, impacts, risks, and response measures in the region; To promote capacity building efforts through, inter alia education, training, research, technology development and transfer, information and knowledge management; To promote climate change research and observations through monitoring, detection, attribution and model prediction to enhance climate change preparedness; To support the integration of climate change into regional development processes and planning including disaster risk management and gender development and to facilitate resource mobilization to implement regional climate change response framework, including the EAC Climate Change Strategy and Master Plan.

4.4.1 Governance and enforcement

The study observed that the key regional and sub-regional inter-governmental organizations have developed largely appropriate environmental policies, operational strategies and action plans. This constitutes a necessary first step and is a promising sign of commitment. Integration of climate change issues is weaker compared to the treatment of ñtraditionalò environmental issues like sustainable land use, integrated water resources management, biodiversity protection etc. In practice, however, the distinction between environmental and climate change issues is difficult to

make which implies that many of the traditional environmental management activities (soil conservation, afforestation, sustainable water management etc.) also promote/constitute climate change adaptation and/or mitigation activities.[115]

Despite some reports on progress like European Commission review of environmental management in the EAC sub-region, obstacles to effective environmental management in Africa include; Slow environmental policy implementation, Inadequate and un-coordinated national, sub-regional environmental legislation and institutions, Poor legal enforcement, and Insufficient financial and human capacity at all levels of implementation. Moreover, integration of environmental concerns into key national development plans (primarily Poverty Reduction Strategies) has also been poor. This is largely due to weak institutions and in some cases insufficient political will. Moreover, despite efforts at strengthening it remains true that partner absorption- and delivery-capacity in the area of environmental management is generally very weak.

Analytical and policy formulation capacity is progressing. Successful realization of existing regional and sub-regional environmental strategies pre-supposes considerable strengthening of the existing capacity. Bottle-necks exist at all levels, including nationally and locally. A large majority of African governments have signed and ratified all the main regional environmental conventions multi-lateral environmental agreements (MEAs). Despite formal commitments and a growing recognition of the importance of environmental management and climate change adaptation for pro-poor growth, Africa is currently insufficiently equipped to adequately address its key environmental challenges. To ensure adequate environmental management, capacity has

[115] UNEP, 2009. *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

to be strengthened and the key environmental challenges ought to be (better) mainstreamed in key (national, regional) development plans and not pursued as isolated efforts.

The research established that in view of the weak capacity at the regional level, NEPADôs Strategic Plan to Build Africaôs Capacity to Implement Global and Regional Environmental Conventions is of importance. Specifically, in order to improve the current situation, NEPAD has proposed to: build capacity in all aspects of sustainable environmental management in Africa, secure political will and commitment of African governments; mobilise and harmonise international, regional and national resources, conventions and protocols to identify realistic programs appropriate environmental management in Africa; and support best-practice-in-action pilot programs that can serve as good examples regionally/sub-regionally. Although weak governance and enforcement can be used as arguments for discontinuing, down-scaling or phasing out support to regional or sub-regional environmental management efforts, such a strategy would be counter-productive given the fact that many of the key environmental problems and climate change impacts can only be addressed or solved via (sub-)regional cooperation. Hence, the implication is that governance and enforcement at the regional and sub-regional levels must be strengthened, in particular by reinvigorated capacity building within the key institutions.

Noteworthy, civil society actors like trade unions, NGOs, CBOs, media, universities and the private sector play a considerably smaller role at the regional level than at the country level. For these actors to have an impact regionally and sub-regionally they need to join forces across borders, coordinate better, and seek financial and organisational support[116].

