

ENVIRONMENTAL DIPLOMACY AS A GREEN ECONOMY FOR KENYA:

THE IMPACT OF CLIMATE CHANGE ON AGRICULTURE, 1963- 2012

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DECLARATION

I declare that this project is my original work and has not been submitted for examination in any other University.

.....


Ashley Kaei

26th November 2012.....

Date

Declaration by Supervisor

This project has been submitted for examination with my approval as University Supervisor.

.....

Dr. Ibrahim Farah

26/11/2012.....

Date

DEDICATION

Dedicated to my late father

Augustine Peter Kaei

Who taught me the value of education and without whose wisdom, advice and love this
research would not have been completed

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I would like to thank the Almighty God for good health and the amazing gift of nature that has inspired me to undertake this study. My first acknowledgements are to the libraries I have had to turn to for my sources UNEP, Ministry of Foreign Affairs and to the University of Nairobi and especially, Institute of Diplomacy and International Studies.

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ABSTRACT

Kenya's agricultural sector employs over 75 percent of the workforce, directly and indirectly accounts for approximately 51 percent of Kenya's Gross Domestic Product (GDP), and has the capacity for significant growth – if irrigation, road, agricultural inputs, extension, marketing, and health/nutrition constraints can be addressed. Because the livelihoods of large numbers of food insecure households in rural areas are based on agriculture, improving agricultural productivity and increasing farmers' incomes are keys to achieving food security and improved nutritional status. This paper seeks to look at environmental diplomacy as a solution to the agricultural sector in Kenya through the numerous attempts to save the environment as they globally seek answers from the treaties and conventions held.

Also the study will reveal that Kenya's relatively high per capita income level hides the fact that over 50 percent of the population is living in poverty. Despite a relatively moderate population growth rate of an estimated 2.6 percent), access to water and land resources is constrained, and most farmers practice rain-fed agriculture on small plots with degraded soils. High potential areas produce significant staple food stocks, yet there are consistently two to four million people receiving food aid each year. Thus we look at climate change as we try to establish the impacts and the measures to fight climate change in Kenya. The study uses interviews across the country and mostly in Rift valley and western which are predominantly Kenya's agricultural heavyweights to provide insights and important realities of current environmental challenges. The study looks at the agriculture as the major economy earner in Kenya and environmental diplomacy as a great solution.

LIST OF ABBREVIATIONS AND CHEMICAL SYMBOLS

Abbreviations

AgGDP	Agricultural Gross Domestic Product
ASALs	Arid and Semi-Arid Lands
COMESA	Common Market for Eastern and Southern Africa
COP	Conference of Parties
CSR	Corporate Social responsibility
EAC	East African Community
EMCA	Environmental Management and Coordination Act
FSI	Foreign Service Institute
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GMO	Genetically Modified Organisms
GoK	Government of Kenya
HMPL	High Medium Potential Land
ICT	Information and Communication Technology
IDIS	Institute of Diplomacy and International Studies
IPCC	Intergovernmental Panel on Climate Change
ISS	Institute for Security Studies
ITCZ	Inter-Tropical Convergence Zone
KARI	Kenya Agricultural Research Institute
KFS	Kenya Forest Service
KM ²	Kilometers Squared
KMD	Kenya Meteorology Department
LCDs	Least Developed Countries
MDG	Millennium Development Goal
MEMR	Ministry of Environment and Mineral Resources
NCCRS	National Climate Change Response Strategy
NGO	Nongovernmental Organization

SEI	Stockholm Environment Institute
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WWF	Wild World Fund
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

Chemical Symbols

CFCs	Chlorofluorocarbons
CH ₄	Methane gas
CO	Carbon monoxide
CO ₂	Carbon dioxide
HCFCs	Hydro- Chlorofluorocarbons
O ₃	Ozone
OH [•]	Hydroxyl radicals

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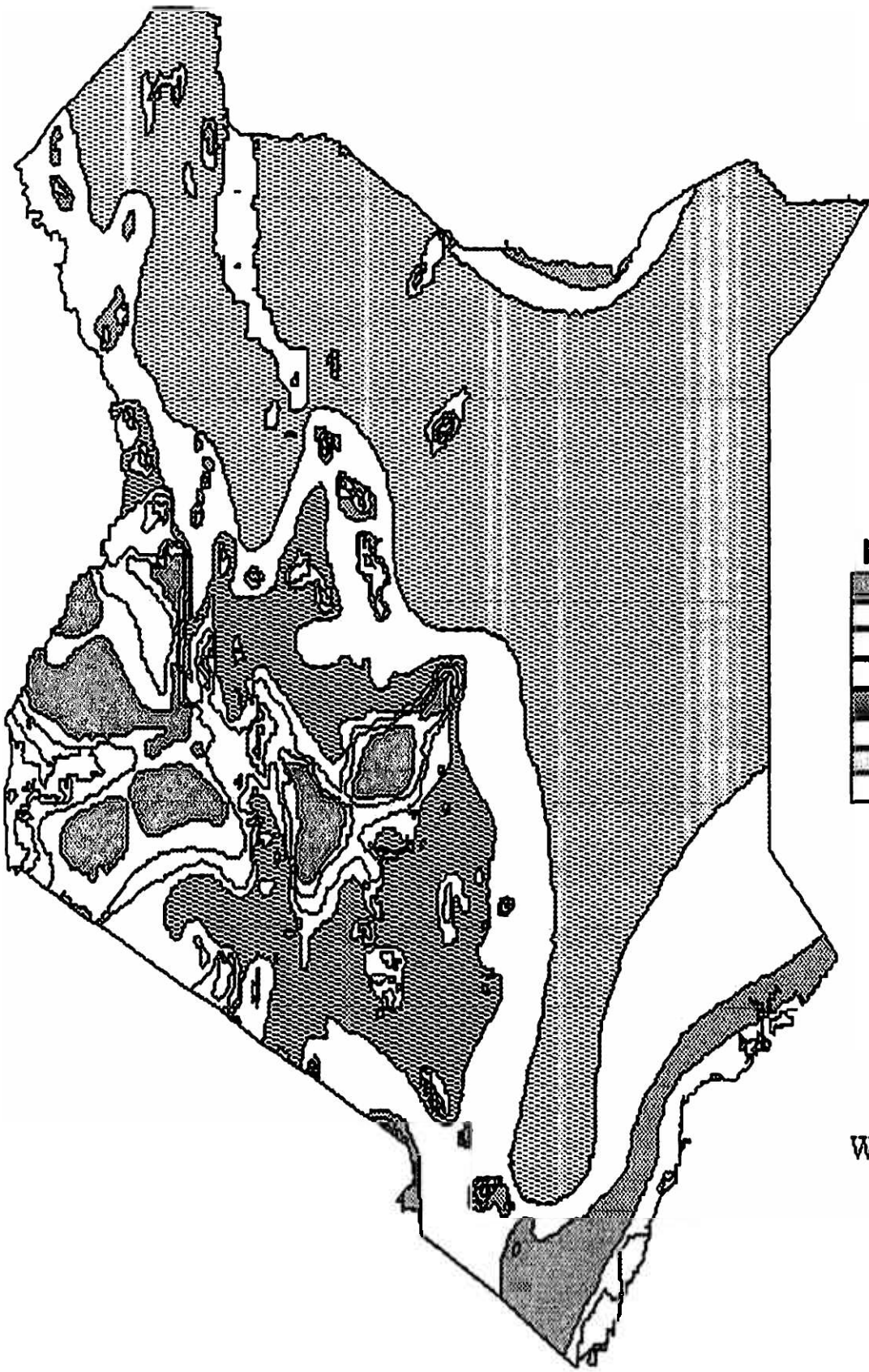
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- KEY**
-  Zone I (Hmic)
 -  Zone I (Sub-Hmic)
 -  Zone II (Semi-Hmic)
 -  Zone IV (Semi-Hmic to Semi-Aic)
 -  Zone V (Semi-Aic)
 -  Zone VI (Aic)
 -  Zone VII (Vere Aic)
 -  Lakes and Deltas



x

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

Environmental threats are bringing new geopolitical, economic and technological challenges to an already unstable world. This is entering a period of intensified environmental stress, in the form of accelerated ecological degradation and greater risk of shortage and disruption in energy and food supplies, as well as heightened political tensions over control of and access to resources. According to Robert Falkner and Bernice Lee Current trends call into question the effectiveness of existing governance mechanisms at various levels in dealing with global environmental threats and the unequal distribution of resources.¹

According to the World Resources Institute, global per capita food production has been increasing substantially for the past several decades.² Climate is expected to present major changes in the availability of water. The availability of water primarily provides for the needed conditions of weather for agriculture. According to Crowshaw R.H (2008) study, climate change has received more attention in the past several years in the international policy realm.

The significance of Environmental Diplomacy is becoming more elaborate by the day since environmental issues especially climate change, is affecting almost every aspect of policy making in the world. The protection and sustainability of the Environment remain paramount due to the complex and highly important reality of current

¹ R. Falkner and B Lee, *International Affairs* 88: 3 (2012) P 457–462

² M. Wooldridge, *Horn of Africa tested by severe drought* 4th July 2011

environmental challenges that threaten human survival and environmental security. Although efforts to counter and manage environmental problems anchor on international collaboration through international environmental governance involving many actors there seem to emerge other complex challenges in regard to environmental protection and sustainability most noticeably climate change.

1.1 Background of the Study

Kenya is generally an agricultural country. Agriculture in Kenya is largely rain fed and productivity mainly depends on agro-ecological factors such as temperature, soil characteristics and production input. Kabubo-Mariara and Karanja examine that climate change impacts vary based on locality, but the probability of disruption of Kenya's agricultural sector is very high.³

For the majority of the poor in Kenya, agriculture is a main livelihood strategy. About half of the population of Kenya is below the poverty line, while only 5 per cent of the national income is held by the poorest that make up 80 per cent of the population and nearly half of the national income is held by the richest equally making up 20 per cent of the population.⁴ According to Michael Muthui, Agriculture is undoubtedly the most important sector in the economies of the most non-oil exporting countries. It constitutes 30% of Africa's Gross Domestic Product (GDP) and it contributes about 50% of the total export value, with 70% of the continents population depending on the sector of their livelihood⁵.

³ Ibid, p. 12.

⁴ Stockholm Environment Institute, *Economics of Climate Change in Kenya*, (Oxford, 2009, p. 23).

⁵ M. Muthui, KENFAP pg 3

Agriculture has been the backbone of the nation for many decades and thus more cases than not has provided food for the nation. Further more, Kenya's foreign exchange earner is derived from the export of agricultural products like coffee, Tea and the horticultural produce. Climate change affects food production and hence causes food insecurity. Since mid-July 2011, a severe drought has been affecting the entire East Africa region. BBC news described it as the worst drought in 60 years. The drought caused severe food crisis across Kenya, Djibouti, Somalia, and Ethiopia.

In Kenya, the evidence of climate change dates back to the late 1960's but its effects were felt in the 1970's, 1980's recorded the highest growth economically and agriculture was the major contributor to the said growth. The study period is since independence to date (1963-2012). The basis for the period of study is that between then and now there have been landmarks that have proved to boost the climate change scenario which provided the sustainable debate and hence sustainable agriculture as one of backbones of the study that has affected agriculture culture in Kenya immensely.

The study traces the origin of climate change debate starting as an international environmental and developmental challenge beginning with the 1972 Stockholm Declaration, the publication of the Brundtland Report in 1987 through to the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1989, the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, and the establishment of the United Nations Framework Convention on Climate Change (UNFCCC). Since then, there have been a series of Conference of the Parties (COP) to the UNFCCC, which have produced international instruments on environment.

1.2 Statement of the Research Problem

Africa is particularly susceptible to climate change because it includes some of the poorest countries.⁶ For example there was a severe drought in 2005 in Kenya in which nearly 80% of the pastoralists lost their livestock hence their livelihood. Michael Muthui attributes this to the fact that when climate changes Africa the poorest countries experience severe situations and this is also because to most African countries and especially Kenya, agriculture is not just an economic activity but also a way of life.

Kenya's economy almost entirely depends on agriculture and predictable weather patterns have made it easy for farmers to plan when to till, plant, weed, harvest and start all over again. From time immemorial, cash crops such as tea, coffee and horticultural products are among the leading foreign exchange commodities. Agriculture is the source of raw materials for industries and employment and therefore plays a critical role in the country's national interest.⁷ Not only does Kenya export its agricultural produce but most of the food crops feed the country for the entire year, with surplus in granaries or stores. In the recent years, climate change has seriously impacted on agriculture in Kenya leading to drought and famine and eventually loss of lives and livestock.

Environmental challenges of which we have become more recently aware are quite different in scope. Environmental issues such as climate change, thinning of the stratospheric ozone layer, spread of dry lands and soil erosion, pollution of oceans and depletion of fish stocks, massive destruction of forests, widespread extinction of plant and

⁶ M. Muthui KENFAP p 4

⁷ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 7-10.

animal species, persistent organic pollutants that spread their poison all over the globe among others represent a new kind of threat to human well-being.⁸

Interrelationships among these apparently disparate issues exist in the form of common causal factors and physical, chemical and biological feedbacks. The global dimensions of the risks have awakened calls for more far-reaching solutions, for new levels of international cooperation. It has become evident that no nation or group of nations, however politically powerful or economically strong, can by themselves solve these planetary problems.

The primary conceptual problem posed in the international system lies within the traditional approach to statehood. Traditionally, a state would only be responsible in the international legal sense for breach of environmental standards. Malcolm Shaw posits that this approach proved to be an inadequate framework of dealing with environmental challenges for a variety of reasons ranging from difficulties of proof to liability for lawful activities and the particular question of responsibility of non-offenders.⁹

The concept of international cooperation is informed by the fact that environmental issues have to be tackled by states and non-state actors alike. However the state still bears the ultimate responsibility of implementing policies that would protect and preserve the environment.

This paper thus further seeks to look at the environmental diplomacy and the various international commitments made to the environment in different capacities and if they are able to help states and mostly if the economy of Kenya that is by and large agricultural benefit from environmental diplomacy.

⁸ L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, Ibid, p. 56.

⁹ M. Shaw, *International Law: Fourth Edition*, (Cambridge: Cambridge University Press, 1997), p. 586.

Also this paper seeks to look at factors that might counteract the violence that is partially conditioned by environmental scarcity. Subsequent scholarship suggested that the existence of *ingenuity*, understood as the ability of some societies to create adaptive ideas to address change, was an essential counter to violent conflict conditioned by environmental stress.

1.3 Objectives

The objective of the study is to examine the impact of climate change on agriculture in Kenya Vis a Vis the significance of environmental diplomacy in General. More specifically, the study aims to:-

- i. Asses the role of environmental diplomacy in tackling Climate Change.
- ii. Evaluate the impact of climate change in Kenya on Agriculture as the leading sector in Kenya's economy.
- iii. Determine the various measures Kenya employees to counter climate change

1.4 Literature Review

The literature on the linkage between environmental diplomacy and economic development on one hand and the impact of climate change on agriculture in Kenya on the other hand will be classified into five main themes. These themes centre on diplomacy for the environment, economic development of a state, international cooperation in managing climate change, adaptation to climate change and the role of agriculture in Kenya's economy.

The theme of environmental diplomacy anchors on the traditional concept of diplomacy in international diplomacy which concerns relations among sates on various global topical issues.

The economic development of a state as a theme refers to a country's national interest and the fact that every state has a right to exploit their own resources pursuant to their own environmental and developmental policies.¹⁰ In this case we look at Kenya as a country and how environmental Diplomacy affects its economic activities due to climate change.

Two important aspects emerge on economic development of a state with regard to environment: the first one being the responsibility of state to protect the environment and the second one being the adverse impacts of environmental challenges on economic development of a state. The latter refers to the constraints posed by environmental challenges on development in which the state has no control over, whereas the former involves the onus of the state to fulfill its obligation of protecting the environment while embarking on development.

The other theme on the other hand is the international cooperation in managing climate change. This theme focuses on the fact that climate change is a transboundary issue that requires collective action from both state and non-state actors due to the historic nature of international community. The main aim here is the quest to establish policies on environmental governance for mutual benefit of the state and the international society.

Finally on the issue of measures that Kenya employees to curb climate change, discussions will revolve around building resilience to climate change through adjustments whether passive, reactive or anticipatory with the view of ameliorating adverse consequences associated with climate change. The issue of sustainable agriculture is to be discussed regarding the role of agriculture in Kenya's economy; this theme thus creates a link between economic development and environment.¹¹ The two concepts are vital in the sense that, besides tourism,

¹⁰ M. Shaw, *International Law: Fourth Edition*, Ibid, p. 589.

¹¹ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 19.

agriculture is dependent on predictable weather patterns which is the leading foreign exchange earner in Kenya.

1.4.1 Environmental Diplomacy

Environmental diplomacy can be broken into two general categories: conventions regulating the use of natural resources, and conventions regulating pollution. In each case, the central problem is that political boundaries rarely reflect biological boundaries, so that as national economies consume resources and produce pollution, they spread environmental problems far beyond their national boundaries.

The Millennium + 5 Summit will review progress towards the achievement of the Millennium Development Goals (MDGs) and take stock of the United Nations' capacity to act. The Summit offers the opportunity to set a new course in international poverty reduction and initiate a reform of the UN. If the MDGs fail, international cooperation will be plunged into crisis. Yet the current poverty debate tends to overlook the environmental problems which exacerbate poverty in many developing countries.

The international community should therefore remind itself of the message sent out by the Earth Summit in Rio de Janeiro in 1992: environmental and development policies are inextricably linked. Some core recommendations are as follows: Linking poverty reduction with environmental policy: The MDGs cannot be achieved without environmental protection measures.¹² Environmental policy is therefore a prerequisite for development and must be a key element in any long-term poverty reduction strategy. Conversely, the global environment cannot be protected without development policy and thus environmental diplomacy.

¹² German advisory council on global change wissenschaftlicher beirat der bundesregierung globale umweltveränderungen p 10

Environmental diplomacy can well be understood from the traditional role of diplomacy as a method of maintaining relations among states. Shaw examines diplomacy as an ancient institution through which communication between various parties, including negotiations between recognized agents was conducted.¹³ Barston examines that diplomacy is the established method of international discourse or the art of managing international relations, chiefly by negotiation and is as old as the formation of the state, and its science has grown in tandem with changing and ever-evolving international relations.¹⁴ Historically, it meant the conduct of official relations between sovereign states, usually bilaterally through the medium of ambassadors and their staff.¹⁵

Waltz observes that in the twentieth century, diplomacy expanded to cover summit meetings and other international conferences, public and parliamentary diplomacy, the international activities of supranational and sub national entities, unofficial diplomacy by non-governmental elements, and the work of international civil servants.¹⁶ This has prompted the diplomat to possess multi-disciplinary skills in addition to the traditional aspects of the art of diplomacy which include negotiation and mediation, knowledge of public international law and an understanding of international political and economic regimes.

With different issues determining world affairs as a result of globalization, diplomacy has taken a great normative leap and the diplomat is often left to grapple with new thematic concerns like environmental diplomacy. O'Neill argues that the diplomatic agenda at bilateral and multilateral levels has seen a creation of documentation that has the subject of environmental

¹³ M. Shaw, *International Law: Fourth Edition*, (Cambridge: Cambridge University Press, 1997), p. 523.

¹⁴ R. Barston, *Modern diplomacy*, (London: Longman Publishers, 1988), p. 3.

¹⁵ G. Berridge, *Diplomacy: Theory and Practice*, (London: Prentice Hall Publishers, 1995), p. 24.

¹⁶ K. Waltz, *Theory of International Politics*, (New York: McGraw-Hill, 1979), p. 197.

protection as its basis.¹⁷ Narain observes that as an integral component of international relations, environmental diplomacy has led to the formulation of over two hundred international environmental treaties now in place and numerous others that are under negotiation.¹⁸ These treaties have generated a crowded schedule of international meetings that have made diplomats and non-governmental organizations and observers to busily shuttle around the world.

Despite the number of international environmental treaties, certain scholars and environmental activists observe that the condition of the biosphere is alarmingly continuing to deteriorate. O'Neill emphasizes that there is need to reconcile the notoriously slow pace of international environmental diplomacy with the growing urgency of global ecological decline.¹⁹ She attributes the slow pace of environmental governance to the fact that environmental issues are increasingly intertwined with other more traditional areas of foreign relations, including trade and investment policies, development and human rights, and even military security.²⁰

Integrating environmental issues into these other spheres is often essential for solving the problems at hand. But this integration is often resisted by those who hold different world views, and who fear that environmental issues will overburden their agendas. Environmental diplomacy is also characterized by complex linkages between foreign and domestic policy and politics as examined by Carter.²¹ This is most evident in the climate change context, where developed countries lead the in emissions of greenhouse gases which are harmful to the environment.

According to Cali the connections between foreign and domestic policy inherent in environmental diplomacy bring new actors to the fore such as the business community which has

¹⁷ K. O'Neill, *The Environment and International Relations*, (New York: Cambridge University Press, 2009), P. 34.

¹⁸ S. Narain, "Environmental Diplomacy in an Unequal World" in AICGS Conference Report, *Environmental Diplomacy*, (Washington, D.C: The Johns Hopkins University Press, 1998), pp. 17-23, p. 17.

¹⁹ K. O'Neill, *The Environment and International Relations*, Ibid, p. 108.

²⁰ Ibid, p. 109.

²¹ N. Carter, *The Politics of the Environment: Ideas, Activism, Policy*, (New York: Cambridge University Press, 2001), p. 213.

become an active participant in international environmental negotiations.²² It has the power to rally domestic support when it becomes convinced of the need for international action. The business community is regarded as the force behind the success of 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.²³

In singling out the role of state in international environment, it is prudent to look at the concept of state development which mostly influences the environment, in both positive and negative ways. This is because even after the international community makes certain demands a country needs to either ratify or not for the sake of a country. The notion of state can be traced back to the Peace of Westphalia of 1648 in which the modern state system was developed. The state was bestowed legitimacy of conducting its affairs and was founded on four principles; territoriality, population, government and sovereignty.

