CLIMATE CHANGE, CONFLICT AND SUSTAINABLE DEVELOPMENT: ISSUES AND PERSPECTIVES IN THE HORN OF AFRICA, 1986 - 2013

CAROLINE KIARIE

R50/68837/2011

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE AWARD OF THE DEGREE MASTERS OF ARTS IN INTERNATIONAL CONFLICT MANAGEMENT TO THE INSTITUTE OF DIPLOMACY AND INTERNATIONAL STUDIES (IDIS), UNIVERSITY OF NAIROBI.

NOVEMBER 2013

DECLARATION

This research project is my original work and has not been submitted for the award of a degree to any other University.

…….. ……

CAROLINE KIARIE **Date**

R50/68837/2011

This research project has been submitted for examination with my approval as the University supervisor.

……. ……

Dr. Ibrahim Farah **Date**

DEDICATION

To my husband, Chris who has always believed in me and encouraged me to be the best that I could be.

ACKNOWLEDGEMENT

I am grateful for the guidance and mentorship of my supervisor Dr. Ibrahim Farah who has been extremely supportive throughout my academic period. I am also grateful for my family and friends who cheered me on, my mother especially who prayed for me and encouraged me when I became overwhelmed. I would also like to appreciate the encouragement and advice received from my colleagues at work and in my graduate class and to acknowledge the critical eye and input from my friend and editor, Christine. Above all, I am thankful to the Almighty God; I have seen His amazing hand throughout my life and I would not be able to have gone through this year without Him. Through His sustenance and grace, I have been able to achieve so much and all glory goes to Him.

TABLE OF CONTENTS

Content **Page**

CHAPTER FOUR
ISSUES AND PERSPECTIVES IN CLIMATE CHANGE, CONFLICT AND SUSTAINABLE DEVELOPMENT IN THE HORN OF AFRICA:A CRITICAL ANALYSIS

CHAPTER FIVE
SUMMARY, KEY FINDINGS AND RECOMMENDATIONS

LIST OF ABBREVIATIONS

AMESD	African Monitoring of the Environment for Sustainable Development
AMCEN	African Ministerial Conference on the Environment
CEWARN	Conflict Early Warning and Response Mechanism.
CCES	Climate Change and Compensation for Environmental Services (Strategic Programme of the GM)
CDM	Clean Development Mechanism
COP	Conference of the Parties
CSO	Civil society organisation
DAC	Development Assistance Committee
ECOWAS	Economic Community Of West African States
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GHG	Greenhouse Gas
GM	Global Mechanism (of the UNCCD)
IFAD	International Fund for Agricultural Development
IFS	Integrated Financing Strategy (of the GM)
INC	Initial National Communication
ICPAC	IGAD Climate Prediction and Adaptation Center
IPCC	Intergovernmental Panel on Climate Change
IGAD	Intergovernmental Authority for Development

LDC	Least Developed Countries
MDG	Millennium Development Goal
NAPA	National Adaptation Plan of Action
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
PRSP	Poverty Reduction Strategy Paper
SADC	Southern African Development Community
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

ABSTRACT

Despite being a global issue and the implications of adversely affecting human life, the debate on climate change has not commanded the kind of global support and legal and structural mechanisms necessary to reverse the changes that years of environmental degradation have had on the climate and the society. Climate change has been allied to be a consequence of increased global warming of which emission of green house gases have played a huge part in. These emissions, scientists have claimed, have been as a result of human activities including industrialization which has increased the carbon component in the air. The model that developed countries applied in the course of their development which focused on industrialization and mass production is the same that the developing countries have been striving towards which essentially means that the world is on a fast, progressive road towards its doom unless an alternative is applied.Alternative development paths affect future climate change as does climate change on the prospects for alternative development paths. The two roads arrive at one impasse; conflict which is the result of the two processes working independent of each other. This study investigated and interrogated the measures that have been put in place towards climate change adaptation in the Horn of Africa sub region vis a vis, the steps towards sustainable development and evaluated them for their feasibility in tandem with each other and within the Horn of Africa context. This was done by exploring a largely qualitative research design with elements of quantitative research design. The study was able to establish and highlight the need to integrate Climate Change into Development and Security policies given the continent's susceptibility to climate change effects as well as the role that development plays in climate change and climate change on security. More critical, it was able to highlight the role and need to have multi-sectoral approaches and the inclusion of multi stakeholders in climate change adaptation and mitigation given the implications of the same to the broader socio, political, economic and security affairs of the sub-region.