[116] AfDB (African Development Bank), 2008. *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank

4.4.2 Promotion of Democratic Governance for enhanced environmental management

The study observed that the promotion of democratic governance is vital as the existence of democratic processes, principles and institutions, which enable and promote pluralistic and non-discriminatory participation, is indispensable to the achievement of sustainable development objectives including poverty reduction, environmental protection and realisation of the right to environment.[117]. The UNDP has identified the promotion of participation through democratic governance as the third pillar of a 21st century human development strategy.[118]. Similarly, the 2005 Eastern African MDG Report states that the key to the institution of policies and programmes for the improvement of the quality of life of all people of Tanzania is the creation of a democratic state and the extension of a universal franchise. The link between democratic governance and the achievement of equitable socio-economic development has been comprehensively analysed by the UNDP in its 2002 Human Development Report. The Report finds that advancing human development requires governance that is democratic in both form and substance for the people and by the peopleô. This finding is based on the premise that democratic governance is not only valuable in its own right, but also, can advance human development. The promotion of democratic governance is also vital for the third aspect of sustainable development ï environmental protection, which is essential to the realisation of the right to environment.[119] This is due to the fact that the protection or conservation of the

[117] Monterrey Consensus on Financing for Development, 2005 World Summit Outcome, and United Nations
General Assembly Resolution

[118] The first two being investing in education and health, and promoting equitable economic growth. See United Nations Development Programme (UNDP), Human Development Report 2002: Deepening Democracy in a Fragmented World 53 (New York: Oxford University Press, 2002)

[119] James C. Kraska,(2006) óGlobal and Going Nowhere: Sustainable Development, Global Governance & Liberal

environment generally fares badly under autocratic governments than under democratic ones, as evidenced by the poor environmental performance.

Furthermore, the environmental calamity of the former Soviet Union and the Eastern Communist Bloc attests to the negative effects of autocratic regimes on the protection of the environment. Such poor environmental performance is mostly due to autocratic governmentsô abject disregard for the natural environment in preference for political and economic considerations. This is exacerbated by óa [general] lack of transparencyö autocratic governments are notoriously poor in monitoring environmental pollution, collecting information about polluters, tabulating the data and releasing it to the publicô. In contrast, democratic governance, by encouraging political freedom and participation in the decisions that shape oneôs life underpinned by freedom of speech and thought, freedom of information, free and independent media and open political debate, gives citizens a voice that allows them to be heard in public policy-making. The resultant public pressure can influence decisions and actions of public officials as well as private agents with regard to environmental pollution and other environmental abuses. Promoting democratic governance for sustainable development in Eastern Africa requires strengthening democratic institutions and promoting democratic politics.[120]

The study observed that strengthening democratic institutions is necessary as they implement policies that are necessary to democracy and development. Most importantly, they constitute formal accountability mechanisms through which citizens can check the powers of their elected leaders and influence decisions including those relating to the protection of their environment, thereby forcing governments to óinternaliseô the social costs of their opportunistic behaviour.

---

[120] United Nations Development Programme, (2002), ôThe Quest for Good Government and Development in Africa

Strengthening democratic institutions requires Africans leaders to inter alia develop stronger vehicles for formal political participation and representation through political parties and electoral systems; strengthen checks on arbitrary power by separating powers among the executive, an independent judiciary and the legislature, as well as by creating effective independent entities such as ombudspersons, electoral commissions and human rights commissions; and develop free and independent media, as well as a vibrant civil society, able to monitor government and private business and provide alternative forms of political participation.

Democratic politics on the other hand is essential towards enabling citizens especially the poor and the marginalised to claim their rights and overcome institutional obstacles. In the absence of democratic politics, public decisions in democracies including those relating to the protection of the environment as well as the utilisation of the resources may end up responding more to interest groups such as big business or the corrupt elite than to the public. When people enjoy civil and political liberties, they can put pressure on public decision-making for their interests.

As observed by the UNDP in its 2002 Human Development Report an alert citizenry is what makes democratic institutions and processes work. Political pressure from below is usually the most effective trigger of changeô Such pressure can crystallise into new environmental activism that leads to greater government responsiveness to environmental matters. It can also influence the development of macro-economic policies that contribute to enhancing the basic capabilities of the poor such as the allocation of an adequate proportion of public expenditure for basic education and health services; the channelling of more credit to sectors like agriculture and promoting development of small and medium-scale enterprises and micro-credit; or/and the institution of pro-poor trade policy that would focus on providing incentives for the export of

labour- intensive manufactures and providing some protection to small farmers to ensure food security and rural livelihoods.