Many pressing environmental problems are governed not by a single treaty but by an array of different mechanisms involving a variety of actors. In such cases, notions of 'regime effectiveness' are of little use, as Bernstein and Cashore argue, and we need to focus instead on the domestic influence of such complex governance mechanisms. The authors therefore set out four different pathways through which actors and institutions seek to influence behavior in a domestic setting. This is very important when looking at Kenya and Environmental Diplomacy.

In recent years, scientific warnings have been accumulating that the impacts on the environment of the enormous economic expansion and prosperity of the last half-century are beginning to upset delicate natural cycles upon which all life on earth depends.²⁴ Unprecedented growth in population, in consumption, and in use of land and other natural resources have had

²² B. Cali, *International Law for International relations: Foundations for Interdisciplinary study*, (Oxford: Oxford University Press, 2009), p. 83.

²³ *Ibid*, p. 85.

²⁴ R. Benedict, "Diplomacy for the Environment" in AICGS Conference Report, *Environmental Diplomacy*, (Washington, D.C: The Johns Hopkins University Press, 1998), pp. 3-11, p. 4.

the unintended effect of bringing forth a new generation of environmental problems that are significantly different from those of the past, most notably climate change.

1.4.2 Climate Change

According to the IPCC TAR (2001), there has been radical climate change with the warming of approximately 0.7C over most of the African continent during the 20th century. Very high temperatures have been recorded and the five of the warmest years in Africa have been occurred since 1988 with 1995 and 1998 being two of the warmest years. Toman defines climate change as unpredictable weather patterns owing to human activity in altering the natural ecosystem occasioned by burning fossil fuels, industrial activities and deforestation among other activities.²⁵

The attention that environmental concerns have elicited and the extent of global interest have legitimized Africa's engagement in the international debate. Closer to home though, the environment, its degradation and political welfare are inextricably linked. Nowhere in the world has the contest for natural resources had as negative an influence on the environment as in Africa. Natural resources are distributed unequally throughout the world. In some instances, scarcity of water or land, or an abundance of oil or diamonds, has contributed to violence within and between states.

Environmental change may have a similar impact. Experts predict that climate change will increase the severity of floods and droughts. This may lead to mass migration, undercut the capacities of states and exacerbate widespread poverty. This has major implications for national development policies and foreign policy.

²⁵ M. A. Toman, *Climate Change: Economics and Policy*, (Washington D.C: RFF Press, 2001), p. 61.

Nelson explains that climate change has attracted a lot of attention in recent years as the key global concern posing a serious threat to the future prosperity of our planet.²⁶ He adds that life on earth is possible partly because some gases such as carbon dioxide (CO₂) and water vapor which naturally occur in the atmosphere of earth trap heat.²⁷ Mendelsohn and Dinar reiterate the same discussion by observing that CO₂ and water vapor help in trapping greenhouse gases (GHGs) and humans are greatly adding to the presence of GHGs by burning fossil fuels and industrial emissions. They emphasize that anthropogenic GHG emissions trap too much sunlight and blocks outward radiation, hence contributing to the change of climate.²⁸

The other basis for the period chosen is that proper review of climate change requires time because it does not occur overnight and a period of three decades is adequate enough to reflect the actual impact. According to the Ministry of Environment and Mineral Resources through the National Climate Change Response Strategy (NCCRS), the minimum (night time) and maximum (daytime) temperatures have been on an increasing trend. The minimum temperature has risen generally by 0.7 – 2.0 degrees Centigrade and the maximum by 0.2 – 1.3 degrees Centigrade, depending on the season and the region.²⁹ In areas near large water bodies, the maximum temperatures have raised much like in other areas but the minimum temperatures have either not changed or become slightly lower.

Martens and Rotmans argue that intertwined with other global challenges such as poverty and population pressure, it is apparent that climate change requires concerted efforts from states

²⁶ G. Nelson, *Climate Change: Impact on Agriculture and Costs of Adaptation*, (Washington D.C: IFPRI Press, 2009), p. 4.

²⁷ Ibid, p. 9.

²⁸ R. Mendelsohn and A. Dinar, *Climate Change and Agriculture: An Economic Analysis of Global Impacts, Adaptation and Distributional Effects*, (Cheltenham: Edward Elgar Press, 2009), p. 10.

²⁹ GoK, Report on National Climate Change Response Strategy, 2010, p. 10.

and non-state actors.³⁰ Effective management of climate change according to Hurrell and Kingsbury will require accounting for the impacts of climate change on agriculture, disease patterns, and violent weather events, all of which particularly impact the poorest countries.³¹ Dinar posits that climate change presents significant threats to the achievement of the Millennium Development Goals (MDGs) especially those related to eliminating poverty and hunger and promoting environmental sustainability. Empirical and scientific evidence points towards the disproportionate negative impact climate change will have on the poorest countries who, ironically, have contributed least to the problem.³²

Climate change is expected to increase the frequency and intensity of severe weather events and poor countries lack the infrastructure necessary to respond adequately to such events. Diseases such as malaria are likely to have wider ranges, impacting more people in the poorest regions of developing states that are already most affected by such diseases. Changing rainfall patterns could devastate rain-fed agriculture on which so much of the population in developing countries depends to survive.

1.4.3 Impact of Climate Change on Agriculture in Kenya

Agriculture, a key economic sector in the Kenya, is highly vulnerable to climate change. Temperature changes, the availability of water, the spread of diseases in plants and animals, the fertilization effect of rising CO₂ levels and the probable increase in extreme weather conditions are all factors in this context. As a result of climate change, harvest yields begin to fall at an

³⁰ P. Martens and J. Rotmans, *Climate Change: An Integrated Perspective*, (Dordrecht: Kluwer Academic Publishers, 1999), p. 33.

³¹ A. Hurrell and B. Kingsbury, *The International Politics of the Environment*, (Oxford: Clarendon Press, 1992), p. 42.

³² A. Dinar, *Climate Change and Agriculture in Africa: Impact Assessment and Adaptation Strategies*. (Trowbridge: Cromwell Press, 2008), pp. 12-14.

earlier stage than in the industrialized countries thereby increasing the threat to food security and resulting in greater dependency on food imports.

Climate change is also conducive to the spread of certain infectious diseases. For example, the greater prevalence of malaria is a problem which particularly affects Kenya developing countries, whose infrastructure and institutions lack the adaptive capacity to cope with this threat.

Sustainable agricultural development is Kenya's major priority since agriculture is the engine of economic growth and it seems it will be the case in the foreseeable future. Tea, Coffee, Tourism and Horticulture are the leading sectors in foreign exchange in Kenya.³³ Although the expansion of agricultural export crops has been the most important factor in stimulating economic development, much agricultural activity is also directed towards providing food for domestic consumption. Kenya's agriculture is sufficiently diversified to produce nearly all of the nation's basic foodstuffs and also extends to neighboring countries.

The basic policy goals for the agricultural sector are to provide food security, raw materials for agro-industry, employment for the rising population and to generate foreign exchange earnings. Much of Kenya's population derives their livelihoods from small holding agriculture leading to degradation of the natural resource base which compromises future development.³⁴ The poorest people in Kenya live in rural areas and depend heavily on the natural resource base for their livelihoods. They are often trapped in chronic food insecurity and chronic poverty with poor financial and human capital endowments which limit their ability to invest efficiently to create wealth.

³³ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 9.

³⁴ Ibid, p. 10.

With the challenge of abject poverty on one hand and the challenge of climate change on the other, agricultural sector is in a precarious position. Agriculture in Kenya is largely rain fed and productivity mainly depends on agro-ecological factors such as temperature, soil characteristics and production input. Kabubo-Mariara and Karanja examine that climate change impacts vary based on locality, but the probability of disruption of Kenya's agricultural sector is very high.³⁵ Susskind observes that climate change arising from the build-up of greenhouse gases provides a profound challenge for the future of agricultural production.³⁶

1.4.4 Literature Gap

This paper seeks to bring to light some of the issues of climate change and how environmental diplomacy can be seen as green economy for Kenya. This is by providing avenues for agriculture as a leading economic sector. Numerous scholars have explored a range of themes that go beyond an investigation of the potential environmental factors and causal mechanisms leading to solutions to climate change. This research examines the conditions under which environmental factors can be a source of cooperation and even promote longer-term solutions for the environment.

Large research projects on environment and violent conflict were prominent during the 1990s within the growing research program on environment and security. These included two major scholarly efforts focused on investigating the consequences of environmental scarcity and violent conflict jointly organized by the Peace and Conflict Studies Program at the University of Toronto and American Academy of Arts and Sciences (AAAS) on the one hand, and the Swiss Peace Foundation's Environment and Conflicts Project (ENCOP) on the other. A much less

³⁵ Ibid, p. 12.

³⁶L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, (Massachusetts: Cambridge University Press, 1994), p. 83.

extensive literature on the sources of some violent conflict stemming from external resource dependence on the part of high-income countries, e.g., the United States, rather than internal resource scarcity in developing countries also exists.

A major effort initiated subsequently by Paul Collier, first at the World Bank and then at Oxford, spurred another stream of research focused on environmental abundance and violent conflict that contradicted some of the emerging conventional wisdom about scarcity and dependence and hence the need for environmental diplomacy.

1.4.5 Hypotheses

The study will be guided by the following.

1. Environmental diplomacy can be viewed as green economy for Kenya.
2. Climate change can affect agriculture the leading economic sector in Kenya
3. Environmental diplomacy can provide solutions to various climate change issues

through international cooperation

1.5 Justification of the study

The study will provide the understanding of the significance of international cooperation in dealing with issues with climate change issues. The study will narrow down to the impact of climate change on agriculture in Kenya while examining its economic impact as well. A link will be put between the slow pace of environmental diplomacy and the rapid impact of climate change on agriculture. Importantly, there lacks studies done on the impact of climate change on agriculture in Kenya as the main source of economic development, and the fact that environmental diplomacy seems like a cause without concern.

The study aims at filling this gap through analysis of environmental diplomacy and economic development in Kenya. This will be through examination of climate change impact on agriculture as the major source of economic development in Kenya.

This study is academically important for it will identify and analyze the scope of environmental diplomacy in managing climate change and its challenges. There is need to develop a more expeditious and effective mechanism of addressing climate change since it is clear that the world shares a global common known as the atmosphere. Carter notes that environmental diplomacy refers to the negotiations on environmental issues that take place in conferences which have in most cases been organized and promoted by the UN, and about the finalizing of declarations, protocols and treaties that were agreed on and signed at the conclusion of these international events.³⁷

This argument however observes that large numbers among the civil society are voicing their fears that the results are too little too late and above all not binding as some states find the constraints to be too onerous.³⁸ The need to hasten the pace of addressing ecological decline is also supported by Susskind who states that successful environmental diplomacy requires a cooperative, multilateral approach.³⁹ This argument calls for all actors including states, non-governmental institutions, scientists and the business community to put ecological issues top on the list of priorities.

Finally, this study will benefit policy makers as they move towards addressing the impact of climate change on agriculture in Kenya and also by taking part in environmental diplomacy. This will include establishment of administrative arrangements that will provide information on

³⁷ N. Carter, *The Politics of the Environment: Ideas, Activism, Policy*, Ibid, p. 314.

³⁸ Ibid, p. 315.

³⁹ L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, (Massachusetts: Cambridge University Press, 1994), pp. 81-87.

the impact of climate change on agriculture to the general public, environment stakeholders, meteorological department and other government actors. The study will also contribute in designing measures to building resilience to climate change through adaptation by advising farmers on suitable farming methods to the ever changing weather patterns.

1.6 Theoretical Framework

This study will be guided by the theory of international cooperation. The theory involves the introduction of non-state actors, the study of norms and ideas and increased examination of the effectiveness or impact of international cooperation. International cooperation relates to the requirement for the states to work together in dealing with transboundary environmental challenges.

Shaw adds that in international law the concept is founded on general principles in which states are required to cooperate in dealing with pollution issues that transgress national boundaries.⁴⁰ Principle 24 of the Stockholm Declaration of 1972, notes that, international matters concerning the protection and improvement of the environment should be handled in a co-operative spirit.⁴¹

The questions in the field are about the emergence of cooperation, its motivations; absolute versus relative gains, and its extent and durability especially above and beyond the particular interests of states. Waltz observes that states would cooperate due to the existing anarchic international system characterized by a war of all against all.⁴² Milner defines

⁴⁰M. Shaw, *International Law: Fourth Edition*, (Cambridge: Cambridge University Press, 1997), p. 602.

⁴¹See Principle 24 of the Stockholm Declaration of 1972.

⁴²K. Waltz, *Theory of International Politics*, (New York, McGraw-Hill, 1979), p. 14.

international cooperation as the deliberate and coordinated adjustment of policies by states attempting to solve a mutual problem or achieve mutual gains.⁴³

According to O'Neill, Balsiger and Van Deveer, the theory of international cooperation has devoted considerable attention to three substantive themes; non-state actors, transnational norms and ideas and regime effectiveness.⁴⁴ On the first theme, an increasing number of non-state actors are playing important roles in international cooperation, including international organizations, transnational social movements, private industry and epistemic communities.⁴⁵

This paper suggests an erosion of the authority of nation-states as the primary units of analysis at the international level. They argue that the emergence of shared transnational norms and ideas is important in generating lasting cooperation by influencing domestic politics.⁴⁶ They also note that the effects of cooperation are a growing concern especially in the field of international environmental politics in which a number of questions arise. These questions include how well states comply with agreements, what measures they undertake to implement them and to what extent the agreements or regimes actually resolve the problems.⁴⁷

According to Hasenclever that cooperation can only be sustained by an international treaty if no country can gain by not being a party to it and no party can gain by not implementing it.⁴⁸ The argument observes that free riding must be deterred and compliance must be enforced. An agreement must therefore specify a strategy, a plan detailing what the parties should do, and

⁴³ H. Milner, "International Theories of Cooperation among Nations: Strengths and Weakness," *World Politics* Vol. 3 No. 44, (1992), pp. 466-496, p. 467.

⁴⁴ K. O'Neill et al. "Actors, Norms and Impact: Recent International Cooperation Theory and the Influence of the Agent-Structure Debate," *Annual Reviews*, Vol. 7 (2004), pp. 149-175, p. 150.

⁴⁵ *Ibid*, p. 156.

⁴⁶ *Ibid*, p. 160.

⁴⁷ *Ibid*, p. 164.

⁴⁸ A. Hasenclever et al. "Integrating Theories of International regimes," *Review of International Studies*, Vol. 1 No. 26, (2000), pp. 3-33, p 4.

the strategy if obeyed must succeed in deterring free-riding and enforcing compliance.⁴⁹ Moreover, it must be in the interests of the parties actually to behave as the strategy demands. That is, the threat to reciprocate to harm a country that has deviated from the strategy must be credible.⁵⁰

This theory enables the researcher to illuminate on the impact of climate change on agriculture in Kenya and the extent to which international cooperation through environmental diplomacy would address the problem.

1.7 Research Methodology

This project will use primary and secondary sources of data to investigate the significance of environmental diplomacy on the environment and the impact of climate change on agriculture in Kenya as a solution for the economy. Primary data will be collected through the use of structured interview method. Kisilu and Tromp believe that structured interview method is a systematic interviewing technique which subjects every informant in a sample to the same stimuli.⁵¹

Primary data will be collected from stakeholders in the environment sector, the agricultural sector and planning and development sector in Kenya. The interviews will be conducted on officials from, National Environment Management Authority, environmental activists and non-governmental organizations in the Republic of Kenya to investigate the impact of climate change in Kenya.

⁴⁹ Ibid, p. 6.

⁵⁰ Ibid, p. 7.

⁵¹ D. Kisilu and D. Tromp. *Proposal and Thesis Writing: An Introduction*, (Nairobi, Pauline Publications Africa, 2006), p. 94.

Secondary data includes books, journals and publications on the emergence of environmental diplomacy, climate change and the connection to economic development. The information collected in both primary and secondary data sources will help in engaging with the debates that exist in environmental diplomacy and the concept of international cooperation. Importantly, the data will provide insights on the impact of climate change on agriculture in Kenya. Data collection will be reinforced through analyses of the national legislations, policies and strategies and also the various international instruments on the environment.

1.8 Chapters Outline

This study is structured into five chapters as follows:-

Chapter one: Introduction to the Study. The chapter introduces the research study by setting the broad context of the research, the statement of the research problem, justification, theoretical framework, literature review, hypothesis and the methodology of the study.

Chapter Two: Environmental Diplomacy, Climate Change and Agriculture Sector in Kenya: An Overview. This chapter will review the significance of environmental diplomacy through international cooperation and the need to fight climate change in the issues of agriculture.

Chapter Three: Environmental Diplomacy as a green economy for Kenya: The impact of Climate Change on Agriculture, 1963-2012

Chapter Four: Environmental Diplomacy as a Green Economic Economy for Kenya: A Critical Analysis. This chapter will give the emerging issues that have come up in the study.

Chapter Five: Conclusions. The chapter will provide a summary of findings, Conclusions and Recommendations to the study.

CHAPTER TWO

ENVIRONMENTAL DIPLOMACY, CLIMATE CHANGE AND THE AGRICULTURAL SECTOR IN KENYA: AN OVER VIEW

1.0 Introduction

Chapter One established the basis of the study by setting the broad context of the research, examining the background of the study, the statement of the research problem, justification, theoretical framework, literature review of environmental diplomacy and economic development, hypotheses, research methodology. It brought about the objectives of the study that will guide the chapters that follow on the various aspects that the study is hoping to achieve.

This Chapter however seeks to provide an overview of environmental diplomacy, climate Change and the Agricultural sector in Kenya by establishing whether these entities are correlated. In that regard, the chapter seeks to examine the linkage between environmental diplomacy and agricultural sector as an economic activity and how climate change has affected agricultural productivity in Kenya.

In the recent past, the nascent Environmental movement was fully preoccupied with such essentially localized issues as urban air pollution, unsafe water supplies, and waste disposal. Although these problems are still relevant most particularly in developing and newly industrializing countries of the South, the environmental challenges which the world is facing today are different in scope. Kenya being a developing country and relying on Agriculture as one of the major economic activity is looking at environmental Diplomacy as a tool to help fight climate change.

2.1 Environmental Diplomacy

Environmental diplomacy was first talked about after the cold war when everyone dreamed about shedding the peace dividend and addressing global change questions like the economic development of the, population growth, the spread of democracy and human rights and last but not the least the looming global environmental crisis.⁵²

It is a commonplace to argue that the global power balance has shifted dramatically since the end of the Cold War. For many observers, the rise of emerging economies such as China, India and Brazil calls into question many established assumptions about the structure of the international system. In 'Emerging powers, North– South relations and global climate politics', Andrew Hurrell and Sandeep Sengupta examine what impact this global shift has had on international environmental politics.

Their analysis of the climate negotiations shows clearly that emerging powers such as India and China have acquired the status of veto-players. Yet the authors reject the widespread perception that the North–South divide is no longer a useful lens through which to view climate politics. Global economic and political inequalities continue to shape the politics of climate change. If anything, it is the North that has, with some success, pursued a revisionist strategy in the climate negotiations, effectively removing the Kyoto Protocol's 'firewall' between developed and developing countries from the design of a future climate agreement.

Environment and development policy were put at the top of the international agenda in 1992, when the United Nations organized the Earth Summit in Rio, the largest meeting of heads of state and government ever. But the spirit of Rio did not prevail. The Rio paradigm of sustainable development was overshadowed by another global trend, the rapidly growing economies of Asia and Latin America and the economic crisis in Western Europe. This

⁵² American Institute for contemporary German Studies *The Johns Hopkins University*: conference report pg 2

phenomenon is globalization and has removed the global environmental crisis from the agenda of the world's political leadership.

The significance of Environmental Diplomacy is becoming more elaborate by the day since environmental issues especially climate change, is affecting almost every aspect of policy making in the world. The protection and sustainability of the Environment remain paramount due to the complex and highly important reality of current environmental challenges that threaten human survival and environmental security. But this has to protect the domestic and nation states wellbeing first to be able to succeed. There has to be solutions to the climate change in Kenya and protection of the Agricultural institution by the introduction of the sustainable agriculture.

The various landmarks of Environmental Diplomacy have to make sense in the domestic economic sector. Sustainable development and (in this case gearing towards sustainable agriculture and green economy) has been there before even modernization and civilization. Kenya's economy almost entirely depends on agriculture and predictable weather patterns. Cash crops such as tea, coffee and horticultural products are among the leading foreign exchange commodities. Agriculture is the source of raw materials for industries and employment and therefore plays a critical role in the country's national interest.⁵³ In the recent years, climate change has seriously impacted on agriculture in Kenya leading to drought and famine and eventually loss of lives and livestock.

Solutions to environmental problems require international cooperation, but global environmental treaty-making efforts, including the 1992 U.N.-sponsored Earth Summit in Brazil, have not accomplished much. International cooperation has been hampered by the conflicts between the developed nations of the North and the developing nations of the South; by the fact

⁵³ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), pp. 7-10

that science cannot accurately predict when or how environmental threats will materialize; and by the problem that the United Nations treaty-making system was never meant to handle threats to the environment.

“Diplomacy is the established method of international discourse or the art of managing international relation, chiefly by negotiation. Historically, it meant the conduct of official relations between sovereign states, usually bilaterally. In the 20th century diplomacy expanded to cover summit meetings and other international conferences, public and parliamentary diplomacy, the international activities of supranational and sub national entities, unofficial diplomacy by non governmental elements, and the work of international civil servants.”⁵⁴

Susskind looks at the weaknesses of the existing system of environmental treaty-making and the increasing role of non-governmental interests in environmental diplomacy. Environmental Diplomacy argues for "nearly self-enforcing" agreements that ensure compliance without threatening sovereignty and maintains that new institutional arrangements are within reach. Susskind builds on the work of the Program on Negotiation at the Harvard Law School and the International Environmental Negotiation Network to offer guidelines for more effective global agreements that provide for sustainable development.⁵⁵

International cooperation relates to the requirement for the states to work together in dealing with transboundary environmental challenges. Shaw posits that in international law the concept is founded on general principles in which states are required to cooperate in dealing with pollution issues that transgress national boundaries.⁵⁶ Principle 24 of the Stockholm Declaration

⁵⁴ W. Lang, "International Environmental Agreements and the GATT. The Case of the Montreal Protocol," in: *Wirtschaftspolitische Blätter* 40(3-4), 1993, 364-372.