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

Climate change poses a serious global and regional challenge to social and economic development. Developing countries have typically born the biggest brunt of the effects of climate change. This despite the fact that they contribute the least to emission of greenhouse gases, are the most vulnerable to the effects of climate change and have the least capacity to adapt to these changes[1]. The Horn of Africa represents a particularly vulnerable constituency because its economies are generally more dependent on climate-sensitive natural resources such as agriculture and pastoralism and because of their limited capacity to cope with the impacts of climate change[2].

There is a direct link between climate change, conflict and development. Adverse effects of climate change undermine economic development, livelihoods and further compromises human security which with interaction with socio-economic and political factors, combusts into intrastate and interstate conflicts as witnessed in the region. Cases such as increased cattle rustling among pastoral communities in Ethiopia, Somalia, South Sudan and Kenya, conflict over diminishing land and water resources such as the Tana River tragedy are all attendant results of climate change.

---

[1] UNDP, *Project: Coping with Drought and Climate Change*, (United Nations Development Program, 2009 p5.
[2] Ibid.

Groups and societies facing dramatic reduction in the quality of life because of changing climate have several coping strategies from which to choose. One of these ways is adaptation. Adaptation is here understood as 'adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities'[3]. The most common forms of adaptation involve pursuing alternate modes of livelihood or finding substitutes for the necessary but increasingly scarce commodity. Often case, adaptation involves mass migration which is normally the precursor to scarcity induced conflicts.

In his 1994 Atlantic Monthly article[4], "The Coming Anarchy", Robert Kaplan popularized the idea that mounting population and environmental pressures can contribute directly or indirectly to conflict. In the article, he asserted that, "The political and strategic impact of surging populations, spreading disease, deforestation and soil erosion, water depletion, air pollution and possibly rising sea levels-development that will prompt mass migration, and in turn incite group conflicts- will be the core foreign policy challenge (in the twenty-first century)". Post 1970 works on the environment and conflict emphasize the role that population growth plays in engendering resource scarcity. This demand-induced scarcity might either force nations to look beyond their borders for resources and hence propel state expansion, or create apprehension amongst population(s) within a nation whom are most affected by this scarcity and create conditions ripe for internal violence.

---

[3] IPCC, *Climate Change (2007): Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press. 2007 p13.

[4]UNEP(1999). Schwartz, Daniel and Singh, Ashbindu. Environmental Conditions, Resources and Conflicts. An introductory Overview and Data Collection, p5.

Population growth is occurring more rapidly in Africa than in other regions of the world, increasing vulnerability to climate change impacts and undermining sustainable development efforts on the continent Indeed, most sub-Saharan development policies note that the region's rapid population growth inhibits efforts to alleviate poverty, ensure food security, preserve the environment, and improve Africans' well-being[5]. The link between population dynamics and sustainable development, including climate change, is therefore critical for the Horn of Africa. This is important given that a large share of the region's population lives in areas susceptible to climate variation and extreme weather events[6].

Climate change and development interact in a circular fashion. Alternative development paths affect future climate change, while climate change impacts on prospects for sustainable development[7]. In the same context, climate change may endanger the success of some development co-operation efforts and vice versa, i.e., some development assistance efforts could (unintentionally) have repercussions for a country's emission levels or mitigation options, as well as exacerbate its vulnerability to climate change[8].

This study seeks to highlight the progress if at all present, towards mitigation and adaptation of climate change in the Horn of Africa, the implications of climate change on

---

[5] *Population, Climate Change and Sustainable Development in Africa, Policy Brief, (*2012). Population Action International and the African Institute for Development, p17.