As observed scholars and the respodents, an important issue in the promotion of pro-poor policies is ćthe nature of political and economic institutions. Those in which policy making is transparent and participatory are more likely to promote the adoption of pro-poor policiesĉ Promoting Respect for Human rights promoting respect for human rights for the achievement of sustainable development objectives including environmental protection in Eastern Africa, demands that States respect not only civil and political rights, but also, social, economic, cultural and environmental rights. This is because these rights ensure empowerment, voice, access to social services, and equality before the law. Thus, respect for certain civil and political rights such as access to information including environmental information, public participation in governance including environmental decision-making process, and access to justice in instances of environmental harm, is essential to environmental protection and realisation of the right to environment. In addition, promoting respect for all human rights including socio-economic and environmental rights is essential to the prevention of armed conflicts and civil wars, one of the causes of poverty in Eastern Africa, as it not only provides citizens with political stability, but also, socio-economic security including employment, healthcare and shelter.

Promoting respect for human rights is only possible when States establish transparent and accountable systems of governance, grounded in the rule of law, and provide access to justice for all members of society. With regard to the latter, providing access to justice involves not only strengthening the judicial system, but also, guaranteeing or facilitating access to justice for all citizens, especially the most vulnerable individuals in society. This will involve improving or reforming the judiciary in Africa, in order to make them pro-poor. Required actions in this area

include the wide distribution of adequately funded and staffed courts in local communities and rural areas, in order to minimize the long delays in procuring justice; access to legal aid; and tackling judicial corruption by demanding judicial accountability. Judicial accountability is essential if judges are to decide cases fairly and impartially, and for the public including the poor, to perceive the judiciary as an impartial, accessible body that strives to protect their rights and not that of vested interests.

There is also the need for States in Eastern Africa to undertake legal reforms that will enhance the poorôs access to legal and administrative remedies. This will include liberalising the locus stand rule to create greater access for individuals and NGOs acting in the public interest in instances of environmental degradation, corruption and other abuses of office; eliminating antiquated laws with anti-poor bias; and reducing legal technicalities and simplifying legal language. Furthermore, increasing the poorôs access to legal information including environmental information, as well as raising their legal literacy level, is vital to improving their ability to access legal remedies.[121]

Also, the role of civil society organizations including NGOs in promoting or procuring access to justice for the poor should be supported and strengthened. This is very important as in most instances of environmental degradation, the hope of the poor in getting legal or judicial redress rests mostly on the activities of the NGOs. In addition to the courts, the establishment of independent human rights institutions, or ombudsman offices, as well as effective law enforcement organisations will help. This is very important as public access to information is vital for effective environmental management. A free media has been instrumental in

[121] Njuguna Ngôethe, Musambayi Katumanga and Gareth Williams, Strengthening the Incentives for Pro-Poor Policy
Change: An Analysis of Drivers of Change in Kenya, 2004

highlighting environmental problems in both the public and the private sectors. In some countries, the State has effectively used public pressure by making information publicly available in order to encourage greater pollution compliance.

4.5 Chapter summary

The chapter analyses the natural resources for environmental security, the linkages between environment, climate change and key development challenges focusing on the key environmental problems and their causes in East Africa Community, the opportunities of resources in Eastern Africa and assessment of environmental challenges. The chapter looks at the opportunities of resources in Eastern Africa Community, the key actors in managing environmental and climate change problems, actors in environmental sector like the EAC treaty on cooperation in environment and natural resources management as informed by the respondents. The chapter also analyses the existing responses to the environmental and climate change, governance and enforcement and promotion of democratic governance for enhanced environmental management

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The chapter outlines the summary, conclusion and recommendations based on the three objectives as guided by this study.

5.1 Summary

The physical factors leading to environmental degradation are increasing with the increase in population and development. The extraction of the natural resources in increasing as a result of industrial demand amidst lack of sufficient information on sustainable extraction and legal support to regulate the processes. The implementation of the existing laws is also a challenge and this really complicates the sustainable management of the resources for the use by current generation and for posterity.