⁵⁵ L. E. Susskind. *Environmental Diplomacy: Negotiating More Effective Global Agreements*: Jan 1994

⁵⁶M. Shaw, *International Law: Fourth Edition*, (Cambridge: Cambridge University Press, 1997), p. 602.

of 1972 notes that international matters concerning the protection and improvement of the environment should be handled in a co-operative spirit.⁵⁷ Principle 7 of the Rio Declaration of 1992 reiterates the same notion by stating that states shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem.⁵⁸

2.1.1 Key Environmental Landmarks

According to Richard Benedick, the past few years have witnessed a virtual explosion of multilateral negotiations aimed at addressing the new global environmental issues. These include the 1985 Vienna Convention on Protecting the Ozone Layer; the 1987 Montreal Protocol on Substances That Deplete the Ozone Layer; the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes; the establishment in 1991 of the Global Environment Facility; the 1992 UN Conference on Environment and Development, and its offshoots, Agenda 21 and the Commission on Sustainable Development; the 1992 UN Framework Convention on Climate Change; the 1992 Convention on Biological Diversity; the 1993 UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks; the 1994 UN Conference on Sustainable Development of Small Island Developing States; the 1994 UN Convention to Combat Desertification; the 1994 International Conference on Population and Development; the 1997 Kyoto Protocol on Climate Change; and numerous intergovernmental negotiations and working groups on such subjects as sustainable forest management, land and water resources, economic instruments, and biotechnology.

Institutional frameworks, backed by permanent secretariats and expert groups, have been established in support of continuing negotiations that appraise and refine national commitments

⁵⁷See Principle 24 of the Stockholm Declaration of 1972.

⁵⁸See Principle 7 of the Rio Declaration of 1992.

in light of changing knowledge and conditions especially in environmental issues. These were not one-time events, but rather, in most cases, they have launched an ongoing process of reporting and review of national policies and scientific evidence. Taken together, all of this can be viewed as a still-evolving system of international governance of the environment.

Environmental diplomacy truly came of age at the 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro. Also known as the “Earth Summit,” UNCED was the largest gathering of heads of state ever held up to that time: nearly 180 nations participated, 118 at head-of-state level. In addition, there were dozens of United Nations and other intergovernmental organizations, plus thousands of observers representing hundreds of nongovernmental organizations and media sources from every corner of the world. Paradoxically, at Rio the environment ministers themselves lost control over their own domain.

Narain adds that UNCED, also known as the Earth Summit, was the largest gathering of heads of state ever held up to that time: nearly 180 nations participated, 118 at head-of-state level. In addition, there were dozens of United Nations and other intergovernmental organizations, plus thousands of observers representing hundreds of nongovernmental organizations and media sources from every part of the world.⁵⁹

Even as the environment captured global headlines for the first time over a sustained period, the subject matter itself became too important to be left to “environmentalists.” The forty chapters of “Agenda 21,” negotiated during two years of preparations for the Rio conference, covered nearly every realm of human experience. Foreign ministries increasingly took over the issue, while other parts of government—notably finance, economics, science, energy, agriculture, and development cooperation ministries—hastened to buttress their own competence

⁵⁹ S. Narain, “Environmental Diplomacy in an Unequal World” in AICGS Conference Report, *Environmental Diplomacy*, (Washington, D.C.: The Johns Hopkins University Press, 1998), pp. 17-23, p. 19.

in environmental themes. Special ambassadors were commissioned to coordinate and oversee the increasingly complicated negotiations, which required expertise not only in traditional ecological subjects, but also in economics, finance, technology, and often arcane branches of science.⁶⁰

When looking at the key landmarks of environmental diplomacy, we look at the impact on the fight of the environment having established that environment in Kenya are truly one and the same thing. Hence a look at Climate Change.

2.2 Climate Change

The term sometimes is used to refer specifically to climate change caused by human activity, as opposed to changes in climate that may have resulted as part of Earth's natural processes.⁶¹ In this sense, especially in the context of environmental policy, the term climate change has become synonymous with anthropogenic global warming. Within scientific journals, global warming refers to surface temperature increases while climate change includes global warming and everything else that increasing greenhouse gas levels will affect.⁶²

Based on the 2001 impact assessments of climate change from the United Nations Intergovernmental Panel on climate change (IPCC), they were able to identify three major forms of Climate related environmental change that according to the environmental security literature is likely to have security implications: land productivity fresh water and population. Furthermore it appears to be a consensus that climate changes, like the environment change generally,

⁶⁰ Richard Benedick. Environmental diplomacy: American institute for Contemporary German studies. The Johns Hopkins University. Washington, D.C 18th November 1998. *Diplomatic initiatives*

⁶¹ "The United Nations Framework Convention on Climate Change". 21 March 1994. "

⁶² "What's in a Name? Global Warming vs. Climate Change". NASA. Retrieved 23 July 2011.

represents a greater threat to domestic than international peace, and that the proper focus should be on state level⁶³.

Susskind thus contributes that on the agenda of national interest, security concerns normally come first, economic interest follow a close second and environmental questions are considered to be a rather remote issue which can be dropped if other seemingly more important issues are at stake.⁶⁴

The Government of Kenya tends to view export-oriented production systems as more important than those that supply domestic demands. This is misguided. Focusing on exports alone involves hidden costs: in transport, in assuring local food security, etc. Policies should treat domestic demand and in particular food security (either by farmers producing food for themselves, or by selling produce for cash they can use to buy food) as equally important to the visible trade balance.

IPCC has projected future changes in climate based on the evidence observed attributed to global warming, ice mass loss and loss in vegetation cover. According to IPCC, for the next two decades a warming of about 0.2 degrees Celsius per decade is projected for a range of emission scenarios. Even if the concentrations of all GHGs and aerosols had been kept constant, a further warming of about 0.1 degrees Celsius per decade would be expected and continued GHGs emissions at or above current rates would cause further warming and induce many changes in the global climate system during the twenty first century that could be very likely larger than those observed during the twentieth century.

Recent human induced changes in atmospheric chemistry have occurred over decades. When referring to post industrial era, scientist generally use the term climate change. Defined by

⁶³ Barnett, j: the Meaning of Environmental Security. 2001 pg 6

⁶⁴ L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*. (Massachusetts: Cambridge University Press, 1994), p. 56.

UNFCCC, climate change is a change of climate that is attributed directly or indirectly to human activity that alter the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.⁶⁵

According to Hardy, human activities generate several different GHG that contribute to climatic change. To determine the individual and cumulative effects of these gases on the earth's climate, there is need to examine their total quantity, their natural and human sources to the atmosphere, their rates of loss to natural sinks, their past and projected rates of increase and their individual and cumulative heating capacity.⁶⁶ Water vapour traps heat in the atmosphere and makes the greatest contribution to the GHG effect. Its level in the atmosphere is not directly the result of human activities.

However because warmer air can hold more water vapour, an increase in the earth's temperature resulting from other GHGs produces a positive feedback, that is more warming meaning more water vapour in the atmosphere which in turn contributes to further warming. CO₂ is a natural component of the atmosphere and is very biologically reactive. It can be reduced to organic carbon biomass through photosynthetic up take in plants through biological oxidation (respiration), converted back to gaseous CO₂ and turned to the atmosphere.⁶⁷

Letcher observes that major natural sources to the atmosphere are animal respiration microbial breakdown of dead organic matter and soil carbon, and ocean to atmosphere exchange known as flux. These natural cycles maintained the atmospheric concentration of CO₂ for several thousand years prior to industrialization in the mid nineteenth century.⁶⁸

⁶⁵ Article 1 Paragraph 2 of the United Nations Framework Convention on Climate Change.

⁶⁶ J.T. Hardy. *Climate Change: Causes, Effects and Solutions*, (West Sussex: John Wiley & Sons Ltd., 2003), p. 11.

⁶⁷ *Ibid* p 17

⁶⁸ T. Letcher, *Climate Change: Observed Impacts on Planet Earth*, (Oxford: Elsevier Publishers, 2009), p. 5.

Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions, or in the distribution of weather around the average conditions (i.e., more or fewer extreme weather events). Climate change is caused by factors that include oceanic processes (such as oceanic circulation), variations in solar radiation received by Earth, plate tectonics and volcanic eruptions, and human-induced alterations of the natural world; these latter effects are currently causing global warming, and "climate change" is often used to describe human-specific impacts.⁶⁹

Scientists actively work to understand past and future climate by using observations and theoretical models. Borehole temperature profiles, ice cores, floral and faunal records, glacial and periglacial processes, stable isotope and other sediment analyses, and sea level records serve to provide a climate record that spans the geologic past. More recent data are provided by the instrumental record. Physically based general circulation models are often used in theoretical approaches to match past climate data, make future projections, and link causes and effects in climate change. In Kenya the availability of water affects the variation of climate change and its impacts.

Life depends on water. Access to water continues to accelerate into one of the biggest issues of our day in many parts of the world, especially the developing world. Only 3% of the world's water is fresh water and much of that is polluted. Two to five million people a year die from water-related illnesses. Eight of the 10 most water-stressed nations are among the 50 poorest nations in the world. More than a billion people lack access to safe drinking water and 3

⁶⁹ *Education Center – Arctic Climatology and Meteorology*. NSIDC National Snow and Ice Data Center. IPCC TAR WG1 2001.

billion lack sanitation. Twenty per cent of agricultural lands are salt laden due to poor water quality (UN 1997).⁷⁰

Climate change can be expected to worsen conditions in some areas of the world, especially desertification in the Middle East and North Africa. Egypt already imports 95% of their water and Sudan imports 77 %. Globally, freshwater use rose 6 fold from 1990 – 1995 (The Ramsar Convention Manual 2006). According to Pamela Griffin, modifications to water resources (such as dams and groundwater extraction) proceed at an unprecedented rate, often in an unsustainable manner. At the heart of these problems is unsustainable population growth. War exacerbates all of these problems.

Evidence for climatic change is taken from a variety of sources that can be used to reconstruct past climates. Reasonably complete global records of surface temperature are available beginning from the mid-late 19th century. For earlier periods, most of the evidence is indirect—climatic changes are inferred from changes in proxies, indicators that reflect climate, such as vegetation, ice cores,⁷¹ dendrochronology, sea level change, and glacial geology.

2.2 Causes of Climate Change

While much remains to be learned, the core phenomenon, scientific questions, and hypotheses have been examined thoroughly and have stood firm in the face of serious scientific debate and careful evaluation of alternative explanations. Nevertheless, there is a strong, credible

⁷⁰ Pamela Griffin: *The Ramsar Convention: A new window for environmental diplomacy?*

Institute for Environmental Diplomacy and Security for Environmental Diplomacy & Security @ the University of Vermont Published January, 2012

⁷¹ Petit J. R., Humberto Ruiloba M, Bressani R, J.-M. Barnola, I. Basile, M. Bender, J. Chappellaz, M. Davis et al. (1999-06-03). "Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica". *Nature* 399 (1): 429–436.

body of evidence, based on multiple lines of research, documenting that climate is changing and that these changes are in large part caused by human activities.

Historically, GHG concentrations in the earth's atmosphere have undergone natural changes over time and those changes have been closely followed by changes in climate. Warmer periods are associated with higher atmospheric GHG concentrations and cooler periods with lower GHG concentrations. Recent human induced changes in atmospheric chemistry have occurred over decades. When referring to post industrial era, scientist generally use the term climate change. Defined by UNFCCC, climate change is a change of climate that is attributed directly or indirectly to human activity that alter the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.⁷²

Human activities according to Hardy generate several different GHG that contribute to climatic change. To determine the individual and cumulative effects of these gases on the earth's climate, there is need to examine their total quantity, their natural and human sources to the atmosphere, their rates of loss to natural sinks, their past and projected rates of increase and their individual and cumulative heating capacity.⁷³ Water vapour traps heat in the atmosphere and makes the greatest contribution to the GHG effect. Its level in the atmosphere is not directly the result of human activities.

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organic carbon biomass through photosynthetic up take in plants through biological oxidation (respiration), converted back to gaseous CO₂ and turned to the atmosphere.⁷⁴

Letcher observes that major natural sources to the atmosphere are animal respiration microbial breakdown of dead organic matter and soil carbon, and ocean to atmosphere exchange known as flux. These natural cycles maintained the atmospheric concentration of CO₂ for several thousand years prior to industrialization in the mid nineteenth century.⁷⁵ Kininmonth states that during the past one hundred and fifty years, and especially during the last few decades, humans have greatly increased the concentration of atmospheric CO₂.

Huge reservoirs of carbon stored for millions of years as fossilized organic carbon (coal, oil and gas) in the earth's crust, have been removed and burned for fuel.⁷⁶ Burroughs reiterates the same by observing that when carbon fuels burn, they combine with atmospheric oxygen to produce carbon dioxide which enters the atmosphere. Globally, more than 80 per cent of human CO₂ emissions come from transportation and industrial sources.⁷⁷ The remaining 20 per cent comes primarily from deforestation and biomass burning. A forest stores about a hundred tons of carbon per acre, and about half the worlds forest was destroyed in the last half of the twentieth century.⁷⁸

According to Lovejoy and Hannah they have examined in regard to GHGs, that natural wetland soils, swamps and some coastal sediments release significant quantities of CH₄ to the atmosphere. The same is produced by the microbial breakdown of organic matter in the absence of oxygen and while in the atmosphere, it can combine with hydroxyl radicals (OH[•]) to form

⁷⁴ Ibid p 17

⁷⁵ T. Letcher, *Climate Change: Observed Impacts on Planet Earth*, (Oxford: Elsevier Publishers, 2009), p. 5.

⁷⁶ W. Kininmonth, *Climate Change: A Natural Hazard*, (Essex: Multi-science Publishers, 2004), p. 127.

⁷⁷ W. Burroughs, *Climate Change: A Multidisciplinary Approach*, (Cambridge: Cambridge University Press, 2007), p. 36.

⁷⁸ Ibid, p. 39.

carbon monoxide (CO). About half the current CH₄ emissions are from the anthropogenic (human produced) sources. These sources include livestock production (incomplete digestion of food), wetland rice cultivation, solid waste landfills, coal, and oil and gas production. However global emissions rates appear variable and are difficult to quantify exactly.⁷⁹

In the same regard, Burroughs observes that nitrous oxide (N₂O) originates from the microbial breakdown of agricultural fertilizers, fossil and fuel combustion, biomass burning and coal combustion which makes a significant contribution to the overall global warming.⁸⁰ Similarly, Chlorofluorocarbons (CFCs) and hydro-chlorofluorocarbons (HCFCs) are a relatively inert class of manufactured industrial compounds containing carbon, fluorine and chlorine atoms. They are used as coolants in refrigerators and air conditioners, foam insulation, aerosols sprays and industrial cleaning solvents. These compounds escape to the atmosphere where they destroy the stratospheric ozone layer that shields the earth from harmful ultra violet radiation.⁸¹

Hardy attributes their role in the ozone depletion which led to the first comprehensive international environmental treaty, the Montreal Protocol, to phase the use of CFCs. However CFCs and HCFCs are also GHGs. Although they are involved in the destruction of the stratospheric ozone layer, which leads to some cooling, they still make an overall positive contribution to green house warming.⁸²

Gaan posits in addition to CO₂, CH₄, N₂O and CFCs, Tropospheric ozone (O₃) motor vehicle emissions are the major source of the GHG. Vehicle combustion hydrocarbons and nitrogen oxides undergo a photochemical reaction to produce a hazy air pollution condition

⁷⁹ T. E. Lovejoy and L. J. Hannah, *Climate Change and Biodiversity*, (Yale: Yale University Press, 2005), p. 15.

⁸⁰ Burroughs, *Climate Change: A Multidisciplinary Approach*, Ibid, p. 41.

⁸¹ Ibid, p. 44.

⁸² J.T. Hardy, *Climate Change: Causes, Effects and Solutions*, Ibid, p. 18.

known as smog with high concentrations of O₃.⁸³ Aerosols on the other hand are small microscopic particles resulting from fossil fuel and biomass combustion that smell. They are formed largely from sulfur, a constituent of some fuels, particularly some high sulfur coal and oil. Sulfate aerosols increase the acidity of the atmosphere and form acid rain. They also reflect solar energy over a broad board, including the infrared and thus have negative radioactive forcing or cooling effect in the atmosphere.⁸⁴ Natural sources of aerosols such as volcanic emptier can also inject particles into the atmosphere resulting in temporary global-scale cooling events, lasting months to several years.

According to Letcher, Climate Change is a long term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average. Climate change may be limited to a specific region, or may occur across the whole earth.⁸⁵ Burroughs offers the most general definition of climate change as a change in the statistical properties of the climate system when considered over periods of decades or longer, regardless of cause. Accordingly, fluctuations on periods shorter than a few decades, such as El Niño, do not represent climate change.⁸⁶

Factors that can shape climate are climate forcings. These include such processes as variations in solar radiation, deviations in the earth's orbit, mountain-building and continental drift, and changes in GHG concentrations. There are a variety of feedbacks that can either amplify or diminish the initial forcing. Some parts of the climate system, such as the oceans and ice caps, respond slowly in reaction to climate forcing because of their large mass. Therefore, the

⁸³ N. Gaan, *Climate Change and International Politics*, (Delhi: Kalpaz Publications, 2008) p 47

⁸⁴ Ibid, p. 52.

⁸⁵ T. Letcher, *Climate Change: Observed Impacts on Planet Earth*, Ibid, p. 7.

⁸⁶ W. Burroughs, *Climate Change: A Multidisciplinary Approach*, Ibid, p, 3.

climate system can take centuries or longer to fully respond to new external forcings. Science has made enormous inroads in understanding climate change and its causes, and is beginning to help develop a strong understanding of current and potential impacts that will affect people today and in coming decades. This understanding is crucial because it allows decision makers to place climate change in the context of other large challenges facing the world.

Consequently, the debate is shifting onto ways to reduce further human impact and to find ways to adapt to change that has already occurred and is anticipated to occur in the future. Of most concern in these anthropogenic factors is the increase in CO₂ levels due to emissions from fossil fuel combustion, followed by aerosols and cement manufacture. Other factors, including land use, ozone depletion, animal agriculture and deforestation, are also of concern in the roles they play both separately and in conjunction with other factors in affecting climate and measures of climate variables.

Barr observes that over the course of millions of years, the motion of tectonic plates reconfigures global land and ocean areas and generates topography. This can affect both global and local patterns of climate and atmosphere due to ocean circulation.⁸⁷ The position of the continents determines the geometry of the oceans and therefore influences patterns of ocean circulation.⁸⁸ The locations of the seas are important in controlling the transfer of heat and moisture across the globe, and therefore crucial in determining global climate.

The size of continents is important in the sense that the stabilizing effect of the oceans on temperature through yearly temperature variations are generally lower in coastal areas than they are inland. In the same regard Kininmonth posits that slight variations in earth's orbit lead to changes in the seasonal distribution of sunlight reaching the earth's surface and how it is

⁸⁷ G. Barr, *Climate Change: Is the World in Danger?* (Portsmouth: Heinemann Publishers, 2007), p. 11.

⁸⁸ *Ibid.*, p. 14.

distributed across the globe.⁸⁹ According to Victor, however, estimates are that human activities generate one hundred to three hundred times the amount of carbon dioxide emitted by volcanoes.⁹⁰ Volcanism contributes to climate forcing which is a process of conveying material from the crust and mantle of the earth to its surface. Volcanic eruptions, geysers, and hot springs, are examples of volcanic processes which release gases and/or particulates into the atmosphere.

Eruptions large enough according to Letcher that affect climate occur on average several times per century, and cause cooling by partially blocking the transmission of solar radiation to the earth's surface for a period of a few years. Much larger eruptions, known as large igneous provinces, occur only a few times every hundred million years, but may cause global warming and mass extinctions.⁹¹ Volcanoes are also part of the extended carbon cycle. Over very long geological time periods, they release carbon dioxide from the earth's crust and mantle, counteracting the uptake by sedimentary rocks and other geological CO₂ sinks.⁹²

In Hardy's view however, the ocean is a fundamental part of the climate system and short-term fluctuations such as the El Niño-Southern Oscillation, the Pacific Decadal Oscillation, the North Atlantic Oscillation and the Arctic Oscillation represent climate variability rather than climate change. On longer time scales, alterations to ocean processes such as thermohaline circulation play a key role in redistributing heat by carrying out a very slow and extremely deep movement of water, and the long-term redistribution of heat in the world's oceans.⁹³

⁸⁹ W. Kininmonth, *Climate Change: A Natural Hazard*, *Ibid*, p. 55.

⁹⁰ D. Victor, *Climate Change: Debating America's Policy Options*, (New York: Council of Foreign Relations, 2004), p. 130.

⁹¹ T. Letcher, *Climate Change: Observed Impacts on Planet Earth*, p. 82.

⁹² *Ibid*, p. 83.

⁹³ J.T. Hardy, *Climate Change: Causes, Effects and Solutions*, p. 45.

2.3 Evidence of Climate Change

Evidence for climatic change is taken from a variety of sources that can be used to reconstruct past climates. Reasonably complete global records of surface temperature are available beginning from the mid-late nineteenth century. For earlier periods, climatic changes were inferred from changes in proxies, indicators that reflect climate, such as vegetation, ice cores, dendrochronology, sea level change, and glacial geology. Climate change in the recent past may be detected by corresponding changes in settlement and agricultural patterns. Archaeological evidence, oral history and historical documents can offer insights into past changes in the climate. Climate change effects have been linked to the collapse of various civilizations.