[6] Ohlsson, Leif,(2003) 'The risk of Livelihood Conflicts and the Nature of Policy Measures Required', in Nicholas N. Kittrie et al., eds , *Seeds of True Peace: Responding to the Discontents of a Global Community*, Washington, DC: Carolina Academic Press, p49.

[7] IPCC (2001), IPCC *Third Assessment Report***.** Climate Change 2001. Working Group II: Impacts, Adaptation and Vulnerability. Chapter 1.

[8] IPCC, *Climate Change (2007): Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* p13.

conflict in the region and feasibility of achieving sustainable development in the Horn of Africa with the current climate change mitigation mechanisms and plans.

1.2 Statement of Research Problem

There is considerable amount of research that links sustainable development and climate change. There is equally a sufficient amount of data to support the reduction of greenhouse gas emissions in the course of development as a measure against the adverse impacts of climate change. Much less attention, however, has been paid to how development can be made more resilient to the impacts of climate change particularly within the context of developing countries. At the global level, policy approaches including the Kyoto protocol[9] have been developed largely within the institutional, economic and political contexts of industrialized countries. Arguments have been made to consider the implications of climate change on a variety of development activities including poverty reduction, sectoral development, and natural resource management which has become to be defined as sustainable development. Bridging the gap between the climate change adaptation and developing communities, has been a challenge particularly within developing countries which already face the adverse effects of global climate change and whose capacities for development leave alone mitigation of climate change are limited. The two communities have different priorities, often operate on different time and space scales, and are not necessarily in tandem with each other.

[9] The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change .It is a legally binding agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2%.

There has been a need to evaluate the significance of development to climate change adaptation and mitigation with operational guidance on how best to adapt to its impacts within the contexts of other pressing social priorities in the Horn of Africa.

1.3 Objectives of the Study

1.3.1 Main Objective of the Study

The overall objective of the study is to interrogate the relationship between climate change, conflict and sustainable development in the Horn of Africa sub-region.

1.3.2 Specific Objectives

The following are the specific objectives of the study

i. Provide an overview on the impact of climate change on conflict and sustainable development in the Horn of Africa sub-region;
ii. Analyze the issues and perspectives in climate change, conflict and sustainable development and their interconnection focusing on the Horn of Africa sub-region;
iii. Evaluate the effectiveness of the structural and legal mechanisms on climate change and the role of sustainable development in climate change adaptation and mitigation.

1.4 Literature Review

This chapter focuses on literature review and analyzes discussions by other scholars and relevant stakeholders in the issues and perspectives on the interlinkages between climate change, conflict and sustainable development in the East and Horn of Africa.

1.4.1 Issues and Perspectives in the East and Horn of Africa

Major political organizations including the European Commission and the Intergovernmental Authority on Development (IGAD) - use the term Horn of Africa to refer to the states of Ethiopia, Eritrea, Somalia, Djibouti, Sudan, Kenya and Uganda [10].

Climate change poses significant threats on ecology and human life worldwide. In the Horn of Africa, the effects of climate change are distinctive given by the region's high poverty levels, weak infrastructure, poor natural resources management and dependence on rainfed agriculture[11]. Climate in the region has shown various changes during the past decades. These changes have included an accelerating rise in night time temperature; an intensifying bipolar rainfall pattern, with increasing rainfall over the northern sector of the Greater Horn of Africa, and declining amounts over the southern sector (large parts of Kenya, Uganda, as well as Burundi, Rwanda and Tanzania; an increase in the frequency of strong rainfalls causing floods; large geographical and temporal variation in the observed rainfall[12].

The Horn of Africa is a region characterized by a particularly large diversity of species and ecosystems. Its population suffers from serious environmental problems as well as chronic food shortages. Plagued by regular droughts, the degradation of natural resources in the region endangers sufficient food supplies to the population. Due to the decline in natural resources in the Horn of Africa, there is a real danger of increasing

---

[10] Reuveny, Rafael (2007) 'Climate Change-Induced Migration and Conflict', *Political Geography* 26(6): p 656–673.