The socio economic factors affect the environment greatly because itôs the human activities that affect the environment causing it to be insecure. Issues like demographic characteristics, education levels, information availability, health factors, gender awareness, poverty levels,

economic changes, production and consumption levels, technological changes and changing lifestyles.

The analyses of the natural resources for environmental security, the linkages between environment, climate change and key development challenges focusing on the key environmental problems and their causes in East Africa region, the opportunities of resources in Eastern Africa and assessment of environmental challenges. The opportunities of resources in Eastern Africa region, the key actors in managing environmental and climate change problems, actors in environmental sector like the EAC treaty on cooperation in environment and natural resources management as informed by the respondents. The chapter also analyses the existing responses to the environmental and climate change, governance and enforcement and promotion of democratic governance for enhanced environmental management

Good governance and sound socio-economic reform should form an integral core of proper approach environmental conservation in Africa. It was observed that African leaders have realised the need to promote good governance and socio-economic reform in the region by their adoption of NEPAD. Its major problem is whether member States of the African Union can mobilise enough political will to translate their provisions into concrete results in environmental conservation.

This study observed that despite the existence of various regulatory frameworks for the protection of the environment in East Africa region, most of the citizens do not enjoy a right to clean and healthy environment as a result of environmental degradation

5.2 Conclusion

The physical factors leading to environmental degradation are increasing with the increase in population and development. The socio economic factors affect the environment greatly because itôs the human activities that affect the environment causing it to be insecure. The management of natural resources should be done to ensure environmental security. The study observed a great linkages between environment management, climate change and key development challenges. There is great opportunity of resources management in East Africa region and regular assessment and mitigation of environmental challenges for environmental security

The commitment of African countries must be matched by equivalent commitment on the part of poverty reduction and sustainable development in order to reduce the over reliance on natural resources in order to promote environmental health and security.

5.3 Recommendations

The East African countries should implement the environmental management strategy, cooperate and co-ordinate their policies and actions for the protection and conservation of the natural resources and environment against all forms of degradation and pollution a rising from developmental activities. This will ensure that there is environmental security. The co-operation and adoption of common policies for control of trans-boundary movement of toxic and hazardous waste including nuclear materials and any other undesirable materials should be real. The states should provide prior and timely notification and relevant information to each other on natural and human activities that may or are likely to have significant trans-boundary environmental impacts. They should consult with each other at an early stage to avoid re-

invention and disaster; and they should have joint capacity building program for sustainable management of natural resources.

The socio-economic factors within the region should be well managed improved because they result to environmental insecurity. From the research findings, the population growth should be checked in order to reduce stress to the natural resources. The environmental education should be done at all levels of education. The population within the region should be healthy in order for it to be able to take care of the environment. The gender roles and awareness should be considered when developing environmental programs. The countries need to economically empower the people by the development of the small and medium enterprises in order to reduce the reliance on the natural resources for the livelihood improvement. The technological development should be environmental friendly. The development should focus on green productions.

The countries that have developed National plans of action on climate change and are in various stages of implementation. The successes of the implementation of the plans should be share among the states so that the best and effective actions can be promoted.

Collaborative approach is required in order to reduce the negative impact of environmental degradation on the environmental security in East Africa region. The existing best strategies of managing the inter-related and joint natural resources in the East Africa region should be enhanced and improved.

Bibliography

Adegoke Adegoroye, (2009); óThe Challenge of Environmental Enforcement in Africa

AfDB (African Development Bank), (2007); *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank

AfDB (African Development Bank), (2008); *Gender, Poverty and Environmental Indicators on African Countries*, African Development Bank

Agrawal, A. (2012); *Common resources and institutional sustainability*. In E. Ostrom, *The drama of the commons* (pp. 41ï 85). Washington DC: National Academies Press.