Glaciers are considered among the most sensitive indicators of climate change. Their size is determined by a mass balance between snow input and melt output. As temperatures warm, glaciers retreat unless snow precipitation increases to make up for the additional melt; the converse is also true. Burroughs states that glaciers grow and shrink due both to natural variability and external forcings. Variability in temperature, precipitation and englacial and subglacial hydrology can strongly determine the evolution of a glacier in a particular season.⁹⁴ In the same breadth, Hardy examines that one must average over a decadal or longer time-scale and over a many individual glaciers to smooth out the local short-term variability and obtain a glacier history that is related to climate.⁹⁵

Rarieya advances that a change in the type, distribution and coverage of vegetation may occur given a change in the climate. In any given scenario, a mild change in climate may result in increased precipitation and warmth, resulting in improved plant growth and the subsequent

⁹⁴ W. Burroughs, *Climate Change: A Multidisciplinary Approach*, Ibid, p. 217.

⁹⁵ J.T. Hardy, *Climate Change: Causes, Effects and Solutions*, Ibid, p. 46.

sequestration of airborne CO₂. Larger, faster or more radical changes, however, may result in vegetation stress, rapid plant loss and desertification in certain circumstances.⁹⁶ The observed wide spread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is extremely unlikely that the global climate change can be explained without external forcing, and very likely that it is not due to unknown natural causes alone. Anthropogenic forcing is also likely to have contributed to changes in wind patterns as well, affecting extra-tropical storm tracks and temperature patterns in both hemispheres. Temperature of the most extreme hot nights, cold nights and cold days are likely to have increased.

IPCC has projected future changes in climate based on the evidence observed attributed to global warming, ice mass loss and loss in vegetation cover. According to IPCC, for the next two decades a warming of about 0.2 degrees Celsius per decade is projected for a range of emission scenarios. Even if the concentrations of all GHGs and aerosols had been kept constant, a further warming of about 0.1 degrees Celsius per decade would be expected and continued GHGs emissions at or above current rates would cause further warming and induce many changes in the global climate system during the twenty first century that could be very likely larger than those observed during the twentieth century.

IPCC also projects that snow cover will contract. There will be wide spread increases in thaw depth over most permafrost regions and that the glaciers on Mt. Kilimanjaro and Mt. Kenya may be gone by the year (2020) twenty twenty. Likewise sea ice will shrink in both the Arctic and the Antarctic. Arctic late-summer sea ice will disappear almost entirely by the latter part of the twenty first century and it is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent.

⁹⁶ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, (New York: Rensselaer Polytechnic Institute, 2007), p. 69.

2.3.1 Responding to Climate Change

The response to extreme climate events which have had negative socio-economic impacts on almost all sectors including energy, health, agriculture, livestock and hydropower generation among others require the establishment of mechanisms that might enable states to adapt to climate variability. Falk observes that the UN system promotes and supports the development of national strategies on adaptation to address both short and long term needs, policy decisions and operational programmes on relevant sectors.⁹⁷ Adaptation to climate change is one of the greatest challenges facing the world today and more so in the developing countries. Lobell and Burke examine that coupled with poverty, adaptation to climate change remains an uphill task in the achievement of sustainable economic growth. Improved technology transfer such as more reliable long-term weather forecasting will contribute to reducing current vulnerability of poor and food insecure rural households and will be critical to their ability to adapt to future changes.⁹⁸

The potential for autonomous adaptation according to O'Neill depends on affordability of such measures which include changes in crops and crop varieties, improved water management and irrigation systems, and changes in planting schedules and tillage practices.⁹⁹ Most of these adaptation opportunities are being applied by farmers where there is access to the right information and tools. Carter adds that adaptation to climate change should include capacity building of local communities to manage water resources and increase resilience to droughts and floods.¹⁰⁰ Citing econometric analyses used to study the sensitivity of GDP to climate change,

⁹⁷ A. Falk et al, *The United Nations and a Just World Order*, (New York: West View Press, 1991), p. 20.

⁹⁸ D. Lobell and M. Burke, *Climate Change and Food Security: Adapting Agriculture to a Warmer World*, (Stanford: Springer Science+Business Media, 2010), p. 133.

⁹⁹ K. O'Neill, *The Environment and International Relations*, (New York: Cambridge University Press, 2009), p. 110.

¹⁰⁰ N. Carter, *The Politics of the Environment: Ideas, Activism, Policy*, (New York: Cambridge University Press, 2001), p. 213.

Gaan observes that results show that about a half of all the countries have significant climate effects. Precipitation extremes have the most important climate effect on economic growth.¹⁰¹ He adds that climate risk management focuses on current pressing issues while factoring in projected changes in climate.¹⁰²

Protection against climate hazards is therefore essential according Mendelsohn and Dinar, and interventions that provide benefits regardless of climate changes and reduce current climate vulnerabilities are a first step in adaptation. Climate risk management according to him requires countries to invest in climate information systems and early warning systems, diversification of crops and livelihoods, transportation and storage, market development and financial risk transfer.¹⁰³ According to Victor, adaptation planning must be based on an understanding of climate impacts. Uncertainty of future projections requires a climate risk management approach, and managing current variability is the foundation of adaptation. Noting that most current efforts are ad hoc and fragmented his main recommendation is that governments should mainstream climate change risk assessment into all aspects of policy planning.¹⁰⁴

2.4 Agricultural Sector in Kenya

Agriculture is still a mainstay of the Kenyan economy, sitting alongside tourism as one of the top earners of foreign exchange. While urban growth continues to benefit from rural to urban migration, most of the Kenyan population is still rural and some 75 per cent of the population engages in agriculture to some extent. However, on-farm crop production is a declining source of

¹⁰¹ N. Gaan, *Climate Change and International Politics*, Ibid, p. 59.

¹⁰² Ibid, p. 60.

¹⁰³ R. Mendelsohn and A. Dinar, *Climate Change and Agriculture: An Economic Analysis of Global Impacts, Adaptation and Distributional Effects*, (Cheltenham: Edward Elgar Press, 2009), p. 116,

¹⁰⁴ D. Victor, *Climate Change: Debating America's Policy Options*, Ibid, p. 156.

household income, a common trend in developing countries. Rarieya observes that agriculture as a portion of GDP is not insignificant whereas livestock production is central to livelihoods and food security in the arid and semi-arid lands (ASALs).¹⁰⁵

For the majority of the poor in Kenya, agriculture is a main livelihood strategy. About half of the population of Kenya is below the poverty line, while only 5 per cent of the national income is held by the poorest that make up 20 per cent of the population and nearly half of the national income is held by the richest equally making up 20 per cent of the population.¹⁰⁶ The dominant farm type is a smallholding, 0.9 hectares (ha) being the average size presently.¹⁰⁷ Protection of watersheds, control of soil erosion, maintenance of wetlands, protection of natural forests and biodiversity, supporting natural wildlife are all common development objectives that entail some contribution from agriculture.

Pilot schemes on payment for ecological services and community carbon sequestration have shown considerable promise. Weather-related hazards already present a serious threat to agriculture. These will be potentially exacerbated by a mix of climate and socio-economic change. However, the prediction of these effects is extremely complex.

Sustainable agricultural development is Kenya's major priority since agriculture is the engine of economic growth and it seems it will be the case in the foreseeable future. Tea, Coffee, Tourism and Horticulture are the leading sectors in foreign exchange in Kenya.¹⁰⁸ Although the expansion of agricultural export crops has been the most important factor in stimulating economic development, much agricultural activity is also directed towards providing food for

¹⁰⁵ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, *Ibid*, p. 63.

¹⁰⁶ Stockholm Environment Institute, *Economics of Climate Change in Kenya*, (Oxford, 2009), p. 23.

¹⁰⁷ *Ibid*, p. 23.

¹⁰⁸ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 9.

domestic consumption. Kenya's agriculture is sufficiently diversified to produce nearly all of the nation's basic foodstuffs and also extend to neighboring countries.

The basic policy goals for the agricultural sector are to provide food security, raw materials for agro-industry, employment for the rising population and to generate foreign exchange earnings. Much of Kenya's population derive their livelihoods from small holding agriculture leading to degradation of the natural resource base which compromises future development.¹⁰⁹ The poorest people in Kenya live in rural areas and depend heavily on the natural resource base for their livelihoods. They are often trapped in chronic food insecurity and chronic poverty with poor financial and human capital endowments which limit their ability to invest efficiently to create wealth.

With the challenge of abject poverty on one hand and the challenge of climate change on the other, agricultural sector is in a precarious position. Agriculture in Kenya is largely rain fed and productivity mainly depends on agro-ecological factors such as temperature, soil characteristics and production input.

Kabubo-Mariara and Karanja examine that climate change impacts vary based on locality, but the probability of disruption of Kenya's agricultural sector is very high.¹¹⁰ In that regard, the chapter sought to examine the linkage between environmental diplomacy and agriculture as an economic activity and how climate change has affected agricultural productivity in Kenya. In the recent past, the nascent environmental movement was fully preoccupied with such essentially localized issues as urban air pollution, unsafe water supplies, and waste disposal.

Based on the 2001 impact assessments of climate change from the United Nations Intergovernmental Panel on climate change (IPCC), they were able to identify three major forms

¹⁰⁹ Ibid, p. 10.

¹¹⁰ Ibid, p. 12.

of Climate related environmental change that according to the environmental security literature is likely to have security implications: land productivity fresh water and population.

Agriculture in Kenya cannot be sustainable unless it is economically viable over the long term. Conventional agriculture poses greater long-term economic risks than “sustainable” alternatives. And so, agriculture and forestry clothe the rural landscape. Inappropriate use causes erosion, landslides and flooding, clogs irrigation channels, and reduces the ability of the land to support the local population.

2.5 Conclusions

Impoverished rural people flock into the cities in search of jobs, forming unsightly, insanitary slums that further destroy the landscape. Rehabilitating ecologically damaged areas needs huge investments that few countries can afford. Sustainable agriculture avoids these problems by improving productivity, conserving the soil, avoiding the expansion of farming into unsuitable areas, and preserving rural jobs.

Agriculture is a very sensitive sector that is highly affected by and susceptible to climate change, both positively and negatively. Temperature and other climatic changes affect yield and growing season and there is also a potentially direct fertilisation effect. Given much of Kenyan agriculture is currently rain-fed, there are also potentially wide ranging effects from the potential changes in precipitation. Moreover, there are a number of complex interactions with other factors, inter alia, extreme events (heat, floods, and droughts), pests and diseases, water availability for irrigation, which will affect the sector. In face of this complexity it is impossible to predict future climate change impacts in Kenya.

The arid and semi-arid lands that cover a greater percentage of Kenya, have long experienced water shortages and drought due to unreliable and poorly distributed rains. Smallholder farmers in these regions are used to coping with variable conditions, but the weather has become even more unpredictable putting lives and livelihoods at greater risk. Climate change is likely to lead to significant declines in rainfall and river flows in many parts of Kenya, particularly its arid and semi-arid regions. This additional stress further threatens the water and lands upon which smallholder farmers rely for their livelihoods, health and well-being.

CHAPTER THREE

Environmental Diplomacy as a Green Economy for Kenya: the impact of Climate

Change on Agriculture, 1963-2012

3.0 Introduction

The previous chapter we looked at an overview of environmental diplomacy, climate change and Agriculture sector in Kenya. In this chapter, we seek examine the linkage between environmental diplomacy and agriculture as an economic activity and how climate change has affected agricultural productivity in Kenya. Also this chapter will seek to establish whether these entities are correlated and if indeed environmental diplomacy is solution to a green economy.

This chapter being the case study will examines the impact of climate change on agriculture in Kenya since independence from 1963-2012. The decline in national economy in the mid 1970's was attributed to the decline of agricultural productivity in the same decade. This came in the wake of environmental diplomacy efforts all over the world, most notably Stockholm Declaration of 1972, with the aim of protecting and preserving the environment. This chapter will therefore examine the value of agriculture in Kenya, climate change effects on agricultural productivity, economic costs of climate change and management of climate change in Kenya.

3.1 Environmental Diplomacy

The concept of sustainable development emerged from anxieties that accompanied the triumphant rise in living standards enjoyed in developed countries during the second half of the 20th century. Encapsulated in the Club of Rome's 1972 publication of *The Limits to Growth*, this

unease sprang from two painful realities. It had become clear that the life-sustaining role of the biosphere was at risk from open-ended consumption of natural resources. And yet the urgent cause of environmental protection could not be isolated from the right of poorer countries to develop. The interconnection of these two issues was thoroughly examined in the 1987 landmark report, *Our Common Future*, produced by the World Commission on Environment and Development. The Commission's Chair, Gro Harlem Brundtland, wrote in the foreword: "the 'environment' is where we all live; and 'development' is what we all do in attempting to improve our lot within that abode. The two are inseparable." In championing a new global mission of "sustainable development," the report grasped the nettle of a definition:

Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs.

Political action followed with the UN Conference on Environment and Development in Rio de Janeiro in 1992. Popularly known as the "Earth Summit", the Conference approved Agenda 21, an action programme for sustainable development in the 21st century. World leaders also approved the Rio Declaration, a set of principles to guide future multilateral environmental agreements. These include the "polluter pays" principle, the precautionary principle, the right to development, and the principle of common but differentiated responsibilities between rich and poor countries

In an outpouring of global political commitment that would be inconceivable in today's stonewalling UN conferences, the 1992 Earth Summit additionally put signatures to far-reaching Conventions on climate change, biodiversity and desertification. This was a fleeting moment of faith in multilateralism, of belief that nations could unite under the banner of sustainable development to create a better world.

One proposal to assure food supplies in the future is to reduce meat consumption. In recent years, meat consumption increased worldwide, including in countries where it was an occasional luxury before. Producing one kilogram of meat (depending on the kind of meat involved) needs approximately 16 kilograms of grain. In this context, Compassion in World Farming describes in their report "Eating the Planet," that reducing global meat consumption could free up one million square kilometers of cropland. It would also result in lower greenhouse gas emissions so that reducing meat consumption is both socially equitable and environmentally beneficial. Similarly there is a need to sensitize people on the food problem. One-third of the world food goes to waste, says the FAO, amounting to around 1.3 billion tons per year. Therefore, resources devoted to food production are manifestly wasted.

The second main perspective on the food crisis is that, from the perspective of people in poverty, food security becomes very important. Food production needs to be able to meet the demands of an increasing world population. Such valuations could inform tax and subsidy policies to strengthen rather than destroy nature, improve decision-making on the impact of infrastructure projects, and calibrate "payment for ecosystem services," an increasingly popular method for compensating owners or custodians who preserve environmental assets. There is consensus that the transition to this form of green economy requires significant up-front investment in renewable energy production, efficient use of natural resources and innovative technologies.

The UNEP report, *Towards a Green Economy*, suggests 2% of global GDP. Advocates of green economics argue the investment would be rewarded with net gains in employment and a lower risk of the economic shocks caused by short termism. However, it is the radical nature of the proposition which perhaps deters politicians as much as

the cost. Even when the world's economic system was on its knees in the 2008 banking crisis, leaders disdained the opportunity to grasp an alternative model. It is unlikely that the Rio+20 conference will succeed in shaking up the dominant GDP paradigm. Nevertheless, there is real interest in supplementing GDP figures with new indicators of social and environmental well-being. A long-established example is the Gross National Happiness index pioneered in Bhutan.¹¹¹

Of all the Rio Principles that have been shamefully neglected since 1992, the most damaging from the perspective of sustainable development is Principle 16:

National authorities should endeavour to promote the internalization of environmental costs

“Environmental costs” refer to the depletion of the earth's natural capital - ecosystems, biodiversity and mineral resources - and the damage caused by waste pollution. Sustainable development is normally assessed by reference to parallel progress in its “three pillars” - economic growth, human development and environmental protection. These can be examined at local, national, regional or global levels. The global economy is in a fragile and unsustainable condition. Success stories are often compromised by widening social inequality or, in the case of China, by the heavy price paid in terms of pollution and the suppression of human freedoms.

Since its collapse in 2008, much of the banking system in Europe and the US survives only by virtue of state guarantees of liquidity. Global food and fuel prices have run out of control in two separate periods in the last four years, delivering shocks to a system which is poorly equipped to withstand them. The global economy has become suffused with government subsidies which directly undermine the cause of sustainable development. Support for fossil fuel

¹¹¹ One world publishes: green economy and sustainable development.

consumption and production is the most extreme example, amounting worldwide to \$470 billion in 2010. Subsidies to develop renewable sources of energy were under \$70 billion

The Millennium Development Goals (MDGs) offer a quantifiable basis of post-1992 assessment as they embrace an almost identical period. There has been significant poverty reduction in South America and Southeast Asia. The threat of HIV and AIDS has been brought under control and the incidence of malaria greatly reduced. Although the rate of population growth remains too high for comfort, it has fallen significantly.

Developed countries have taken great strides towards the environmental exhortations of Agenda 21. Swathes of national legislation are in place, cleaning up the combustion of fossil fuels in power generation, the use of chemicals in industrial production and the quality of air and freshwater. Where international cooperation is a necessary component of conservation, the record is largely dismal. The architects of Agenda 21 would be dismayed by the crisis language that scientists now adopt when examining the prospective security of food, water and energy resources under the combined pressure of population and economic growth.

An influential 2009 scientific study published by the Stockholm Resilience Centre suggests that three out of nine environmental boundaries critical to a sustainable planet have already been crossed. Two of these – the loss of biodiversity and the concentration of atmospheric carbon dioxide – were supposed to be brought under control by international conventions signed at the Earth Summit.

According to Josue Dione, Director, Food Security and Sustainable Development Division at the United Nations Economic Commission for Africa (ECA), and whose Division is leading the organization of the Forum, the continent contributes only about 3.8 per cent of total

greenhouse gas emissions, yet its countries are among the most vulnerable to climate change in the world:

“The imminent and project impact of the threat of climate change to sustainable development in Africa makes this Forum timely and urgent.” Intergovernmental Panel on Climate Change (IPCC) data reveals that a quarter of Africa’s population lives within 100 kilometers of the coast and most of Africa’s largest cities are along coasts and therefore vulnerable to sea level rise, coastal erosion and extreme events.¹¹²

Sustainable agricultural practices often rely on traditional knowhow and local innovation. Local people have a wealth of knowledge about their environment, crops and livestock. They keep locally adapted breeds and crop varieties. They have social structures that manage and conserve common resources, help people in need, and maintain the social fabric. Rather than ignoring or replacing this knowledge, sustainable agricultural development seeks to build on it and enrich it with appropriate information from outside.

3.2 Agriculture in Kenya

Kenya has a complex existing climate, with wide variations across the country and with very strong seasonality. Average temperatures show strong differences between the narrow coastal strip, the arid and semi arid lands (ASALs) and the temperate highland plateau. Rainfall is particularly variable and the annual cycle is bimodal, with two wet seasons: the long rains from March to May which contributes more than 70 per cent of annual rainfall and the short rains from October to December which contributes less than 20 per cent. The two wet seasons

¹¹²J. Mwangi *Diplomat East Africa: door to region, window to the world.*, 2011

arise from the Inter-Tropical Convergence Zone (ITCZ) moving northwards and retreating southwards respectively.¹¹³

Overall, there are significant inter-annual and spatial variation in the strength and timing of these rains, though the variability is highest in the ASAL areas. The western highlands and coastal areas also receive significant rainfall during June to September. There are complex patterns of climate variability, which are due to many factors, notably the El Niño Southern Oscillation events, also sea surface temperatures in the Indian and Atlantic Oceans. El Niño is associated with anomalously wet conditions during the short rains while La Niña conditions are associated with unusually dry conditions such as drought. In Kenya the 1997/1998 El Niño and the 1999/2000 La Niña episodes were the most severe in the past half century according to Kenya Agricultural Research Institute (KARI).¹¹⁴

The agricultural sector is critically important to Kenya, both in terms of social and economic development. As stated in the previous chapter, around 75 per cent of Kenyans depend directly on agriculture for their livelihoods and production ranges from small-scale subsistence farming to large-scale export industries. Agriculture contributes to about 50 per cent of Kenya's total export value, approximately 21 per cent of its total GDP and provision of over 45 per cent of the annual Government budget.¹¹⁵ Agricultural activity is highly sensitive to climate change, largely because it depends on biodiversity and ecosystems. Sufficient freshwater supplies, fertile soil, the right balance of predators and pollinators, air temperature and average weather conditions all contribute to continuing agricultural productivity.

¹¹³ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, (New York: Rensselaer Polytechnic Institute, 2007), p. 63.

¹¹⁴ KARI, *Environmental and Social Management Framework*, East Africa Agricultural Productivity Project, 2009, p. 4.

¹¹⁵ Stockholm Environment Institute, *Economics of Climate Change in Kenya*, (Oxford, 2009), p. 23.

Human interventions, such as excessive extraction of natural resources, forest clearance for pasture or cropland, large-scale monocropping and use of chemical fertilizers and pesticides, have resulted in biodiversity losses. These can ultimately damage an ecosystem's capacity to adapt naturally to changes in the climate, thus loss in fertility and an increased risk of exposure to new pest, and diseases. Drought is one of the most serious hazards for Africa's agricultural sector Kenya included, and according to Clements, by 2100 regions of ASAL are expected to expand by five to 5-8 per cent, or sixty to ninety million hectares, resulting in agricultural losses of GDP in African countries in general.¹¹⁶ The report further states that a reduction in land suitable for rain-fed agriculture and crop production is also expected, although it takes note of the fact that climate adaptation could reduce such effects.

The importance of rain-fed agriculture in Kenya varies depending with regions, and is most significant in Central, Rift-Valley, Western and Nyanza Provinces. Some parts of Eastern and Coast Provinces also depend on rain for agriculture. The impact on maize is of particular concern in Rift-Valley and Western Provinces, while decreases in wheat yields in Rift-Valley Province could increase famine. Kenya's leading cash crops such as Coffee and Tea, which are planted in Central and Rift-Valley Provinces, are the most susceptible to climate change impacts. In contrast, increased temperatures and rainfall changes in certain areas could lead to longer growing seasons and increased agricultural production.¹¹⁷ Stuart and Adams observe that the net balance in cereal production potential is expected to be negative, with up to 40 per cent of sub-Saharan African countries set to lose substantial shares of their agricultural resources due to climate change.¹¹⁸

¹¹⁶ R. Clements, *The Economic Cost of Climate Change in Africa*, (Nairobi: PACJA, 2009), p. 9.