[11] Slingo, J.M., A.J. Challinor, B.J. Hiskins and T.R. Wheeler (2005). "Introduction: food crops in a changing climate" *Philosophical Transactions of the Royal Society*, Series B 360, p. 1983–1989.

[12] Christy, J.R. W.B. Norris, and R.T. McNider "Surface Temperature Variations in East Africa and Possible Causes." *J. Climate,* in press. (2009), p149.

conflicts over natural resources such as water and land. The population in the region (Ethiopia, Eritrea, Sudan, Djibouti, Somalia, Kenya and Uganda) has increased fourfold in the past 50 years and continues to grow rapidly[13]. An increasing demand for natural resources fuelled by population expansion in combination with a dwindling supply of natural resources brought on by ecological degradation augments the propensity of completion for resources which in interaction with social and political conditions can lead to armed conflicts.

Famine and conflicts have been a persistent challenge in the Horn of Africa region. In the 1980s major famine brought the Horn of Africa – and especially Ethiopia and Sudan - in the spotlight of global media attention.[14]. The region has also been ravaged by interstate and intrastate conflicts in the last three decades. Environmental security has a lot of bearing on the peace and security of a region. Khadiagala (2008) asserts that the characteristics of conflict in the Horn of Africa made the development of peace and security mechanisms both more urgent and more difficult than in other regions of Africa[15]. It is important to see the Horn of Africa as a regional security complex, in which the security problems of one region depend very much on the security of all. According

---

[13] Nori M & Davies J,. *Change of Wind or Wind of Change? Report on the e-conference on Climate Change, Adaptation and Pastoralism*, organised by the World Initiative for Sustainable Pastoralism (2007), http://www.iucn.org/wisp/resources/?2339/ 3 April 2013

[14] Healy, S. *Lost Opportunities in the Horn of Africa: How Conflicts Connect and Peace Agreements Unravel.* Published by Chatham House - Royal Institute of International Affairs, London, United Kingdom, 2008, p7.

[15] Khadiagala, G. L. 2008a. Eastern Africa: Security and the Legacy of Fragility. New York: International Peace Institute, p79.

to Barry Busan[16], a security complex is made up of "a set of states whose major security perceptions and concerns are so interlinked that their national security problems cannot reasonably be analyzed or resolved apart from one another". The Horn of Africa, as a security complex means that climatic variances of one country have implications on the security (both physical and human) security of the other states in the region.

1.4.2 The Relationship between Climate change and Conflict

There have been conflicting debates around the implications of climate change on conflicts in the East and Horn of Africa. Barnett & Adger [17] argues that the risks of climate change to social systems is as much about the characteristics of those systems as it is about changes in environmental systems. Few scholars actually claim that there is a direct link between scarcity of renewable resources and armed conflict. Most assessments of the environment and conflict sketch a causal story where scarcity of renewable resources constitute yet another stone to the burden, implying that violence is a probable outcome only in societies already suffering from a multitude of other ills.

Homer-Dixon explains that, 'environmental scarcity is never a sole or sufficient cause of large migrations, poverty, or violence; it always joins with other economic, political, and social factors to produce its effects.' He used the following definition of environmental conflicts, "Environmental conflicts are violent conflicts that are caused by environmental scarcity in interaction with a variety of, often situation-specific, contextual

---

[16] Buzan, Barry. *Regions and Powers: The Structures of International Security.* Cambridge: Cambridge University, 2003.