Akpo Mudiaga Odje, (2007); óAbuse of Power and Access to Court in Tanzania

AMCEN, (2008); *Climate Change Adaptation in Africa: Scoping paper for the African Ministerial Conference on the Environment (AMCEN) Expert Group Meeting*

Baldyga, T. J., Miller, N. S., Driesse, L. K., & Gichaba, N. C. (2007); *Assessing land cover change in Kenya's Mau Forest region using remotely sensed data*. African Journal of Ecology.

Bandura, A. (2008). *Environmental sustainability by sociocognitive deceleration of population growth*. In P. Schmuck & W. Schultz (Eds.), *Psychology of sustainable development* (pp. 209ï 238). Norwell, MA: Kluwer

Barnett, J (2001) The Meaning of Environmental Security: Ecological Politics and Policy in the New Security Era, Zed Books.

Batjes, N. H. & Gicheru, P. (2004) *Soils data derived from SOTER for studies of carbon stocks and change in Kenya (Version 1)*. World Soil Information (ISRIC) GEF-SOC/VROM project report no. 2004/01 (February 2004).

Boko, M., I. et al (2007); *Africa Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*

Borga, M. (2002). *Accuracy of radar rainfall estimates for stream flow simulation*. Journal of Hydrology.

Calder I.R. (1998). *Water-resource and land use issues*. SWIM Paper 3. Colombo: IIMI

Campbell, J. B. (2002): Plant sciences. *Introduction to remote sensing.* The Guilford Press**,**

Chemelil, M.C. (1995). *The effect of human induced watershed changes on stream flows*. PhD Thesis, Southborough University of Technology, UK.

China, S.S. (1993). *Land Use Planning using GIS. Unpublished PhD thesis,* University of Southampton

Cohen M.J., Brown M.T., and Shepherd K.D, (2006). Estimating the environmental costs of soil erosion at multiple scales in Kenya using emergy sunthesis. Agriculture Ecosystems and Environment

Collier, Paul, (2003). *Natural Resources, Development And Conflict: Channels Of Causation And Policy Interventions*, World Bank, Washington DC.

Coppin P., Jonckheere, I., Nackaerts, K., & Muys, B. (2004). *Digital change detection methods in ecosystem monitoring*: a review. International Journal of Remote Sensing

Coppin P., Jonckheere, I., Nackaerts, K., & Muys, B. (2004). *Digital change detection methods in ecosystem monitoring*: a review. International Journal of Remote Sensing

Corey, J. A. B., Navjot, S. S., Kelvin, S-HP. & Barry, W. B. (2007). *Global evidence that deforestation amplifies flood risk and severity in the developing world*. Global Change Biology.

Daniel H. Cole (2008), *Pollution and Property: Comparing Ownership Institutions for Environmental Protection* 6 (Cambridge University Press);

David Hunter, James Salzman and Durwood Zaelke (eds), (2002) *International Environmental Law & Policy* 2ed, New York: Oxford University Press.

Dodds, F. Higham, A. Sherman, R. (2009). "Climate Change and Energy Insecurity: The Challenge for Peace, Security and Development", London. Earthscan.

Dodds, F. Pippard, T. (2005). "Human and Environmental Security: An Agenda for Change, London. Earthscan

Drakenberg, Nyangena and Lokina (2007). *Entering the Century of the Environment*: A New Social Contract for Science in Science.

Drakenberg, Olof, Wilfred Nyangena and Razack Lokina, (2007). Environmental Policy Brief for the Lake Victoria Basin. Göteborg University.

Edward B. Barbier, and Daniel Leonard, (2007); ócorruption, Trade and Resource Conversionô, 50 *Journal*

Ernest M. Makawa, (2010); Experience of Kenya: Public Role in Enforcement, Fifth International Conference.

Ertegun (2002); *Natural Resources, Development And Conflict: Channels Of Causation And Policy Interventions*, World Bank, Washington DC.

FAO (2003); Global Forest Resources Assessment 2003. Main Report. *FAO Forestry Paper.*

FAO (2003); *Crop evapo-transpiration: Guidelines for computing crop water requirements* ï FAO Irrigation and drainage paper 56, Rome, Italy.