¹¹⁷ IPCC Report, Working Group I to the Fourth Assessment Report, (Geneva, 2007)

¹¹⁸ S. Stuart and J. Adams, *Biodiversity in Sub-Saharan Africa and its Islands: Conservation, Management and Sustainable Use*, (Oxford: Information Press, 1990), p. 16.

In Kenya, sea level rise resulting from saltwater intrusion into inland freshwater supplies could impact on the farming of mangoes, cashew nuts and coconuts in the Coast Province.¹¹⁹ Kenya's poorest people live in rural areas and depend mostly on agriculture for food and income. These people are the most vulnerable to hunger, as well as dependence on food imports and food aid caused by deteriorating farming conditions. In the Northern part of Kenya people depend on livestock, a slight warming from average global temperatures could benefit some small-scale farmers in some areas who keep goats and sheep as they are more heat tolerant than other species.

By contrast, the same temperature rise could reduce the income of large-scale livestock farmers dependent on non heat tolerant cattle and as ecosystems shift from savannah to forest small-scale livestock farmers will suffer losses due to climate change.¹²⁰ This is as a result of farmers lacking the information, skills and technology necessary to change animal stock to more suitable and adaptable species, or to shift from livestock to crop production. Following the projection by the Ministry of Agriculture, cereal production and livestock rearing are more prone to climate change. Due to the increase in demand for cereal (mostly maize and wheat) and meat (livestock) in Kenya, climate change impacts on cereal production and livestock rearing will therefore pose a serious challenge to the future food security of millions of Kenyans.¹²¹ This in itself poses a severe threat to Kenya's ability to cope with and respond to other expected impacts of climate change.

The greatest challenge facing Kenya today is poverty reduction and the achievement of sustained economic growth for national development. Agriculture in Kenya is the engine for this

¹¹⁹ Ibid, p. 112.

¹²⁰ M. Dakoh, "Agriculture and Biodiversity Conservation in Africa Through Indigenous Knowledge" in J. Lemons et al, *Conserving Biodiversity in Arid Regions: Best Practices in Developing Nations*, (Massachusetts: Kluwer Academic Publishers, 2003), p. 73.

¹²¹ KARI, *Environmental and Social Management Framework*, Ibid, p. 7.

economic growth and will remain so in the foreseeable future. Consequently sustainable agricultural development is the country's major priority. The main policy goals for the agricultural sector are to provide food security, raw materials for agro-industry, employment for the rising population and to generate foreign exchange earnings. Pressures are being exerted on agriculture to feed the rising population, provide employment to rural labour force, provide raw materials to industry and earn foreign exchange for the country. Much of Kenya's population derives their livelihoods from small holding agriculture. Lack of markets and the very small size of land holdings lead to degradation of the natural resource base which compromises future development.

The root cause of environmental degradation in the country according to Rarieya is the grinding poverty in rural areas. She adds that the poorest people in Kenya live in rural areas and depend heavily on the natural resource base for their livelihoods, and these people are often trapped in chronic food insecurity and chronic poverty. They have poor financial and human capital endowments, which limit their ability to invest efficiently to create wealth and climb out of poverty.¹²²

Kabubo-Mariara and Karanja reiterate the same point by examining that in the short term, as agricultural productivity declines, the incentive to mine natural resources to sustain their livelihoods makes sense. They further argue that over the longer term, the interaction of the biophysical factors of their environment and the economic context leads to a downward spiral.¹²³ As land degrades, more marginal land is brought into cultivation, and with poor results returns to labour become poor as well thus limited generation of wealth. Owing to such circumstances

¹²² J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, Ibid. p. 74.

¹²³ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 17.

investment in the resources that sustain farming, such as soils and water, is not possible and resources degrade further. The farmers move on to even more marginal land and the cycle begins again, with even poorer results. Ultimately this spiral leads to a situation where the farmer is trapped in chronic poverty and has few options for improving his or her situation. This process also leads to loss of biodiversity including many endemic species.

The ASALS that cover approximately 84 percent of Kenya have long experienced water shortages and drought due to unreliable and poorly distributed rains. Smallholder farmers in these regions are used to coping with variable conditions, but the weather has become even more unpredictable recently putting lives and livelihoods at greater risk. Climate change as observed by Stockholm Environment Institute (SEI) will likely make matters worse as it is projected to lead to significant declines in rainfall and river flows in many parts of Kenya, particularly its arid and semi-arid regions.¹²⁴ This additional stress further threatens the water and lands upon which smallholder farmers rely for their livelihoods, health and well-being. Therefore identifying and implementing policies, processes and technologies to sustainably develop an agricultural sector resilient to current climate variability and long-term climate change is very vital and necessary.

3.2.1 Agriculture and Climate Change

According to Kabubo-Mariara and Karanja, Kenya has a total land area of fifty seven million six hundred thousand hectares (ha) that is 57.6 million ha. Out of this, only nine million four hundred hectares (9.4 million ha) are High to Medium Potential Land (HMPL) accounting for about 16 per cent of the total land area. The ASALS cover over forty eight million hectares (48 million ha), accounting for about eighty 84 per cent of the total land area of Kenya. Of the 9.4 million ha of HMPL, 1.1 million ha are occupied by game parks, 2.8 million ha are cropland,

¹²⁴ Stockholm Environment Institute, *Economics of Climate Change in Kenya*, (Oxford, 2009), p. 16.

2.8 million ha are grazing land for dairy, 2 million ha are forested and 0.5 million ha are covered by urban centers, homesteads and other infrastructures. 9 million ha of the ASALs can support some form of agriculture while 15 million ha is just adequate for raising livestock and the remaining 24 million ha is dry and suitable for nomadic pastoralism.¹²⁵ Most importantly is that the HMPL has the potential to be the breadbasket of Kenya. However, productivity in these areas is declining despite the growing demand for food and other agricultural products.

Marred by shortcomings attributed to productivity, these fertile areas have fallen short of providing food security for Kenya. Soil erosion, loss of soil fertility, water scarcity, flooding and loss of biodiversity are some of the major factors that hinder productivity and are increasing in all areas. Due to population pressure in the HMPL, sub-division of land has resulted in small uneconomic farm sizes, which cannot be run sustainably.

Agriculture continues to be the leading sector in the Kenyan economy in terms of its contribution to real GDP. As provided in the National Climate Change Response Strategy (NCCRS) in the Ministry of Environment and Mineral Resources (MEMR) in Kenya, agriculture contributed 36.6 per cent of GDP in the period between 1964–74, 33.2 per cent in 1974–79, 29.8 per cent in 1980–89, 26.5 per cent in 1990–95, 24.5 per cent in 1996–2000, 19 per cent in 2001–2005 and 26 per cent in 2006–2010. It is further advanced in the same report that only 12 per cent of Kenya is considered high potential for farming or intensive livestock production. A further 5.5 per cent which is classified as medium potential mainly supports livestock, especially sheep and goats. Only 60 per cent of this high and medium potential land is devoted to crops to include maize, coffee, tea and horticultural crops among others, while the remaining 40 per cent is used

¹²⁵ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," *Ibid*, p. 5.

for grazing and forests.¹²⁶ In quantifying the impact of agriculture, it is always necessary to calculate the net revenue which is defined by Kabubo-Mariara and Karanja as gross revenue less all total variable costs, costs of hired labor, farm tools, machinery, fertilizers and pesticides. Costs of household labor are not netted due to difficulties of accurate measurement while household wage rates for adults and children have are captured as independent variables.¹²⁷

On average about 90 per cent of all Kenyans are engaged in farming. Most of the household level variables have a significant impact on crop revenue. Large farm size may be associated with higher productivity. Main and secondary occupation of household head, religion of household head and average number of years of education of the household members are positively correlated with net crop revenue. Household size, introduced as a proxy for household labor, has a positive and significant impact on net crop revenue.¹²⁸ Generally irrigation has a large positive impact on crop revenue in Kenya since agriculture mostly relies on rainfall.

The study by the Ministry of Agriculture in Kenya reveals that marginal impacts occasioned by temperatures during the wet season are positive, but temperatures during dry season have larger negative impacts on net crop revenue. High temperatures during dry season are harmful to crop production while high temperatures during wet season are beneficial. This is justified by the fact that temperatures during dry season facilitate the planting period followed by formative crop growth. Temperatures during wet season on the other hand enhances crop ripening and maturing.¹²⁹ Increased precipitation increases productivity where increase in rainfall would lead to increase in net crop revenue.

¹²⁶ GoK, Report on National Climate Change Response Strategy, (2010), p. 8.

¹²⁷ J. Kabubo-Mariara and F. Karanja. "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," Ibid. p. 21.

¹²⁸ Ibid, p. 22.

¹²⁹ GoK, Report on Economic Review of Agriculture, (2010), p. 25.

According to Clements, there is a projection that medium and low potential zones in Kenya will bear the brunt of global warming and losses are estimated to be up to United States dollar 178 per hectare by the year 2030 for these zones compared to losses of only United States dollar 32 for high potential zones and United States dollar 117 for the whole country.¹³⁰ This is the intensity of agriculture in regard to sensitivity to global warming and precipitation.

3.3 Effects of Climate Change on Agricultural Productivity in Kenya

In Kenya, where agriculture is largely rain fed, productivity depends largely on agro-ecological factors and in particular on rainfall. Other factors such as temperature, soil characteristics and the use of production input factors such as fertilizers and chemicals are also important for determining agricultural output. Climate change arising from the build-up of greenhouse gases provides a profound challenge for the future of agricultural production.

Climate change impacts will vary based on locality, but the probability of disruption of Kenya's agricultural sector is very high. Predictions are not sufficiently detailed at this point to provide secure guidance for adaptation strategies. A number of modeling exercises suggest that the highlands of Kenya are likely to get wetter, while the ASALs are likely to get drier. One thing we can say with relative certainty is that the climate is likely to become more variable. Kenya can expect more droughts and more floods than it has seen in the past, and planning for this situation is wise. KARI identifies a number of impacts and their implications for the changes likely to be experienced in the future in Kenya:

To begin with, a decrease in rainfall in the ASALs would increase the total area of the country under arid conditions. This has the potential of disrupting agro-pastoral production systems and cause severe food insecurity in the event of droughts that would create water stress

¹³⁰ R. Clements, *The Economic Cost of Climate Change in Africa*, Ibid, p. 32.

for both crops and livestock. Desertification would be intensified as vegetation cover deteriorates and soil erosion accelerates. A rise in temperature associated with increase in rainfall amounts in pastoral lands would have positive effect on pastures, hence livestock conditions and arable crops in the same localities.

Secondly, in the high potential areas, a rise of temperatures without corresponding increase in rainfall may predispose agriculture to increased levels of pests. Crop fecundity could decline requiring the development of new crop varieties. Thirdly, a corresponding increase in rainfall in the high potential areas would, however, have mixed results linked to landslides on steep slopes, floods, increased maturation period for crops, increased incidence of fungal diseases in crops such as maize, beans and potatoes. In the coastal areas, it is predicted that climate change would cause loss of biodiversity, siltation and salinization of agricultural land and change time of harvest.¹³¹

In Kenya, the adverse impacts of climate change are compounded by local environmental degradation (illegal encroachments and settlements, logging and livestock grazing), which have among other factors, further aggravated deforestation and land degradation. Forest cover in Kenya for instance, has fallen from 12 per cent in the 1970s to less than 2 per cent at present. This has considerably affected the ability of Kenya's five main Water Towers to act as water catchments for major rivers and lakes, which are the main sources of water for daily consumption in rural and urban areas.¹³² Thus, the impacts of climate change, compounded by local environmental degradation, are profound.

As mentioned above, Kenya has a landmass of about 57.6 million ha of which only 16 per cent is arable while 84 per cent consists of ASALs. Due to climate change and other human

¹³¹ KARI, *Environmental and Social Management Framework*, Ibid, p. 14.

¹³² W. Newmark, *Conserving Biodiversity in East African Forests: A Study of the Eastern Arc Mountains*. (New York: Springer Science+Business Media, 2002), p. 5.

factors, desertification that is the extent of arid and semi-arid land, is increasing. In regard to decreased rainfall, “there is the potential of disruption in agricultural and pastoral production systems that would result to severe food insecurity in the event of droughts creating water stress for both crops and livestock.”¹³³ Kenya’s natural resources, in particular its rich flora and fauna are among the country’s most valuable natural assets. Climate change now threatens this rich biodiversity and species loss has been observed, while in some places, the number of indigenous and important species has tremendously dwindled. Kenya’s rangelands support millions of pastoralists and agro-pastoralists who travel long distances in search of pasture and water for their cattle. Receding rangelands threaten the very basis of the livelihood and the way of life of the pastoralists.

The Kenyan coastline is characterized by a rich diversity, including fish, coral reefs and mangrove forests. But the Kenyan coast is one of the most vulnerable to sea level rise in the world. It is estimated that about 17 per cent of Mombasa or 4600 ha of land area will be submerged with a sea level rise of only 0.3 metres.¹³⁴ Kenya is a water-scarce country and the natural endowment of renewable freshwater is low, water resources are unevenly distributed in both time and space. Climate change will worsen this already precarious situation according to Clements as it affects the main hydrological components namely; precipitation and runoff. This will alter the spatial and temporal availability of water resources.¹³⁵

3.4 Addressing Climate Change

Serious droughts have occurred in the last four consecutive years. Major rivers show severe reduced volumes during droughts, and many seasonal ones completely dry up. The

¹³³ Interview with Dennis Cheruiyot, Kenya Meteorological Department, Nairobi, 18th July, 2011.

¹³⁴ R. Clements, *The Economic Cost of Climate Change in Africa*, Ibid, p. 36.

¹³⁵ Ibid, p. 37.

consequent crop failures in 2009 for instance, placed an estimated 10 million Kenyans or one fourth of the entire population at risk of malnutrition, hunger and starvation. Droughts reduce the production of not only staple food crops such as maize but also other major crops such as tea, sugarcane and wheat. This increases imports (maize, wheat and sugar) and reduces exports (tea and coffee), weakening the country's balance of payments.

According to Rarieya, diseases such as malaria, cholera, ebola, lyme disease, plague, tuberculosis, sleeping sickness, yellow fever and Rift Valley fever are expected to spread as temperatures rise and precipitation patterns change. In addition, during floods, diseases such as typhoid, amoeba, cholera and bilharzia reach epidemic levels and such disease outbreaks will further burden the already stretched public health infrastructure.

Population displacement and migration from climate disaster-prone areas such as drought prone northern Kenya and sea-level rise in the coastal region are expected to increase due to climate change. It is expected that most of those on the move will be from rural areas heading towards urban agglomerations where assistance, income opportunities and infrastructure may be perceived to be more accessible and readily available.¹³⁶ This will create an enormous social, health, infrastructural and management challenge for cities, subjecting them to unplanned population growth. In regard to managing climate change, Wangeci observed that “no nation or groups of nations, however politically or economically robust, could unilaterally resolve the planetary environmental problems.”¹³⁷

Global warming is likely to disrupt and even destroy some of the tourist attractions such as the snow-caps of Mt. Kenya, the coastal rainforests and fragile marine ecosystems. While coral reefs are bleaching and the number of flamingoes in Lake Nakuru and Lake Baringo is

¹³⁶ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, Ibid, p. 78.

¹³⁷ Interview with Ann Wangeci, Lecturer United States International University, Nairobi, 12th July, 2011.

diminishing due to diminishing water levels of the lakes. The great migration of the wildebeest across the Mara River is under threat as the river's flow is reducing as well. Further, climate change is exacerbating human-wildlife conflicts. Pastoralists in search of pasture and water have encroached into game parks, chasing wildlife away from their natural habitats. Drought has also pushed wild animals closer to waterholes and vegetation near to human settlements.¹³⁸

Along the coastline, some of the popular beaches could eventually disappear as the sea level rises. Already, hotels along the Kenyan coastline have been forced to construct sea walls to protect against increasingly strong sea tides. All these do and will continue to impact negatively on Kenya's tourism sector.¹³⁹ Changes in ocean circulation are predicted to lead to loss of certain fish populations or establishment of new ones. Temperature change may also result in changes of upwelling patterns, which might impact on fish spawning period and success of larvae, thereby altering the entire life cycle and size of fish population

Rarieya observes that climate change will also affect Kenya's energy supply due to the fact that hydropower potential has dramatically reduced during the past 20 years following the destruction of water catchment areas.¹⁴⁰ As observed by Omambia, "climate change is likely to worsen the situation as it will result in prolonged droughts which will see water levels in the generating dams recede further."¹⁴¹ The country currently relies on hydropower for nearly 70% of its electricity. Further, extreme weather events such as rainstorms will destroy the energy generation and distribution systems.¹⁴² Torrential rains accompanied by floods can also destroy roads, bridges, railway lines and other transportation and communication infrastructure. This has

¹³⁸ KARI, *Environmental and Social Management Framework*, Ibid, p. 16.

¹³⁹ GoK, Report on Economic Review of Agriculture, Ibid, p. 26.

¹⁴⁰ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, Ibid, p. 136.

¹⁴¹ Interview with Ann Omambia, NEMA, Nairobi, 9th August, 2011.

¹⁴² KARI, *Environmental and Social Management Framework*, Ibid, p. 17.

been experienced in the past following the damage caused by the 1997/1998 El-Niño rains to the country's transport and telecommunication infrastructure which was estimated at one billion US Dollars. In addition, rising temperatures will cause warping of rail-tracks.¹⁴³

The direct and indirect impacts of climate change are already being felt across Kenya and there is a high possibility of increasingly severe changes in the future, according to Kenya Meteorology Department (KMD), unless unprecedented measures are taken to reduce emissions of GHGs.¹⁴⁴ Natural disasters associated with climate variability and change have in the past cost huge losses. Kenya's ability to cope with the impacts of climate change is compounded by many factors including poverty, weak institutions, poor infrastructure, inadequate information, poor access to financial resources, low management capabilities, armed conflicts due to a scramble for diminishing environmental resources and high interest rates. It is vital that policies and measures for adaptation to and mitigation against climate change are put in place across all the sectors in order to minimize the impending climate change catastrophe.

3.5 Governance of Climate Change

An analysis of existing environmental policy and legal framework currently in place to guide climate change activities in Kenya has revealed that Kenya currently has no policies or laws that deal directly and explicitly with climate change. The only policy that has attempted to address climate change to some extent is the draft National Environmental Policy of 2008. The same is true of the legislative framework, with the national environmental law, the Environmental Management and Coordination Act (EMCA, 1999), only having certain

¹⁴³ GoK, Report on National Climate Change Response Strategy, (2010), p. 10.

¹⁴⁴ Ibid, p. 11.

provisions relevant to mitigation of climate change, but not effectively addressing several aspects of the problem.

The Strategy therefore recommends that a comprehensive climate change policy and related legislation be put in place. This could be achieved by either reviewing and updating the clauses on climate change in the draft National Environmental Policy or developing a completely new climate change policy. This should be followed by a review of existing laws (in particular, the EMCA) to make them climate change responsive and/or enactment of a new and comprehensive climate change law. However, the Strategy recommends that a new climate change legislation be enacted, a process that could run concurrently with formulation of a climate change policy.¹⁴⁵

In addition, the Strategy has established that institutions currently in place to govern climate change affairs are inadequate. It has consequently recommended that a dedicated and adequately funded Climate Change Secretariat be established within the Ministry of Environment and Mineral Resources to oversee climate change issues including the implementation of the adaptation and mitigation programmes and the other aspects of the National Climate Change Response Strategy. The Secretariat, including the proposed structures within it, should be anchored on the provisions of the new climate change laws to be enacted.¹⁴⁶

Further and in relation to climate change governance, it is recommended that the National Climate Change Activities Coordinating Committee should continue to perform its current advisory capacity. It is further proposed that MEMR establishes a National Climate Change Steering Committee to help it gather and collate input and advice from key climate change

¹⁴⁵ GoK, Report on National Climate Change Response Strategy, (2010), p. 16.

¹⁴⁶ Ibid, p. 18.

stakeholders for its use in the coordination of Kenya's climate change activities.¹⁴⁷ The Climate Change Secretariat to be established at MEMR will provide secretarial functions for the two committees while the Climate Change Coordination Unit at the Office of the Prime Minister should continue to provide high-level political support to climate change activities in Kenya.¹⁴⁸

Research in the agricultural sector is very important as it will provide data and information on the impact of climate change on agriculture as well as causes, effects and solutions. Research areas include the development of superior (drought-tolerant, fast-maturing, disease and pest-resistant) crop varieties and countrywide assessments to determine regional vulnerability of the sector to climate change elements. The strengthening of research in vaccines against priority livestock diseases and inoculants for improving soil nitrogen as well as phosphorous in acid soils are vital in enhancing agricultural productivity. Intertwined with the forestry sector, research areas entail evaluating the potential for remunerating natural resource users for natural forests conservation and restoration with funds from carbon markets, developing technologies to rehabilitate naturally degraded areas or those cleared for charcoal burning and validation as well as integration of indigenous knowledge.

3.6 Climate change and Environmental diplomacy

Over the past 40 years, global environmental governance has evolved in many respects. Its substantive scope has grown from an initial focus on issues with direct and visible impacts on human health (such as air and water pollution, toxic chemicals or waste) and those related to conservation and endangered species. Many of the issues on the sustainability agenda today are global in nature, from climate change and the degradation of land and ecosystems to ocean acidification, among others.

¹⁴⁷ Ibid, p. 18.

¹⁴⁸ Ibid, p. 19.

Scientific advances and the exponential growth in computational power over the past four decades have enabled experts to carry out environmental analyses and modeling of complex trends such as global climate change and biodiversity loss. These breakthroughs have contributed to an ever-growing scientific evidence base, which has in turn raised the profile of environmental issues on national and international agendas and enabled sustainability to become a mainstream concern.¹⁴⁹

Despite these advances, the record of UN summitry is mixed. On the one hand, it has been no mean feat to have established and sustained a process of high level meetings of state leaders to address the urgent problems of environment and development. The Earth Summit in Rio took place in 1992, 20 years after the first UN Conference on the Human Environment in Stockholm, and was followed in 2002 by the World Summit on Sustainable Development in Johannesburg.