[17] Baland, J.M., and J.P. Platteau *Halting Degradation of Natural Resources: Is there a Role for Local Communities?* Oxford University Press, Oxford. 2006.

factors[18]. Homer-Dixon adds that as populations increase and economic outputs grow, scarcities will increase sharply. Scarcities arise as a result of environmental stress, mismanagement, high population growth or unfavourable climatic factors and can occur in the following ways; a) where demand for natural resources exceeds supply and as such the resources cannot meet the needs of the people. b) Where natural resources reduce as a result of degradation and c) Where access is restricted or unequally distributed. In each of these cases conflict arises as people compete for the resources available and/or their rights to the resources (especially in the case where they have been marginalized against). Access and control over these resources combined with one or more social/economic factors to elevate friction is what ultimately contributes to conflict. Havalrd Buhaug,[19] explains that disasters are thought to exacerbate conflict risk primarily through reduction in the supply of livelihood resources, economic loss, and weakened government institutions, particularly in societies with pre-existing tensions. He adds that climate change may increase the risk of armed conflict only under certain conditions and in interaction with several socio-political factors[20]. Climate Change is therefore seen to be 'threat multiplier' particularly in already volatile regions, e.g. by decreasing food production and freshwater availability.

McSweeney & Lizcano, agreeing with Homer-Dixon have explained the link as follows; climate change will lead to the depletion of natural resources, which will lead to

---

[18] Homer-Dixon, Thomas F. (1999). Environment, Scarcity, and Violence. Chichester: Princeton UP p 254.

[19] Ibid

[20] Havalrd Buhaug, N. P. (2008). *Climate Change, The Environment and Armed Conflict.* San Fransisco: International Studies Association Convention p 65.

increased demand for reduced supply, which will in turn generate socio-economic tensions leading to violent conflict[21] However, none of the links in this chain of causality is as straightforward as that suggests. First, the impacts of climate change vary from region to region: in some cases there may actually be an increase in rainfall. Second, climate change is only one of a number of factors causing the depletion of natural resources, so it would be incorrect to attribute climate change to conflict. Third, it is not just a simple equation of supply and demand; crucially it is how people manage the reduced supply which will determine if natural resource scarcity generates increased conflict. Lastly, despite the centrality of natural resources to many conflicts, this is only one aspect in a complex web of conflict-generating factors[22]. A new study led by the University of Colorado Boulder[23] which shows that the risk of human conflict in East Africa increases somewhat with hotter temperatures and drops a bit with higher precipitation concludes that socioeconomic, political and geographic factors play a much more substantial role than climate change. According to University of Colorado-Boulder geography Professor John O'Loughlin, "The relationship between climate change and conflict in East Africa is incredibly complex and varies hugely by country and time period." He adds that, "The simplistic arguments we hear on both sides are not accurate, especially those by pessimists who talk about 'climate wars'. Compared to social,

---

[21] McSweeney C, New M & Lizcano G, UNDP Climate Change Country Profiles. Kenya (United Nations Development Programme, 2008), http://country-profiles.geog.ox.ac.uk, 2nd May 2013

[22] Ivan Campbell, S. D. et al (2009). *Climate Change and Conflict. Lessons from community conservancies in northern Kenya.* Nairobi: CDC, IISD and Saferworld, p 9.

[23] O'Loughlin, J. (2012, October 22). *Climate Variability and Conflict Risk in East Africa measured by Boulder team*. Retrieved May 12, 2013, from University of Colorado, Boulder:

economic and political factors, climate factors adding to conflict risk are really quite modest."

The conflict impact of climate change is therefore a function of its interaction with a range of other factors such as economic, political, environmental and cultural. Buhaug[24] adds that almost all accounts of conflict are explained at least partly by scarcity of fundamental resources point to the weakening of the state as an important intermediate development. There are several aspects to this. First, responding to soil degradation, crop failure, or drought is costly, and the poorest and institutionally weakest regimes may simply not be able respond in a manner that satisfies the disgruntled population. Second, increasing climatic variations may affect the redistributive capacity of governments and drain attention and capital away from other important social programs, including health, education, infrastructure, and security.

1.4.3 Climate Change and Sustainable development

The term sustainable development was popularized in Our Common Future, a report published by the World Commission on Environment and Development in 1987. Also known as the Brundtland report, Our Common Future, included the "classic" definition of sustainable development: "development which meets the needs of the present without compromising the ability of future generations to meet their own needs." Acceptance of the report by the United Nations General Assembly gave the term political salience; and in 1992 leaders set out the principles of sustainable development at the United Nations

[24] Ibid.