FAO (2004); Global Forest Resources Assessment 2004. Main Report. *FAO Forestry Paper.*

FAO, (2001); *Soil Map of the World, Revised Legend. FAO World Soil Resources report no. 60*. Food and Agricultural Organization of the United Nations, UNESCO, Rome, Italy.

FAO. (2009); Food and Agriculture Organization of the United Nations. Crop evapotranspiration: Guidelines for computing crop water requirements ï FAO Irrigation and drainage paper 56, Rome, Italy

Food and Agriculture Organization of the United Nations. (2007) Crop evapo-transpiration: Guidelines for computing crop water requirements ï FAO Irrigation and drainage paper 56, Rome, Italy

.

Food and Agriculture Organization of the United Nations. *(2010) Crop evapotranspiration: Guidelines for computing crop water requirements – FAO Irrigation and drainage*

Foody, G. M. (2001). *Monitoring the magnitude of land cover change on the southern limits of the Sahara*. Photogrammetric Engineering and Remote Sensing

Graham & Trotman, (2003)*The Earth Summit: The United Nations Conference on Environment and Development (UNCED)* (London:).

Holmberg, Johan, (2007). *Natural Resources In Sub-Saharan Africa: Assets And Vulnerabilities: A contribution to the Swedish Government White Paper on Africa*

IPCC (Intergovernmental Panel on Climate Change), (2007a); *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York.

IPCC, (2007). Climate Change 2007: Impacts, Adaptation and Vulnerability, Africa, Geneva,

IPCC. (2007); *Climate Change Impacts, Adaptation and Vulnerability*, Report of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, U.K., and New York

J Barnett, (2001); *The Meaning of Environmental Security: Ecological Politics and Policy in the New Security Era,* Zed Books, 2001, p 122.

J Lubchenco (1998); *Entering the Century of the Environment: A New Social Contract for Science* in Science, Vol 279, 23 January 1998, p 491.

J.K. Wilson and R. Damania, (2005) ócCorruption, Political Competition and Environmental Policyô, 49(5) *Journal*

James C. Kraska,(2006) ócGlobal and Going Nowhere: Sustainable Development, Global Governance & Liberal

Jensen, J. R. (2000). Remote Sensing of the Environment: an earth resource perspective. Prentice Hall series in geographic information science. Upper Saddle River, NJ, USA

L Elliot (1998); *The Global Politics of the Environment*, Macmillan Press Ltd, London, 1998, p 231.

Malinverni and Fangi, (2010) Ecological Sustainability in a Developing Country such as South Africa: A Philosophical and Ethical Inquiryô, 6(2) *The International Journal of Human Rights*.

Mathews, J.T. 1989. ñRedefining Security,ò Foreign Affairs 68, No. 2 (Spring 1989): 162-177.

McSweeney, C., New, M. & Lizcano, G. (2008): UNDP Climate Change Country Millennium Ecosystem Assessment. *Ecosystems and Human Well-being, Current State and Trends (*Vol. 1) and *Our Human Planet: Summary for Decision Makers*, Island Press

Neema Pathak, Ashish Kothari and Dilys Roe, (2010) óConservation with Social Justiceò The Role of Community Conserved Areas in Achieving the Millennium Development Goals.

Ness and Golay (2007). ñ*Moving to Greener Pastures" Multinationals and the Pollution-haven Hypothesis*, Journal of Development Economics

New Partnership for Africaôs Development (NEPAD), (2003) Action Plan of the Environment Initiative.

Ngigi, T. G. & Tateishi, R. (2004): Monitoring deforestation in Kenya. *International*

Njuguna Ngôethe, Musambayi Katumanga and Gareth Williams, Strengthening the Incentives for Pro-Poor Policy

O.A. Bowen, (2000) óThe Role of Private Citizens in the Enforcement of Environmental Lawsô

Ochego, H. (2003); Application of Remote Sensing in Deforestation Monitoring: A Case study of Mau watershed.