On the other hand, there is a growing sense of frustration, and even failure, regarding the ability of the international community to implement lasting solutions to environmental problems in a collective manner—not least because the crisis of ecological and economic sustainability remains unresolved. Many urgent environmental problems that were on the agenda in Rio 1992 are still with us today, from climate change to deforestation and the destruction of biodiversity.

Food, water and other resources continue to face serious pressures, driven by demographic change, economic growth and shifting consumption patterns. Scientists and even the media have started to refer to a new geological age, the Anthropocene, in which humans have become key drivers of large-scale ecological change. Some argue that human society is pushing against a set of nine planetary boundaries and needs to stay within them to avoid abrupt, non-

¹⁴⁹ R. Falkner and B. Lee 458 *International Affairs* 88: 3, 2012 Copyright © 2012 The Author(s). *International Affairs* © 2012 The Royal Institute of International Affairs

linear environmental change. If current economic trends persist, global consumption could soon exceed the tolerance thresholds of ecosystems and resources, including cropland, rangeland, fisheries and usable water.

Correspondingly, there is a growing commitment to *bioregionalism*, the realization that ecological management must be defined by natural delineations such as watersheds and biomes rather than by national or other borders¹⁵⁰. In this regard, numerous joint environmental commissions between countries and jurisdictions have taken root all over the world. This has played out in various ways at international forums wherein bioregionalism and common environmental sensitivities have sometimes transcended traditional notions of state sovereignty.

Scarcity proponents such as Homer-Dixon and Baechler have to date been guided by assumptions, such as “causal processes are exceedingly complex, involving multiple physical and social variables, feedback loops, interactive effects and nonlinear responses. . .” and “although the underlying influence of environmental factors on conflict may sometimes be great, the complex and indirect causation in these systems means that the scanty evidence available is open to many interpretations”¹⁵¹

In addition to these geophysical challenges, there is also a crisis of institutions and governance. Over the past half-century, governments have created a range of global instruments and institutions in response to environmental concerns, ranging from international organizations to multilateral treaties and voluntary initiatives. At the national level, environment ministries and agencies have been set up to manage environmental affairs, backed up by new environmental laws.

¹⁵⁰ Sanjeev Khagram, Saleem Ali *Public Affairs and International Studies, University of Washington, Seattle, Washington 98195-3055*; pg 45

¹⁵¹ Sanjeev Khagram, Saleem Ali *Public Affairs and International Studies, University of Washington, Seattle, Washington 98195-3055*; pg 12

At the international level, numerous bodies have been created—from the United Nations Environment Programme (UNEP) to the Commission on Sustainable Development, from the Multilateral Ozone Fund to the Global Environment Facility and now the Global Green Fund—that are charged with gathering information, facilitating international cooperation, disbursing environmental aid and capacity-building. There have also been many attempts to ‘green’ other global public policy agendas, including trade (via the World Trade Organization) and development (through multilateral development banks). Yet implementation gaps persist, and the limited availability and predictability of financial resources has been a key constraint on effective environmental governance, particularly at the global level where multiple and overlapping organizations and issue-areas compete for scarce resources.

Despite expanding systems of regulatory control, human health and the environment continue to be damaged by toxic chemicals, waste, air pollution, water stress, destruction of habitats and ecosystems, and species extinction in many parts of the world. This is especially evident in developing countries like Kenya, whose rapid economic development is adding to global ecological pressures, while their capacity to cope with growing ecological stresses is severely limited.

Underpinning this increasing sense of frustration is a broader crisis of international environmental diplomacy. In the years since the Rio Earth Summit in 1992, the system of environmental multilateralism has come under increasing strain, with global divisions blocking progress on a number of fronts. The US–EU split on the Kyoto Protocol has held back climate policy since the 1990s, while the North–South divide is widely seen as having contributed to the failure to agree a post-Kyoto agreement (though this may now be changing). The greater variety of voices and positions in international environmental politics, together with more fluid and

unstable patterns of coalition-building, also presents new challenges to established modes of environmental multilateralism.

Perhaps the early successes in environment-related diplomacy after 1972, including the large number of multilateral agreements on nearly all ecological issues, obscured the inevitability of a political backlash against ever more demanding environmental regulations. Achievements such as the Montreal Protocol on substances that deplete the ozone layer have not generally been replicated elsewhere. The discussion around historical versus current and future responsibilities has bedeviled the climate change negotiations. The willingness of developing countries to participate in global solutions depends heavily on international assistance from developed countries—an argument that is increasingly difficult to sell to constituencies in industrialized economies at a time of fiscal austerity and growing economic competition from emerging economies.

As observed by Susskind, on the agenda of national interest, security concerns normally come first, economic interest follow a close second and environmental questions are considered to be a rather remote issue which can be dropped if other seemingly more important issues are at stake.¹⁵² Rather, environmental stress in combination with other factors such as lack of legitimate (often not democratic), capacious political institutions or weak civil societies usually generate negative outcomes. For example, recent conflicts in central Africa, particularly Rwanda and Darfur, exemplify this multiple conjectural causation.

Given the necessity for certain environmental resources and a growing realization that environmental issues require integrated solutions across (and within) borders, the likelihood for their instrumental use in conflict resolution has increased in recent years. One of the earliest

¹⁵² L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, (Massachusetts: Cambridge University Press, 1994), p. 56.

contributions to the development of the study of environmental peace building was Haas's work on the Mediterranean Action Plan.¹⁵³

Today, furthermore, there is closer interaction between the sustainability and security agendas, with ecological and resource constraints increasingly being seen as threatening the future security and even survival of societies. Global warming has thus gained in prominence in the context of security debates, and greater competition over scarce resources such as energy, food and water has attracted growing attention in international circles. While security concerns can help raise the profile of sustainability issues, they may also promote a zero-sum logic and undermine efforts to arrive at internationally coordinated solutions.

Achieving the ultimate objective of environmental diplomacy and economic development by addressing climate change requires technological innovation and the rapid and widespread transfer and implementation of technologies and know-how for mitigation of greenhouse gas (GHG) emissions as well as technologies for adaptation to climate change. GHG emissions greatly impact on the environment. Kenya depends on natural environment for economic development through agriculture and tourism among other sectors which are vulnerable to climate change. Current climate variability puts huge stress on agriculture, particularly in the smallholder sub-sector.

3.6.1 Impact of Climate Change on Agriculture in Kenya

The agricultural sector continues to dominate Kenya's economy, although only 15 percent of Kenya's total land area has sufficient fertility and rainfall to be farmed, and only 7 or

¹⁵³ Sanjeev Khagram. Saleem Ali *Public Affairs and International Studies, University of Washington, Seattle, Washington 98195-3055; pg 34*

8 percent can be classified as first-class land. In 2006 almost 75 percent of working Kenyans made their living on the land, compared with 80 percent in 1980¹⁵⁴.

From 1991 to 1993, Kenya had its worst economic performance since independence. Growth in GDP stagnated, and agricultural production shrank at an annual rate of 3.9%. Inflation reached a record 100% in August 1993, and the government's budget deficit was over 10% of GDP. As a result of these combined problems, bilateral and multilateral donors suspended program aid to Kenya in 1991.

Agriculture, a key economic sector in the Kenya, is highly vulnerable to climate change. Temperature changes, the availability of water, the spread of diseases in plants and animals, the fertilization effect of rising CO2 levels and the probable increase in extreme weather conditions are all factors in this context. Furthermore it appears to be a consensus that climate changes, like the environment change generally, represents a greater threat to domestic than international peace, and that the proper focus should be on state level¹⁵⁵. Susskind thus contributes that on the agenda of national interest, security concerns normally come first, economic interest follow a close second and environmental questions are considered to be a rather remote issue which can be dropped if other seemingly more important issues are at stake.¹⁵⁶

As a result of climate change, harvest yields begin to fall at an earlier stage than in the industrialized countries thereby increasing the threat to food security and resulting in greater dependency on food imports. Climate change is also conducive to the spread of certain infectious diseases. For example, the greater prevalence of malaria is a problem which particularly affects

¹⁵⁴ "Doing Business in Kenya 2012". World Bank. Retrieved 21 November 2011

¹⁵⁵ Barnett, J.: *The Meaning of Environmental Security*. 2001. p. 6

¹⁵⁶ L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, (Massachusetts: Cambridge University Press, 1994), p. 56.

Kenya developing countries, whose infrastructure and institutions lack the adaptive capacity to cope with this threat.

In examining the factors of economic development, Mansell and Wehn state that the scope of economic development includes the process and policies by which a state improves the welfare of its people through economic, political and social processes.¹⁵⁷ Economic development in Kenya is largely determined by agriculture which is characterized by provision of raw materials, labor force, food security and exportation of agricultural products. According to Kabubo-Mariara and Karanja Kenya's foreign exchange is largely derived from Tea, Coffee and other Horticultural exports.

Finally, sustainable agricultural development is Kenya's major priority since agriculture is the engine of economic growth and it seems it will be the case in the foreseeable future. Tea, Coffee, Tourism and Horticulture are the leading sectors in foreign exchange in Kenya.¹⁵⁸ Although the expansion of agricultural export crops has been the most important factor in stimulating economic development, much agricultural activity is also directed towards providing food for domestic consumption. Kenya's agriculture is sufficiently diversified to produce nearly all of the nation's basic foodstuffs and also extends to neighboring countries. Susskind observes that climate change arising from the build-up of greenhouse gases provides a profound challenge for the future of agricultural production.¹⁵⁹

¹⁵⁷ R. Mansell and U. Wehn, *Knowledge Societies: Information Technology for Sustainable Development*, (New York: Oxford University Press, 1998), p. 19.

¹⁵⁸ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach." CEEPA Discussion Paper No. 12 (2006), p. 9.

¹⁵⁹ L. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements*, (Massachusetts: Cambridge University Press, 1994), p. 83.

3.7 Conclusions

According to the findings of this chapter, change in climate affects agricultural productivity. Similarly, increased temperatures during wet seasons increases net crop revenue, while increased temperatures during dry seasons decreases such net crop revenue, while increased precipitation increases net crop revenue. According to the findings, long-term changes in temperatures and precipitation will have a substantial impact on net revenue, and that the impact will be more pronounced in medium and low potential zones than in high potential zones.

The latter are expected to receive some marginal gains from mild temperature increases, holding precipitation constant. Diversification through changing the crop is the most common adaptation measure, particularly in high potential zones, while water conservation, irrigation and shading vis a vis sheltering of crops are the main adaptation measures in drier regions. These results imply that adaptation to climate change in Kenya is important if households are to counter the expected impacts of long-term climate change.

By and large, the anticipated effects of climate change need to be factored into poverty reduction strategies and rural development strategies. Of all of the human enterprises, agriculture is the most dependent on the climate. Adaptation and mitigation strategies should not be separate from other planning processes in Kenya for sustainable solutions to be achieved. Mainstreaming climate change planning into other planning processes is the key to successful adaptation and limiting the negative effects of climate change

CHAPTER FOUR

ENVIRONMENTAL DIPLOMACY AS A GREEN ECONOMY FOR KENYA

4.0 Introduction

In the previous chapter, we looked at environmental diplomacy, climate change and Agriculture sector in Kenya and if these entities correlate. We have ascertained that they do really link and correlate. This means that we can work with the three entities to bring about change in the Agricultural sector in Kenya, which is the backbone of economy in Kenya.

In this chapter however, we look at the major economic activity in Kenya which is the agriculture sector in and determine if environmental diplomacy can be seen as the saviour of this economic activity in Kenya. We also look at the emerging issues in the study. We first look at environmental diplomacy and what it has contributed to bettering agriculture sector in Kenya. This is to regulate their environmental conduct by standardizing their environmental policies worldwide, thus reducing their ability to exploit cross-country differences in environmental regulations.¹⁶⁰

Another emerging issue is economic development in Kenya. This goes without saying that Agriculture is Kenya's major foreign earner and also practiced by the majority in Kenya. The third issue is very important in the fact that it's the issue of economic development in Kenya. The agriculture sector in has come out in the course of this study as the major economy for Kenya over the period of study which is 1963-2012. This is because over the decades, some economies have picked up tourism. But agriculture still dominates the pack with the majority of

¹⁶⁰ P. Christmann, "Multinational Companies and the Natural Environment: Determinants of Global Environmental Policy Standardization," *The Academy of Management Journal*, Vol. 47 No. 5, (2004), pp. 747-760, p. 748.

Kenyans directly or indirectly affected. And so when looking at the environment the agriculture has to be protected and hence green economy as a solution.

Another emerging issue is the link between the environment and economic development. This is by looking at climate change and its effects on the economy. The agricultural sector cannot thrive without a good environment. And finally the other emerging issues are the two measures that have been taken to protect the environment so that green economy can be a solution to the hurting environment.

4.1 Environmental Diplomacy

According to Richard E. Benedick, scientific warnings have been accumulating in the recent years that the impacts of the environment of the economic expansion and prosperity of the last half century are beginning to upset delicate natural cycles upon which all life forms on planet depend on. The global dimensions of the risks have awakened calls for far reaching solutions, for new levels of international cooperation. It has become apparent that no nation or group of nations, however politically powerful or economically strong can by themselves solve these planetary problems.

The greatest challenge facing Kenya today is to reduce poverty and achieve sustained growth for the national development. Agriculture in Kenya is the engine for this economic growth and will remain so for the foreseeable future. Consequently, sustainable agricultural development is the country's major priority.

Global environmental governance consists of efforts by the international community to manage and solve shared environmental problems.¹⁶¹ Environmental diplomacy and economy of

¹⁶¹ Dingweth and Pattberg 2006. *Global governance its theoretical antecedents and applicability to contemporary world politics.*

Kenya go both hand in hand. These diplomatic initiatives have been as a result of an ongoing process of reporting and review of national policies and scientific evidence. Institutional frameworks, backed by permanent secretariats and expert groups, have been established in support of continuing negotiations that appraise and refine national commitments in light of changing knowledge and conditions. Benedict examines that environmental negotiations can be viewed as an evolving system of international governance of the environment.¹⁶²

Simmons and Steinberg examine that the global challenges for environmental protection and a sustainable development have to be tackled not only on a local scale but also through transnational action. They further argue that effective international cooperation requires an international environmental legislation and international environmental law to implement the necessary conditions.¹⁶³

On the basis of international law, international cooperation is to a large extent restricted to states as the main actors. With this kind of perspective the rationale behind international cooperation is likely to be defeated without incorporating non-state actors, more specifically non-governmental organizations and the business community. Oye attributes the notion of international cooperation to the anarchic nature of the international system by arguing that in the absence of a central governing authority international cooperation is inevitable.¹⁶⁴ Keohane,¹⁶⁵ Milner,¹⁶⁶ and Stein¹⁶⁷ further the same argument by emphasizing that international cooperation

¹⁶² R. Benedict, "Diplomacy for the Environment" in AICGS Conference Report, *Environmental Diplomacy*, (Washington, D.C.: The Johns Hopkins University Press, 1998), pp. 3-11, p. 7.

¹⁶³ B. Simmons and R. Steinberg, *International Law and International Relations*, (Cambridge, Cambridge University Press, 2006), pp. 215-217.

¹⁶⁴ K. Oye, *Cooperation under Anarchy*, (Princeton: Princeton University Press, 1986), pp. 1-24.

¹⁶⁵ R. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984), p. 31.

¹⁶⁶ H. Milner, "International Theories of Cooperation among Nations: Strengths and Weakness," *World Politics* Vol. 3 No. 44, (1992), pp. 466-496, p. 468.

¹⁶⁷ A. Stein, *Why Nations Cooperate: Circumstance and Choice in International Relations* (Ithaca: Cornell University Press, 1990), p. 2.

is vital in the pursuit of safeguarding the future and prosperity of the planet by discussing and providing solutions to various global issues, among them environmental protection.

If practiced in Kenya, it will protect the environment and in safeguard the agricultural sector that is important to Kenya and the regions. This is because a lot of international meetings have been held to aid the debate of climate change and Kenya has often participated and contributed. In environmental diplomacy more than 140 Multilateral Environmental Agreements (MEAs) have been created since 1920, over half of these since 1973¹⁶⁸. If one only counts treaty amendments, protocols and other changes to existing agreements, this number could be far higher than it is right now. “Three or more Governments have agreed on legally binding environmental commitments over 700 times”¹⁶⁹. Narain observes that as an integral component of international relations, environmental diplomacy has led to the formulation of over two hundred international environmental treaties now in place and numerous others that are under negotiation.¹⁷⁰

The significance of environmental diplomacy involves efforts by states and other actors towards addressing ecological decline the world is experiencing. The role of non state actors in environmental diplomacy has been widely acknowledged due to their critical involvement in environmental problems. Christmann observes that multinational companies (MNCs) can self-

Last but not least, the fact that environmental issues are increasingly intertwined with other more traditional areas of foreign relations, including trade and investment policies, development, human rights and even military security, it is important for these other areas of foreign relations to embed environmental issues in their strategies. Integrating environmental

¹⁶⁸ Hass 2001a, pg 316

¹⁶⁹ Mitchell 2003, Pg 434-5

¹⁷⁰ S. Narain, “Environmental Diplomacy in an Unequal World” in AICGS Conference Report, *Environmental Diplomacy*, (Washington, D.C: The Johns Hopkins University Press, 1998), pp. 17-23. p. 17.

issues into these other spheres is often essential for solving the problems at hand and achieving a long lasting solution to environmental problems. Towards this end linkages between foreign and domestic policies should be created in Kenya.

4.2 Link between the Environment and Economic development in Kenya

We cannot talk about development and environment without making reference to MDGs. They emanated from the Millennium Summit held in New York in September 2000, where 189 UN member-states adopted the Millennium Declaration which ideologically was a build-up of the conference process of the 1990s. The Declaration, signed by 147 heads of states, substantially drew from the UN Secretary General Millennium Report which contained the MDGs. They embody the core content of the current development agenda of global governance and treated as the current framework of international development cooperation.

Specifically, goals number seven and eight of MDGs contain the themes of environment and development. They provide for environmental sustainability and global partnership for development respectively. All countries and development agents have so far proven to comply with this framework which will remain valid until at least 2015, the target period for its implementation. Although not a legally binding instrument, nor even a formal UN resolution, the MDG framework has acquired a politically and morally compelling character.

In Kenya, growth of the national economy is highly correlated to growth and development in agriculture. In the first two decades after independence, the agricultural sector, and in turn the national economy, recorded the most impressive growth in sub Saharan Africa at average rates of 6 per cent per annum for agriculture and 7 per cent for the national economy. During this period, small-scale agriculture grew rapidly as the population rallied around the call

by the first president of the republic Mzee Jomo Kenyatta of *rudini mashambani* (return to the farms). This growth was spurred by expansion because there was ample land and better use of technology. Moreover, agricultural extension and research were supported by the Government.

Agriculture, contributes majorly to Kenya's economy, it currently contributes 26 per cent of the GDP directly and another 25 per cent indirectly. The sector also accounts for 65 per cent of Kenya's total exports and provides more than 18 per cent of formal employment whereas more than 70 per cent of informal employment is in the rural areas.¹⁷¹ The agricultural sector comprises four main subsectors namely crop production, livestock production, aquaculture and forestry. Crop production comprises of industrial crops, food crops and horticulture while livestock production comprises of dairy, beef, sheep and goat, poultry, pig and apiculture industries.

Aquaculture involves fish industry whereas forestry involves conservation of the environment, expanding tree cover and adoption of agro forestry. The agricultural sector employs such factors of production as land, water and farmer institutions (cooperatives, associations). Industrial crops contribute 17 per cent of the Agricultural Gross Domestic Product (AgGDP) and 55 per cent of agricultural exports. Horticulture has recorded a remarkable export-driven growth in the past 5 years and is now the largest subsector, contributing 33 per cent of the AgGDP and 38 per cent of export earnings. Food crops contribute 32 per cent of the AgGDP but only 0.5 per cent of exports, while the livestock subsector contributes 17 per cent of the AgGDP and 7 per cent of exports¹⁷². Livestock and fisheries subsectors have huge potential for growth that has not been exploited.

¹⁷¹ GoK, Report by the Ministry of Agriculture, *Economic Review of Agriculture*, (2010), p. 3.

¹⁷² GoK, Agricultural Sector Development Strategy, (2010), p. 15.

The Government has also established and supported many agricultural institutions such as farmer cooperatives and those for agricultural inputs, marketing, credit and agro processing. Budgetary allocation to the agricultural sector for the last four decades has been at an average of 13 per cent of the national budget despite the same being unsustainable. Specifically agricultural sector recorded an impressive average annual growth rate of 3.5 per cent between 1980 and 1990 which in the subsequent decade reduced to 1.3 per cent.

According to the Ministry of Agriculture, Kenya compared badly, between 1990 and 2000, with Tanzania, Uganda, China, India and Vietnam at average annual growth rates of 3.2 per cent, 3.7 per cent, 4.1 per cent, 3.2 per cent and 4.8 per cent respectively, which had all been performing badly in the previous decades.¹⁷³ The main reasons for this decline were low investment in the sector, mismanagement, virtual collapse of agricultural institutions and, more importantly, negligence of agricultural extension and research. It was also during this period that the government of Kenya was implementing structural adjustment programmes prescribed by the Breton Woods institutions, which encouraged poorly sequenced privatization in the sector leading to low investment with budgetary allocation declining to as low as 2 per cent or less in the agricultural sector.¹⁷⁴

By 2005, the decline in growth started to reverse when the average growth rate picked up to 2.4 per cent owing to governments efforts to increase investment in the agricultural sector by reviving agricultural extension and other institutions. The revival rate was gradual with emphasis being exerted more on the increase of budgetary allocation in agriculture and other investments generally. Indeed by 2006, an average of 4.5 per cent budgetary allocation of the national budget was apportioned to the agricultural sector.