Conference on Environment and Development in Rio de Janeiro, Brazil[25]. Sustainable development as a concept calls for a convergence between three pillars: economic development, social equity and environmental protection. Nevertheless, despite its wide acceptance and acknowledgement, implementation had proven difficult especially for developing countries. While sustainable development is intended to encompass the three pillars, over the past 20 years it has often been compartmentalized as an environmental issue and this has influenced engagement in the issue. Added to this, and potentially more limiting for the sustainable development agenda, is the reigning orientation of development on economic growth. This has been the framework used by developed countries in attaining their unprecedented levels of wealth, and major and developing countries are rapidly following the same course. Caccia writes that sustainable development has been viewed a balancing act between the economy and the environment meaning that the economy is an entity that is separate from the environment, where the latter inevitably loses out. The problem with such an approach is that natural resources are in imminent peril of being exhausted or their quality being compromised to an extent that threatens current biodiversity and natural environments[26].

Advocates of sustainable development argue that the consideration of environmental factors when pursuing development, as well as economic and social factors, is vital in order to safeguard the ability of future generations to also enjoy an

---

[25] Murphy, J. D. (2010). *Sustainable Development: From Bruntland to Rio 2012.* New York: International Institute for Sustainable Development (IISD).

[26] Murphy, J. D. (2010). *Sustainable Development: From Bruntland to Rio 2012.* New York: International Institute for Sustainable Development (IISD).

increased standard of living. Many anthropologists, however, would dispute the idea that in practice 'environmental' concerns are necessarily congruent with the developmental aspirations of target communities. A distinctive characteristic of the anthropological critique of sustainable development is the argument that sustainable development projects often fail to primarily serve the interests of target communities, and instead conform largely to the desires and expectations of the involved external stakeholders, such as foreign donors, nongovernmental organisations, and the state. This can be explained through sustainable development's particular attention to environmental concerns; this results in the dominant discourse of sustainable development privileging the perspectives of the developed countries[27].

Other critiques of the concept of sustainable development argue that it is too human centric, as if the greater community of life (the flora, fauna and other living organisms), that also need the biosphere and equally demand sustainability, did not exist. Andrews observes that ''sustainable development is primarily symbolic rhetoric, with competing interests each redefining it to suit their own political agendas, rather than serving as an influential basis for policy development. Adams adds to the discussion by questioning if sustainable development should continue to support economic growth at all, given the physical limits of the global ecosystem; while others have suggested that

[27]Smyth, Luke. 2011: "Anthropological Critiques of Sustainable Development." *The Bruce Hall Academic Journal*, p 77-83.

the concept does not give enough attention to the poor and their acute vulnerability to environmental degradation[28].

In conclusion, the concept of sustainable development has faced various challenges of definition and clarity and while good on paper, operational guidance in necessary for its implementation in light of overarching issues that face developing countries. It also needs to be contextualized for developing countries given the challenges that these countries face and the role of the environment in these.

1.4.4 The Horn of Africa's Response to the Climate Change Conundrum

One of the key issues central to the development of environmental conflict management practise has been the environmental security debate. Fronted as early as 1970s, the environmental security debate highlights the relevance of environmental issues to the overall security of the State[29]. The environmental- conflict nexus is a subset of "environmental security"- a field of inquiry that seeks to determine whether or not traditional notions of security (which emphasize countering military threats with military power) should be adapted to include threats posed by population growth and diminishing quality and quantity of environmental goods and services. This query was first launched by Lester Brown in 1977, in an article entitled "Redefining Security'. Herein, he proposed a redefinition of security based on what he perceived as the pre-eminent threat

---

[28] Andrews, R. N. (1997). National environmental policies: The United States. In: M. Jaenicke, & H. J. Weidner (Eds.), National Environmental policies: A comparative study of capacity building,. New York: Springer Verlag, p 19.