S Khagram, W C Clark, and D F Raad (2003); From the Environment and Human Security to Sustainable Security and Developmentô, *Journal of Human Development, vol 4, No 2, July 2003.*

Scoones (2008) *Stern Review on the Economics of Climate Change*, HM Treasury, London.

Sombroek, W. G.,. Braun, H. M. H. & van der Pouw, B. J. A. (2010). *The explanatory soil map and agro-climatic zone map of Kenya. Report No. E.1, Kenya Soil Survey*, Nairobi, Kenya.

Stern (2006) *Stern Review on the Economics of Climate Change*, HM Treasury, London.

Stern et al, 2006. Commission on Growth and Development, 2008; IPCC 2007a,b;
Study of the Aberdares (Kenya**).** *2nd FIG Regional Conference.* Marrakech.

Svensson, U. (2008). ñ*Environmental Security: A Concept." Presented at the International* Conference on Environmental Stress and Security, the Royal Swedish Academy of Sciences, Stockholm, Sweden,

Svensson, U. 1988. ñEnvironmental Security: A Concept.ò Presented at the International Conference on Environmental Stress and Security, the Royal Swedish Academy of Sciences, Stockholm, Sweden, December 1988.

Swain, A. 1996. "Displacing the Conflict: Environmental Destruction in Bangladesh and Ethnic Conflict in India." Journal of Peace Research, 33(2), 189ï 204.

Human Development Report(UNDP 2002): The treaty for the establishment of the east african community(as amended on 14th December, 2006 and 20th august, 2007)

Transparency International, (2007) Report on the Transparency International Global Corruption Barometer

UNDP,(2005); *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

UNDP, (2005); Assessing Environmentôs Contribution to Poverty Reduction New York.

UNEP, (2008); ñAfricaôs Natural Wealth Key to Economic Prospects.ò *Africa Environment Outlook* Just 27, 2007 press release

UNEP,(2009); *From Conflict to Peace-building: the Role of Natural Resources and the Environment*, UNEP, Nairobi

UNEP. (2006);ñ*Africa's Natural Wealth Key to Economic Prospects." Africa Environment Outlook.*

UNEP: United Nations Environment Program (2006). AEO: *Africa Environment Outlook*. Nairobi, Kenya: UNEP, and London: Earthscan

UNHCR. (2005) Key Principles for Decision Making, Engineering and Environmental

United Nations Development Programme (UNDP) (2007); *Human Development Report: Human Development to Eradicate Poverty* 5 (New York

United Nations Development Programme (UNDP), (2010); Governance for Sustainable Human Development

United Nations Development Programme, (2002); The Quest for Good Government and Development in Africa

Urdal, Henrik, (2008). *Demographic Aspects of Climate Change, Environmental Degradation And Armed Conflict*, United Nations Population Division, Department of Economic and Social Affairs, United Nations Secretariat, New York

WCED (2007). *Changing drivers of deforestation and new opportunities for conservation. Conservation Biology*

Wilson M.K. Masilingi, (2008) ôSocial-Economic Problems Experienced in Compliance and Enforcement in Tanzaniaõ, Fourth International Conference on Environmental Enforcement

World Bank and IMF, (2008); *Global Monitoring Report 2008 - MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC *contribution to the Swedish Government White Paper on Africa,* Environmental Compliance and Enforcement, and *Environmental Economics and Management*

World Bank and IMF, (2005); *Global Monitoring Report 2005- MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

World Bank and IMF, (2008); *Global Monitoring Report 2008 - MDGs and the Environment: Agenda for Inclusive and Sustainable Development*, Washington DC

World Bank, (2008); *The Little Green Data Book Development Indicators 2008/09*, The World Bank, Washington DC

World Bank, (2009); *Africa Development Indicators 2008/09*, The World Bank, Washington DC.

World Resources Institute, (2005); *The Limitation of Law in Promoting Synergy Between Environment and Development Practices* in Developing Countries.

World Resources Institute. (2007); Natureôs Benefits in Kenya: An Atlas of Ecosystems and Human Well-Being. Washington, DC, USA