¹⁷³ Ibid, p. 17.

¹⁷⁴ GoK, Report by the Ministry of Agriculture, p. 10.

According to the Ministry of Agriculture of Kenya, the gains that had been realized by 2006 were set back by the violence following the 2007 general elections, the crises caused by escalating global food and fuel prices of 2008, and the financial crises of 2008/09 to the extent that the agricultural sector reflected a negative 2.5 per cent in 2008.¹⁷⁵

As observed earlier, land is the most important resource in agricultural production in Kenya and limited availability of productive land is a major constraint to increased agricultural production. Kenya has an area of about 587,000 kilometers squared (km²) out of which 11,000 km² is water. Of the remaining 576,000 km² landmass, only about 16 per cent is of high and medium agricultural potential with adequate and reliable rainfall. This potentially arable land is dominated by commercial agriculture with cropland occupying 31 per cent, grazing land 30 per cent, and forests 22 per cent. Game parks, urban centres, markets, homesteads and infrastructure make up the remaining 17 per cent. The 84 per cent ASAL is not suitable for rain-fed farming due to low and erratic rainfall, though there is limited cultivation of some crops.¹⁷⁶

The ASALs are used as rangelands by ranchers and pastoralists. The Report of the Ministry of Agriculture examines that agricultural growth must be led by intensification and substitution towards more high-value products, and expansion of the cultivated area through irrigation.¹⁷⁷ Though it is recognized that the natural environment is the basis of all production, continued degradation of the environment and natural resources constitutes a major challenge to economic development. Increasing population, changing patterns of human settlement, expansion of urban environments, unsustainable land-use systems and industrialization all pose serious threats to the environment across the country.

¹⁷⁵ Ibid, p. 4.

¹⁷⁶ Stockholm Environment Institute, *Economics of Climate Change in Kenya*, (Oxford, 2009), p. 16.

¹⁷⁷ GoK. Report by the Ministry of Agriculture, Ibid, p. 12.

Kabubo-Mariara and Karanja observe that until towards the last decade of twentieth century, environmental management was largely viewed as unrelated to economic development. This contributed to unsustainable development patterns through accelerated land degradation from deforestation, desertification, and soil degradation, loss of biodiversity, climate change and industrial pollution.¹⁷⁸ As a result the large section of the population that depends on the natural resource base for survival has since been trapped in poverty.

Kenya's agriculture is mainly rain fed and is entirely dependent on the bimodal rainfall in most parts of the country. The performance of rain fed agriculture varies due to the diverse agro-climatic zones. In the humid, high-altitude areas productivity as well as predictability of a good crop is high. However, the population density in these areas has increased and land has been subdivided into such small sizes that it is becoming uneconomical for farm enterprises. According to Rarieya, land subdivision should be restricted and farm enterprises should be intensified in order to mitigate the problem subdivision of land to very small sizes.¹⁷⁹

Rarieya further observes that in the medium altitude and moderate-rainfall areas, arable rain fed farming is moderately suitable. However, there is a relatively high risk of crop failure due to increased frequency of dry spells and an uneven rainfall distribution. Better selection of crops, adoption of improved technologies and better crop husbandry is required for purposes of increasing productivity in these areas.¹⁸⁰

Droughts are frequent in ASALS and crops fail in one out of every three seasons. Most of the area is rangeland suitable for ranching and pastoralism. Farm enterprises comprise mixed crops and livestock. While there is ample land, farmers tend to grow crops that are not suitable

¹⁷⁸ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," CEEPA Discussion Paper No. 12 (2006), p. 19.

¹⁷⁹ J. Rarieya. *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, (New York: Rensselaer Polytechnic Institute, 2007) p 68

¹⁸⁰ *Ibid*, p. 101.

for this rainfall regime or for the soils. These areas require better planning, careful selection of farm enterprises and greater investment in infrastructure.

The Ministry of Agriculture in its report states that the Government has made effort to harmonize and prioritize the development of ASALs through the establishment of the Ministry of Development of Northern Kenya.¹⁸¹ As reported by the Ministry of Agriculture, Kenya is classified as one of the water-deficient countries in the world. Water resources are unevenly distributed in space and time with about 56 per cent of all the country's water resources being Lake Victoria basin.¹⁸² Water availability is scarce although there are water basins especially emanating from the highlands.

Consequently, the country's irrigation-based farming is still limited. Irrigation agriculture in Kenya is carried out mainly in irrigation schemes and in large-scale irrigation of crops such as rice and coffee. Individual farmers have developed their own systems of irrigation especially for export crops such as horticulture. Large commercial farms account for 40 per cent of irrigated land, smallholder farmers 42 per cent, and Government-managed schemes 18 per cent.¹⁸³

The Ministry of Agriculture in its report states that, with a national average rainfall of 400 mm, the country should be able to harvest and store adequate water for agriculture and other uses. Groundwater resources that can be exploited for agriculture need to be assessed and quantified.¹⁸⁴ More land can be reclaimed for crop cultivation by developing irrigation infrastructure in the ASALs. It is estimated that intensified irrigation can increase agricultural productivity fourfold and, depending on the crops, incomes can be multiplied 10 times.¹⁸⁵

¹⁸¹ GoK. Report by the Ministry of Environment and Mineral Resources, *National Climate Change Response Strategy*, (2010), p. 4.

¹⁸² *Ibid*, p. 11.

¹⁸³ GoK, National Irrigation Board Development Plan, 2010.

¹⁸⁴ *Ibid*, p. 11.

¹⁸⁵ *Ibid*, p. 12.

4.3 Agriculture major source of Economy in Kenya

Any given economy is a result of the process that involves its technological evolution, history and social organization as well as its geography, natural resources, labor capital and the trade and distribution all this depending on the country and the various elements that affect the particular state and the policies. Environmental degradation in diverse parts of developing or indeed the industrialized world affects the political and security interests of the developed countries. They add that the most important aspect of increased globalization derives from the close relation ship between the generation of environmental problems and the workings of the now effective globalized world economy.

Kenya's economy is market-based, with a few state-owned infrastructure enterprises, and maintains a liberalized external trade system. The country is generally perceived as Eastern and central Africa's hub for Financial, Communication and Transportation services. As at May 2010, economic prospects are positive with 4-5% GDP growth expected, largely because of expansions in tourism, telecommunications, transport, construction and a recovery in agriculture. These improvements are supported by a large pool of English speaking professional workers. There is a high level of computer literacy, especially among the youth.

The government of Kenya has generally been perceived as investment friendly and has enacted several regulatory reforms to simplify both foreign and local investment. An increasingly significant portion of Kenya's foreign inflows is from remittances by non-resident Kenyans who work in the US, Middle East, Europe, Asia and Antarctica. Compared to its neighbors, Kenya has a well-developed social and physical infrastructure. It is considered the main alternative location to South Africa, for major corporations seeking entry into the African continent.

After independence, Kenya promoted rapid economic growth through public investment, encouragement of smallholder agricultural production, and incentives for private (often foreign) industrial investment. Gross domestic product (GDP) grew at an annual average of 6.6% from 1963 to 1973. Agricultural production grew by 4.7% annually during the same period, stimulated by redistributing estates, diffusing new crop strains, and opening new areas to cultivation. Between 1974 and 1990, however, Kenya's economic performance declined.

Kenya's inward-looking policy of import substitution and rising oil prices made Kenya's manufacturing sector uncompetitive. The government began a massive intrusion in the private sector. Lack of export incentives, tight import controls, and foreign exchange controls made the domestic environment for investment even less attractive.¹⁸⁶ Affluence of industrialized countries on the other hand contributes to environmental degradation through high and unsustainable levels of energy consumption and depletion of natural resources.

There are concerns regarding the understanding of sustainable development as a global issue, gauging from the current trends of poverty and affluence. This is brought about by the high levels of economic interdependence. Sustainable development should therefore reflect on the distribution of wealth, power and resources. Also, if the local quality of life could be improved, economic development would be enhanced¹⁸⁷ its scope includes the process and policies by which a nation improves the economic, political, and social well-being of its people¹⁸⁸. Economic development is born from the concept of national interest which refers to goals and ambitions of a country whether military economic or cultural.

¹⁸⁶ Himbara, David (1993). "Myths and Realities of Kenyan Capitalism". *Journal of African Political Economy* 31 (1): 93-107.

¹⁸⁷ Blair, John and Michael Carroll. *Local Economic Development: Analysis, Practices, and Globalization*. Sage Publications, 2009

¹⁸⁸ O'Sullivan, Arthur; Steven M. Sheffrin (2003). *Economics: Principles in action*. Upper Saddle River, New Jersey 07458: Pearson Prentice Hall. pp. 471. ISBN 0-13-063085-3.

From this perspective, economic development can be viewed as one of the pillars of a country's national interest. According to Morgenthau the national interest of a state, is multifaceted in the sense that it determines state's survival through pursuit of wealth, economic growth and power.¹⁸⁹ In that basis, economic development of a state is closely linked with sovereignty principle. As Crawford, examines that sovereignty of state is rooted in the Westphalia Treaty of 1648 which established the modern state system that endowed states with rights which include equality status, independence and absolute jurisdiction within its territories.¹⁹⁰ Waltz supports the argument by observing that sovereignty is the notion behind the cardinal rule of non-interference principle.¹⁹¹

The contemporary international system is widely influenced by Westphalia Treaty of 1648 and as a matter of fact the Montevideo Convention on the Rights and Duties of states of 1933, expounded on the same principles as embodied in the former. Article one of the Montevideo Convention defines a state as consisting of four principles; a permanent population, a defined territory, government and capacity to enter into relations with other states.¹⁹²

Also Shaw observes that states have a sovereign right to their own resources pursuant to their own environmental and developmental policies. However the same should be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.¹⁹³ The correct balance between development and environment protection is therefore vital, a challenge that is facing the international community because it touches on the principle of state sovereignty on one hand, and the need for international cooperation on the other. A country's

¹⁸⁹H. Morgenthau and K. Thompson, *Politics Among Nations: The Struggle for Power and Peace, Sixth Edition*, (New York: Knopf, 1985), p. 57.

¹⁹⁰J. Crawford, *The Creation of States in International Law, Second Edition*, (London: Clarendon Press), pp. 32-36.

¹⁹¹K. Waltz, *Theory of International Politics*, (New York: McGraw-Hill, 1979), p. 26.

¹⁹²See Article 2 of the Montevideo Convention on the Rights and Duties of States, 1933.

¹⁹³M. Shaw, *International Law: Fourth Edition*, (Cambridge, Cambridge University Press, 1997), p. 591.

economic development is related to its human development which encompasses among other things health, education, infrastructure, employment and industrialization. These factors are however closely related to economic growth so that development and growth often go together.

Different models of economic development indicate that growth rate of gross domestic product (GDP) depends positively on the national savings. However Anand and Ravallion argue that the saving rate will only determine the level of income but not the rate of growth.¹⁹⁴ Lucas places emphasis on technological change, innovation and knowledge in attaining sustainable economic development of a state. According to him, labor factor plays a critical role by predicting the flow of knowledge which eventually leads to successful increase in technology.¹⁹⁵

For a long time, development debate has been regarded as niche politics, far removed from the supposedly more important fields of foreign and security policy. Gouldson and Roberts endorses that in an era of mutual dependencies, development cooperation must be central to the quest for a global system built on equity and stability. Because global poverty, state failure, the disintegration of societies and political and religious fundamentalism, are mutually reinforcing development spending especially to achieve the MDGs, is not charity but a prerequisite to safeguard our global future.¹⁹⁶

In light of the Sachs¹⁹⁷ and Annan¹⁹⁸ reports, an international consensus on four development policy strategies to achieve the MDGs include direct poverty reduction and economic growth, more investment in development cooperation, good governance, and partnerships with fast-track countries. However, these approaches according to Sachs and Annan

¹⁹⁴ S. Anand and M. Ravallion, "Human Development in Poor Countries: On the Role of Private Incomes and Public Services," *The Journal of Economic Perspectives*, Vol. 1 No. 7, (1993), pp.133-150.

¹⁹⁵R. Lucas, "On the Mechanics of Economic Development," *Journal of Monetary Economics*, Vol. 1 No. 22, (1988), pp. 3-42. p 6.

¹⁹⁶ A. Gouldson and P. Roberts, *Integrating Environment and Economy*, Ibid, p. 179.

¹⁹⁷ J. Sachs, *The End of Poverty: Economic Possibilities for our Time*, (New York: Penguin Press, 2005), p. 96.

¹⁹⁸ K. Annan, In *Larger Freedom: Towards Development, Security and Human Rights for All*, (New York: UN Publications, 2005), p. 8.

can only be successful in combination with effective environmental policies. Sachs observes that we fundamentally depend on natural systems and resources for our existence and development, and calls for coherence between environmental and development policy.¹⁹⁹ Annan on the other hand clearly identifies the problems associated with development to do with fragmented and weak global governance architecture in the environmental and development spheres.²⁰⁰

Both the Sachs and the Annan reports outline the key elements of a development strategy for the least developed countries (LDCs) which aims to create economic dynamism while directly contributing to improving the living conditions of the poorest. This is an innovative approach, for it helps to end the paralyzing ideological dispute between the protagonists of basic needs strategies on the one hand and pure growth-oriented approaches, on the other. They argue that an MDG-oriented development policy must focus on their

4.4 Agriculture as Green Economy for Kenya

Agriculture continues to be the leading sector in the Kenyan economy in terms of its contribution to real GDP. It contributed 36.6% of GDP in the period 1964–74, 33.2% in 1974–79, 29.8% in 1980–89, 26.5% in 1990–95 and 24.5% in 1996–2000. Only 12% of Kenya is considered high potential for farming or intensive livestock production. A further 5.5%, which is classified as medium potential, mainly supports livestock, especially sheep and goats. Only 60% of this high and medium potential land is devoted to crops (maize, coffee, tea, horticultural crops, etc.) and the rest is used for grazing and forests.

In examining the factors of economic development, Mansell and Wehn state that the scope of economic development includes the process and policies by which a state improves the

¹⁹⁹ J. Sachs, *The End of Poverty: Economic Possibilities for our Time*, Ibid, p. 103.

²⁰⁰ K. Annan, In *Larger Freedom: Towards Development, Security and Human Rights for All*, Ibid, p. 9.

welfare of its people through economic, political and social processes.²⁰¹ Economic development in Kenya is largely determined by agriculture which is characterized by provision of raw materials, labor force, food security and exportation of agricultural products. According to Kabubo-Mariara and Karanja Kenya's foreign exchange is largely derived from Tea, Coffee and other Horticultural exports.

Pearce posits that whatever choice we make about land use involves a cost: If we develop the land, the cost is the forgone value of conservation. If we conserve the land, the cost is the forgone benefit of development. In both cases, those sacrifices involve offence to moral principles. Economic cost is not a matter of mere money, but a matter of rights and obligations and moral value too.²⁰²

Agriculture through environmental diplomacy is thus seen as the green economy for Kenya because it helps protect the land and hence productive agriculture through some of the policies and decisions made to fight climate change and also extensive researches that promote better agricultural practices. As with most states, Kenya's foreign policy has been influenced by the new phenomenon that now characterizes international diplomacy. In its navigation of the international system, Kenya has applied a range of foreign policy strategies, among them the diplomacy of conflict management and economic diplomacy, in its engagement with regional economic regimes such as the East African Community (EAC) and the Common Market for Eastern employed other forms of diplomatic engagement, better understood as foreign policy's 'soft power' tools, which have been very effective tools. In the application of these various foreign policy instruments, 'the environment' has become a consistent standard.

²⁰¹ R. Mansell and U. Wehn, *Knowledge Societies: Information Technology for Sustainable Development*, (New York: Oxford University Press, 1998), p. 19.

²⁰² D. Pearce, *Economics and Environment: Ecological Economics and Sustainable Development*, (Massachusetts: Edward Elgar Publishers, 2000), pp. 25-26.

As part of Kenya's engagement as a legitimate third party or mediator in protracted conflicts in countries such as Somalia and Sudan, the mediation variables it has to contend with cut across contestation for natural resources by the different protagonists. Environmental conflict management has therefore become a major component of the country's diplomatic efforts. Similarly, in Kenya's participation in trade rounds and regional economic blocs, such as the World Trade Organization (WTO), environmental issues ranging from sustainable development to GMO and bio-piracy have become topics for debate and negotiation. The same applies to the implications of climate change discussed at the Kyoto rounds. In essence, the environmental diplomacy pillar is intertwined with all other pillars that define Kenya's foreign policy.

On the other hand, Vig and Axelrod examine that moral views surrounding development debate imply that conservation values are above or superior to those other values, which supposes a world of frustrated demands that sooner or later will destroy the resource. And this much has now been understood by the position conservation activists are taking who no longer speak of outright prohibition of land use, but speak of sustainable use.²⁰³

Attaching economic value to environmental assets, and appropriating the value through markets and bargains, also has potentially immense scope for saving environmental assets. Herrick and Kindleberger advances the debate of attaching economic value to environment by acknowledging that all cost is opportunity cost and opportunity cost embodies potential rights and obligations. The argument states that we should target certain expenditures and direct them to conservation because those expenditures have lower value.²⁰⁴

Protection of watersheds, control of soil erosion, maintenance of wetlands, protection of natural forests and biodiversity, supporting natural wildlife are all common development

²⁰³ N. Vig and R. Axelrod, *The Global Environment: Institutions, Law and Policy*. (London: Earthscan, 1999), p. 253.

²⁰⁴ B. Herrick and C. Kindleberger, *Economic Development*, (New York: McGraw-Hill, 1983), p. 6.

objectives that entail some contribution from agriculture. Pilot schemes on payment for ecological services and community carbon sequestration have shown considerable promise. Weather-related hazards already present a serious threat to agriculture. These will be potentially exacerbated by a mix of climate and socio-economic change. However, the prediction of these effects is extremely complex. The dominant farm type is a smallholding, 0.9 hectares (ha) being the average size presently.²⁰⁵

Net revenue is defined as gross revenue less all total variable costs, costs of hired labor, farm tools, machinery, fertilizers and pesticides. Costs of household labor are not netted due to difficulties of accurate measurement. Household wage rates for adults and children have been added as independent variables. On average about 90% of all Kenyans are engaged in farming.

Environmental diplomacy in Kenya has really evolved. And whether we realize it or not, environmental diplomacy must succeed and is needed in Kenya. Agriculture being one of the main economic activities is therefore necessary to collaborate for the economy to thrive. This is because more and more initiatives target the wise use of natural resources and technological advancements that reduce overdependence on the non renewable sources of energy and thus foster green economy.

4.5 Measures taken to protect the environment

The response to extreme climate events which have had negative socio-economic impacts on almost all sectors including energy, health, agriculture, livestock and hydropower generation among others require the establishment of mechanisms that might enable states to adapt to climate variability. Falk observes that the UN system promotes and supports the development of national strategies on adaptation to address both short and long term needs, policy decisions and

²⁰⁵ Ibid. p. 23.

operational programmes on relevant sectors.²⁰⁶ During the research interview section we asked about measures taken to protect the environment and there this study will at two measures, adaptation and sustainable development. The study will however focus on the latter because that is where it highly recommends for this study in overall.

4.5.1 Adaptation

Adaptation could bring larger benefits and bring them quicker, because any significant benefits from emission reductions, regardless of their stringency, will be delayed by decades (due to the inertia of the climate system). Focused adaptation can be generalized beyond hunger, malaria and coastal flooding if we focus on reducing vulnerability or increasing resiliency to any climate-sensitive problem that could be exacerbated by climate change.²⁰⁷ Another critical advantage of adaptation is that it can capture the benefits of climate change while reducing its costs, whereas mitigation would indiscriminately reduce both the positive and the negative impacts of climate change. That is, mitigation is a double-edged sword, whereas adaptation is a scalpel.

The response to extreme climate events which have had negative socio-economic impacts on almost all sectors including energy, health, agriculture, livestock and hydropower generation among others require the establishment of mechanisms that might enable states to adapt to climate variability. Falk observes that the UN system promotes and supports the development of

²⁰⁶ A. Falk et al. *The United Nations and a Just World Order*, (New York: West View Press, 1991), p. 20

²⁰⁷ Dealing with climate change in the context of other, more urgent threats to human and environmental well-being
Posted on May 6, 2009 by Indur M. Goklany (guest)

national strategies on adaptation to address both short and long term needs, policy decisions and operational programmers on relevant sectors.²⁰⁸

Adaptation to climate change is one of the greatest challenges facing the world today and more so in the developing countries. Lobell and Burke examine that coupled with poverty; adaptation to climate change remains an uphill task in the achievement of sustainable economic growth. Improved technology transfer such as more reliable long-term weather forecasting will contribute to reducing current vulnerability of poor and food insecure rural households and will be critical to their ability to adapt to future changes.²⁰⁹

The potential for autonomous adaptation according to O'Neill depends on affordability of such measures which include changes in crops and crop varieties, improved water management and irrigation systems, and changes in planting schedules and tillage practices.²¹⁰ Most of these adaptation opportunities are being applied by farmers where there is access to the right information and tools. Carter adds that adaptation to climate change should include capacity building of local communities to manage water resources and increase resilience to droughts and floods.²¹¹

Thus, we saw previously that climate change would reduce both the net population at risk of water stress, and habitat converted to cropland. Both these benefits of climate change would be lost under mitigation. On the other hand, adaptation would more selectively capitalize on these positive impacts. In addition, focused adaptation would be more economic than emission reduction. The Kyoto Protocol, despite its minimal effectiveness, is estimated to cost around

²⁰⁸ A. Falk et al, *The United Nations and a Just World Order*, (New York: West View Press, 1991), p. 20.

²⁰⁹ D. Lobell and M. Burke, *Climate Change and Food Security: Adapting Agriculture to a Warmer World*, (Stanford: Springer Science+Business Media, 2010), p. 133.

²¹⁰ K. O'Neill, *The Environment and International Relations*, Ibid, p. 110.

²¹¹ N. Carter, *The Politics of the Environment: Ideas, Activism, Policy*, Ibid, p. 98.

\$165 billion annually. Although the cost of rolling the climate back to its 1990 level has never been estimated, suffice it to say that it should cost orders of magnitude more.²¹²

4.5.2 Sustainable development

It has been observed that since the beginning of the twentieth century, the world's population has more than three times, economy has grown twenty fold and industrial production has gone up tremendously.²¹³ However much of these developments are unsustainable thus cause impact on the environment. The remarkable increase in the scale of human impact on the environment coupled with inadequate understanding of ecological processes contribute to environmental degradation globally, ranging from *inter alia* deforestation, water and fuel scarcity, desertification and global warming.

Sustainable development refers to a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present but for a generation.²¹⁴ This means that the environment will not be compromised. This came about from the growing concerns accelerated deterioration of the human environment and the natural resources and consequences on the economic and social society.

Sustainable development is therefore needed for sustainable agriculture. From the start of international environmental diplomacy in the early 1970s, developing countries have demanded differential treatment when it comes to specific legal obligations and international environmental aid. As Lavanya Rajamani demonstrates, they were successful in establishing, within the context

²¹² Dealing with climate change in the context of other, more urgent threats to human and environmental well-being
Posted on May 6, 2009 by Anthony Watts

²¹³ Hurriel, A. and Kingsbury, B; *the international Politics of the Environment*. Clarendon Press. Oxford, 1992, Pg 2

²¹⁴ The world commission on Environment and Development (1987), Brundtland Redefined sustainable development to what is now known as today, following a report that was published from the Brundtland commission which was convened by the United Nations in 1983

of climate policy and elsewhere, the principle of 'common but differentiated responsibilities and respective capabilities' and gained important concessions in a number of environmental regimes. This principle has come under attack, however, in recent years as the United States and other industrialized countries have challenged its application in the climate regime.²¹⁵ Rajamani traces the evolution of this conflict and the gradual but seemingly unstoppable retreat of differential treatment in international environmental law.

Some of the conventions that have proven to succeed in sustainable development are the 1987 Montreal protocol on substances that deplete the Ozone layer. This was viewed as a major achievement in the struggle for the preservation of the global environment. It was argued that the depletion of the Ozone by industrial Chlorofluorocarbons (CFCS) was a global environmental issue at a global scale.

In Kenya sustainable agriculture has really picked up with farmers realizing how effective and productive it can be. Sustainable agriculture methods, which include organic farming and crop rotation (the successive planting of different crops on the same land to enhance soil fertility and reduce pest and disease damage), are providing very satisfying results for many small farmers around the world. In 57 of the world's poorest regions, small farmers who use sustainable agriculture techniques have increased their yields by 71 percent, according to a report by a team of international scientists who evaluated more than 280 agricultural projects in the world's poorest countries over a four-year period.

Sustainable agriculture is an emerging issue because farmers who practice sustainable agriculture methods use few or no pesticides, they can avoid that expense. Organic farming also requires less water, because soils that are high in organic material are much more efficient at

²¹⁵ L. Rajamani, 'The changing fortunes of differential treatment in the evolution of international environmental law' 461 *International Affairs* 88: 3, 2012 Copyright © 2012 The Author(s). International Affairs © 2012 The Royal Institute of International Affairs.

holding water than poorer soil. High-quality soil is better able to deal with drought conditions, a major consideration in many impoverished nations, especially in Kenya.

It can be cited that the greatest impact in embracing sustainable development has been from the non-state actors and their proliferation in the southern states for example, WWF-World Wildlife Fund and now referred to as Wild Wide Fund for nature. Participation has also diverged to economy players incorporating sustainable development practices within their Corporate Social Responsibility (CSR). Activities include among others, tree planting, recycling, and water conservation. Gains are then attributed to human security in whole but with focus on the environment and sustainable development.

Organic farming is often more labor intensive than conventional farming, especially in the beginning stages. However, because organic farming typically involves crop rotation throughout the year, farmers have more evenly distributed planting and harvesting schedules and better distribution of labor. Crop rotation spreads out the risks of crop failure; it can also make farmers more competitive in the marketplace if they sell some of their produce, and provide them and their families with a more nutritious, varied diet.

According to Hurrell issues like the economic development of the South, population growth, the spread of democracy, human rights and last but not least the looming global environmental crisis quickly became the focus of international agenda.²¹⁶ Toman observers that environment and development policy were put at the top of the international agenda in 1992, when the United Nations (UN) organized the earth Summit in Rio De Jenairo, one of the largest meetings of heads of state and government.²¹⁷

²¹⁶A. Hurrell and B. Kingsbury, *The International Politics of the Environment*, (Oxford: Claredon Press, 1992), p. 2.

²¹⁷M. A. Toman, *Climate Change: Economics and Policy*, (Washington D.C: RFF Press, 2001), p. 99.

Maria Ivanova, in contrast, focuses on the intergovernmental agenda of the Rio+20 conferences. In 'Institutional design and UNEP reform: historical insights on form, function and financing', Ivanova reviews the preparatory negotiations on UNEP reform and finds that current debates largely mirror those of the early 1970s when UNEP was created. She urges policy-makers to learn the lessons of history and focus on the functions that the international environmental body can realistically be expected to perform. Her analysis thus runs counter to the widespread perception of UNEP as a weak and ill-designed international body. Ivanova concludes by arguing for a more modest institutional reform agenda focused on strengthening the existing institution and improving its links with other elements of the UN system.²¹⁸

Given this complexity therefore, and imperfect knowledge, the focus has been on using methods and developing theories consisting of plausible, generalizable causal mechanisms and not simple specific predictions as well as on diagnostic frameworks of potential intervention points rather than on ostensibly universal and precise policy change packages. According to Abbot on how international organizations can improve this situation. Given the constraints within which they operate, international organizations should have recourse to coordination mechanisms, either in the form of 'regulatory cooperation', which allows them to influence the behavior of private actors directly, or through 'orchestration' efforts, which rely on intermediary bodies as regulatory conduits.²¹⁹

And although the Millennium Declaration explicitly recognizes respect for nature, the Millennium Development Goals (MDGs) fall short of what is required from an environmental perspective. Their strong focus on social policy deficits implies that poverty reduction can be

²¹⁸ M. Ivanova, 2010. "UNEP in Global Environmental Governance: Design, Leadership, Location," in *Global Environmental Politics*, 2010, Vol. 8, Issue 1, p. 30-59.

²¹⁹ K. Abbot, 461 *International Affairs* 88: 3, 2012 Copyright © 2012 The Author(s). International Affairs © 2012 The Royal Institute of International Affairs.

achieved irrespective of the condition of the world's natural life-support systems. But on the contrary: the objective of ecologic sustainability is a key prerequisite for the attainment of the other goals.

4.6 Other Issues

Agriculture in Kenya is the main mandate of the Ministry of Agriculture. However, other ministries such as the Ministry of Environment and Mineral Resources, Ministry of Lands and Ministry of Foreign Affairs may at times have to work hand in hand with the Ministry of Agriculture on policy issues. Since agriculture majorly contributes to the economic development of Kenya, the Government of Kenya (GoK) has developed a strategy for economic recovery. The decline in economic growth was evident in the previous chapter and a number of factors including decline in agricultural productivity contributed to such decline. Through economic recovery strategy, the GoK emphasizes economic growth and creation of wealth and employment as means of eradicating poverty and achieving food security.²²⁰ The strategy identifies agriculture as the leading productive sector for economic recovery and also takes cognizance of the fact that revival of agricultural institutions and investment in agricultural research and extension are critical and essential for sustainable economic growth.

According to the same report, the GoK developed and launched the strategy for recovery of agriculture in 2004 with the aim of transforming Kenya's agriculture into a profitable, commercially-oriented and internationally and regionally competitive economic activity that provides high-quality, gainful employment to Kenyans.²²¹ The same objective is to be achieved within the framework of improved agricultural productivity and farm incomes, while conserving the land resource base and the environment. As regards the enhancement of agricultural

²²⁰ Report by the Ministry of Agriculture, *Agricultural Sector Development Strategy: 2010-2020*, (GoK: 2010), p. 7.

²²¹ Ibid. p. 3.

productivity. Ngaira observes that a paradigm shift from subsistence agriculture to agriculture as a business that is profitable and commercially oriented should be adopted. This will assist in reducing poverty because it is the most important economic activity the poor in the rural areas rely on for a livelihood.²²² He further observes that in promoting agriculture as a commercial business, it has emerged that marketing and associated infrastructure is critical. Cooperative societies that deal with marketing of farmers produce need to be revived and made efficient and effective. Other marketing infrastructure, such as wholesale and retail markets need to be established across the country.²²³

The strategy in addressing the need to increase production, concentrates in reviving agricultural institutions that provide services to Kenyan people. Institutions that were on the verge of collapse and have since been revived are the Kenya Meat Commission, the Kenya Cooperative Creameries, the Kenya Seed Company, the Agricultural Finance Corporation, and the Agricultural Development Corporation. Institutions that were considered moribund and dysfunctional, such as research and extension services with their subcentres, training centres and tractor hire are now vibrant and providing services to farmers.²²⁴

Rarieya²²⁵, Kabubo-Maria and Karanja²²⁶ observe that, the impact of climate change and external factors such as high cost of inputs, crop yields on smallholder farms have affected agricultural productivity. However the strategy for revival of agriculture has employed better technology transfer and extension services to increase production. As a result, the strategy examines that the average yield of maize has increased from 1500 to 3000 tonnes per hectare in

²²² J. Ngaira, "Challenges of Water Resource Management and Food Production in Changing Climate in Kenya," *Journal of Geography and Regional Planning*, Vol. 2 No. 4, (2009), pp. 79-103, p. 83.

²²³ *Ibid.*, p. 87.

²²⁴ GoK, Report by the Ministry of Agriculture, *Ibid.*, p. 17.

²²⁵ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, *Ibid.*, p. 6.

²²⁶ J. Kabubo-Mariara and F. Karanja, "The Economic Impact of Climate Change on Kenyan Crop Agriculture: Ricardian Approach," *Ibid.*, p. 9

the past decade.²²⁷ Furthermore, the yield for medium and large-scale farmers has increased by a higher margin due to use of high-yielding varieties and better agronomic practices. The other approach of enhancing productivity in agriculture by the GoK has been the Development of policies and legislation. According to the report by the Ministry of Agriculture, over 15 policies and 6 pieces of legislation have been developed so far and are being implemented. They include, *inter alia*, the Seed Policy, the Food Security and Nutrition Policy, the National Dairy Development Policy, the National Agricultural Sector Extension Policy, the Cotton Act 2006 and the Cooperatives Policy.²²⁸

4.7 Conclusions

Unlike the other MDGs, however, very few quantifiable and substantive targets or a fixed timetable have been set for ecologic sustainability, with the result that – also in the view of UNEP and UNDP – it remains rather vague. A clearer definition of the environmental policy dimension of sustainability, taking account of the systemic interactions between poverty economic empowerment and respect for the global environmental balance, is a key priority.

Achieving the ultimate objective of environmental diplomacy and economic development by addressing climate change requires technological innovation and the rapid and widespread transfer and implementation of technologies and know-how for mitigation of greenhouse gas (GHG) emissions as well as technologies for adaptation to climate change. GHG emissions greatly impact on the environment.

Kenya depends on natural environment for economic development through agriculture and tourism among other sectors which are vulnerable to climate change. Current climate variability puts huge stress on agriculture, particularly in the smallholder sub-sector. By and

²²⁷ GoK. Report by the Ministry of Agriculture, *Ibid*, p. 13.

²²⁸ *Ibid*. p. 20.

large, the anticipated effects of climate change need to be factored into poverty reduction strategies and rural development strategies. Of all of the human enterprises, agriculture is the most dependent on the climate. Adaptation and mitigation strategies should not be separate from other planning processes in Kenya for sustainable solutions to be achieved. Mainstreaming climate change planning into other planning processes is the key to successful adaptation and limiting the negative effects of climate

CHAPTER FIVE

CONCLUSIONS

5.0 Introduction

Chapter 4 provided the emerging issues of the impact of climate change on agricultural productivity in Kenya and the view that environmental diplomacy seen as green economy. The chapter also provided an analysis of the relationship between agriculture and economy by establishing that economic growth in Kenya is dependent on agricultural growth. In the same line, in taking cognizance of the importance of agriculture in Kenya, it examined the significance of managing environmental concerns through environmental diplomacy.

This chapter however will look at the findings of the study within the framework of objectives sets and hypotheses developed. It provides a summary of the study chapter after chapter and also the key findings and the recommendations.

5.1 Summary

The first chapter dealt with the background of the study, statement of the research problem, objectives, reviewed the available literature, set objectives and hypotheses. It further provided a theoretical frame work for purposes of guiding the study. The chapter framework is keen on the need to establish and support diplomatic initiatives and global environmental efforts as an evolving system of international governance for the environment.

Chapter two provided an overview of environmental diplomacy, climate change and the agricultural sector in Kenya by establishing a relationship between the entities. The linkage between environment and agriculture sector as a green economy revealed a close correlation and

that pursuit of economic growth must consider environmental aspects. This chapter also established agriculture as major economic activity in Kenya.

Chapter three examined the impact of climate change on agriculture in Kenya during the period between 1963 to 2012. It also highlighted the relevance of agriculture in Kenya as a green economy for Kenya. Environmental diplomacy can also be seen to provide solutions to protect the environment and thus make it a tool for better economy. Chapter four provided a critical analysis of the impact of climate change on agricultural productivity in Kenya from 1963-2012. It also provided the analysis that economic development in Kenya is dependent on agricultural productivity, and further analyzed that agriculture, is the most dependent on the climate.

5.2 Key Findings

The study looked at environmental diplomacy and climate change by examining agriculture as a major economic activity in Kenya and how it has been impacted by climate change since independence (1963-2012). The study indicates that economic development and environment go hand in hand in Kenya and that effective economic development anchors on environmental safeguarding. The study revealed that indeed climate change has affected agricultural productivity between 1963 and 2012. In the early 1970's Kenya had recorded the highest GDP since independence in both agriculture and national economy.

The decline in economic growth towards the end of 1970's to 1980's through to 1990's was attributed to climate variability which greatly affected agricultural productivity. Thus it is found that environmental diplomacy in the eyes of sustainable development thus refers to the use of international relations in advocating for conservation and preservation of the environment. This is played out at varied levels, be it within a state or internationally.

The other key finding from the study is the dependence of Kenyan people on agriculture. This is over 75 per cent of Kenyans engage on agriculture in one way or another. Be it small scale, big scale, industrial or livelihood. In the same regard, agriculture is linked to economic development through earning foreign exchange for Kenya, providing raw materials for industries, providing food security and also providing employment both formal and informal to the Kenyan people.

Poverty is also another finding in the study. This is explained by the above finding on over reliance on agriculture by Kenyan people. Most notably, the poor people engage in agriculture for survival and in so doing they strain the little resources. Closely interrelated with the foregoing is the dependence of agriculture on climate and specifically favorable climate. Whereas climate change has negatively affected agricultural productivity, human activities are also attributed to environmental decline through clearing of forests, burning of fossils and fuels among other activities. As a result, rise in GHG emissions has been recorded contributing to climate change experienced all over the world.

Finally, another key finding and vital to the management of climate change is environmental diplomacy. The continuing environment negotiations and diplomatic initiatives are vital for international environmental governance since no state on its own however powerful, politically or financially or both can manage climate change on its own. The transboundary nature of climate change indicates that a state that has not contributed to environmental degradation might find itself grappling with effects of climate change as occasioned by another state.

As with most states, Kenya's foreign policy has been influenced by the new phenomenon that now characterizes international diplomacy. In its navigation of the international system,

Kenya has applied a range of foreign policy strategies, among them the diplomacy of conflict management and economic diplomacy, in its engagement with regional economic regimes such as the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA). In addition it has employed other forms of diplomatic engagement, better understood as foreign policy's 'soft power' tools, which have been very effective tools. In the application of these various foreign policy instruments, 'the environment' has become a consistent standard.²²⁹

5.3 Recommendations

According to Muthui, Agriculture is undoubtedly the most important sector in the economies of the most non-oil exporting countries. It constitutes 30% of Africa's Gross Domestic Product (GDP) and it contributes about 50% of the total export value, with 70% of the continent's population depending on the sector of their livelihood.²³⁰ On the strength of research findings, and the assessment of agriculture as the main economic activity which is susceptible to climate change and environmental diplomacy as a solution there are several recommendations towards the study.

To begin with, the recommendation regards environmental governance through policy and legislation. Kenya's need to develop a suitable climate change response strategy including a suitable climate change governance framework is needed.²³¹ This is because a lot of respondents linked environmental diplomacy with international organizations and that means that there are no strong frameworks for climate change in Kenya. The same should stem from both the realities of the negative impacts of climate change and from obligations placed upon it by the UNFCCC and

²²⁹ Institute for Security Studies Environmental diplomacy and human security

²³⁰ M. Muthui, KENFAP pg 3

²³¹ GoK. Report on National Climate Change Response Strategy, p. 87.

Kyoto Protocol. This will be the ultimate strategy used to address climate change problems that have already affected many people in Kenya, especially ASALs.

Secondly, given the importance of curbing climate change, it is recommended that the Kenyan government should create a Facility for mobilizing resources for climate change and protection of agriculture activities.²³² This is very important as it will bring together government ministries and departments that offer environmental, developmental and infrastructural services with the aim of addressing climate change woes. Such collaboration is the tool for forging strategic partnerships between the government and non-state actors. This will in the long run promote a low carbon economy and climate change resilient production system in Kenya.

The third recommendations that there is need to mainstream climate change responsive activities in programmes and projects by the GoK through its various ministries. Such responsive activities to climate change will provide information to farmers and land users in general about climate change effects. Rarieya observes that in achieving this objective, most line ministries particularly those offering development and infrastructural services should develop climate change response programmes and projects.²³³

The fourth and very important recommendation is on the need to look at environmental diplomacy as a serious solution to climate change. Therefore there is need to focus more energy and resources on agriculture as the major economic activity in Kenya. According to Ngaira, Agriculture is an important sector to the country's economy and one of the sectors most vulnerable to climate change, there is need to scale up research in agriculture in areas that

²³² Ibid (2010), p. 79.

²³³ J. Rarieya, *Environmental Degradation, Food Security and Climate Change: An STS Perspectives on Sustainable Development in Western Kenya*, (New York: Rensselaer Polytechnic Institute, 2007), p. 109.

respond to climate change including undertaking countrywide assessments to determine regional vulnerability of the sector to climate change elements.²³⁴

Finally, there is need to work fast and in the lines of international diplomacy with the growing urgency of global ecological decline. This will require domestic cooperation with the characteristics of environmental diplomacy and adapting attitudes and strategies accordingly.²³⁵ All the diplomatic efforts and initiatives geared towards addressing ecological decline in the world should focus more on climate change which poses serious threats in future, especially in developing countries.

²³⁴ J. Ngaira. "Challenges of Water Resource Management and Food Production in Changing Climate in Kenya," *Journal of Geography and Regional Planning*, Vol. 2 No. 4, (2009), pp. 79-103, p. 92.

²³⁵ H. French. "Reconciling International Diplomacy with the Growing Concern of Ecological Decline" in AICGS Conference Report. *Environmental Diplomacy*, (Washington, D.C: The Johns Hopkins University Press, 1998), pp13-16. p. 13.

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INTERVIEW QUESTIONS TO THE RESPONDENTS

Dear Respondent,

My name is Ashley Kaei and I am currently studying my Masters at the University Of Nairobi.

Am conducting a research on Environmental Diplomacy and the Agricultural sector in Kenya.

This research is for academic purpose only.

You are kindly requested to answer all the questions as accurately and as honest as possible. All responses you give to the questions will be treated with utmost confidentiality. Kindly write your details in the spaces provided below. **Do not** write your name on this questionnaire. Please fill in all the answers and information in the spaces provided.

Date

Education

Gender

Age

County

Name of the organization (if you have any)

Section one:

Environmental Diplomacy

1. What is environmental diplomacy according to you?

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

2. What is the relationship between environmental diplomacy and climate change?

.....
.....

.....
.....
3. Do you think environmental diplomacy has played a role in addressing global climate change?
Yes No

Kindly explain.....
.....
.....
.....

4. What do you understand by Green economy?
.....

In your own opinion, do you think Environmental diplomacy can be a solution to Green Economy for Kenya? Please explain.
.....
.....
.....
.....

5. Does Kenya have any framework on environmental diplomacy? Yes No

Please explain.....
.....
.....
.....

6. Do you think agriculture have been greatly impacted by environmental diplomacy in Kenya?
Yes No I don't know

Kindly give your reasons.....
.....
.....
.....

Section two:

Agriculture in Kenya

1. Kenya's agriculture has been regarded as the engine of the economy. In your own opinion, what role does agriculture play in the economic development of Kenya?.....
.....
.....
.....

2. What factors have made agriculture the major economic activity in Kenya?.....
.....
.....

3. Is there decline in agricultural productivity since 1963- 2012? Yes No
Kindly explain.....
.....
.....

4. How does climate contribute to agricultural productivity in Kenya?
.....
.....

5. To what extent has the government facilitated sustainable agriculture in Kenya?.....
.....
.....

6. In your own opinion, how do you think sustainable agriculture can be achieved?.....
.....
.....

7. What is the level of reliance on agriculture by Kenyan people?
.....
.....

8. Do you rely on agriculture as a source of income and livelihood? Yes No
Kindly explain.....
.....
.....

Section Three:
Climate Change

1. What are the impacts of climate change on agriculture in Kenya?.....
.....
.....

2. Do you think the impact climate change on Agriculture in Kenya can be can be countered?
Kindly Explain.....

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

3. In your own opinion, what are the major factors that have contributed to climate change in Kenya since 1963 to 2012?

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

4. In your own opinion, do you think climate change affects economic development in Kenya?

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

5. Do you think Kenya is well equipped to manage climate change? Yes No
Kindly explain.....

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

6. What are the government efforts in managing climate change and its effects in Kenya?

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

7. In your own opinion, what measures should be employed in managing climate change?
Give 3.....

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

Thank you for your cooperation.