[29] Caroline Kiarie, Ibrahim Farah and Peter Durrito. (2013). Environmental conflicts, natural resources and diplomacy in the East and Horn of Africa. *Horn of Africa Bulletin* , p2.

to future human welfare- the increasing gap between supply and demand of environmental resources[30]. Over recent years, climate change and its impacts on security has become a key concern for policy makers around the world. For the Horn of Africa, this concern instigated the formulation of a regional body to address the various climate events such as droughts and floods affecting the allied countries and which had severe impacts on the socio-economic affairs of the allied countries.

The Inter-Governmental Authority on Drought and Desertification (IGADD) was established in 1986, with the objective of addressing environmental crises that led to food insecurity and famine in the Horn of Africa. Because of the prevailing inter- and intrastate conflicts, the impetus for the establishment of IGADD came from UN agencies, which saw the urgent need for a regional coordination agency to address problems of famine and drought. Although individual countries made substantial efforts to cope with the situation and received generous support from the international community, the magnitude and extent of the problem argued strongly for a regional approach to supplement national efforts. The founding members were Djibouti, Ethiopia, Kenya, Sudan, Somalia, and Uganda. In 1993, Eritrea joined the Organization after its independence. Since then and especially in the 1990s, IGADD became the accepted vehicle for regional, security and political dialogue. The Intergovernmental Authority on Development (IGAD) in Eastern Africa was created in 1996 to supersede the Intergovernmental Authority on Drought and Development (IGADD).

---

[30] UNEP (1999). Schwartz, Daniel and Singh, Ashbindu. Environmental Conditions, Resources and Conflicts: An Introductory Overview and Data Collection, p6.

With the inauguration of IGAD, great emphasis was given to the peaceful settlement of regional conflicts as a means for achieving sustainable development. IGAD member states agreed: a) to take effective collective measures to eliminate threats to regional cooperation, peace, and stability; b) to establish effective mechanisms of consultation and cooperation for the peaceful settlement of differences and disputes; and c) to agree to deal with disputes between member states within this subregional mechanism before they are referred to other regional or international organizations. With this aim, three priority areas were identified: conflict prevention, management and humanitarian affairs; infrastructure development and food security; and the environment[31].

IGAD plays a critical sub-regional role in the mitigation and adaptation of climate change. However, one of its limiting challenges over time was the fact that environmental conflict management is a relatively young concept and often characterised by the application of general conflict management principles as opposed to its own principles. When it comes to climate change adaptation, one priority that has not received sufficient attention is transboundary and regional co-ordination. Most climate change action and adaptation plans are at the national level, although many of the impacts of climate change cut across national boundaries. Meaningful integration of a range of climate risks, from flood control to dry season flows to glacial lake hazards, would require greater co-

[31] Mulugeta, Kidist. (2009) *The Role of Regional and International Organizations in Resolving the Somali Conflict: The Case of IGAD.* Addis Ababa: Freidrich Ebert Stiftung,

ordination on data collection, monitoring and policies at the regional level[32]. IGAD Climate Prediction and Adaptation Center is part of the Intergovernmental Authority on Development (IGAD) in Eastern Africa. Set up in 1989 and later as an IGAD institution in 2003, its mission is to foster, through a whole set of programs, sub-regional and national capacity for climate information, prediction products and services, early warning, and related applications as a contribution to sustainable development in the IGAD sub-region.

This study will pursue an analysis of current climate change stakeholders' capacity and efforts in climate change mitigation to establish any gaps in structure, framework and capacity while considering the region's development plans.

1.5 Literature Gap

Sustainable development is not a new concept of development but has had more reflective meaning given the effects climate change has had on the continent in the 21st century. Response to climate change has become an urgent need given the rate at which the earth is warming as well as the already visible effects of climate change such as droughts, floods, tornados etc. There is also an increase of natural resource based conflicts in the Horn of Africa region and while there is no direct link to climate change, their occurrence cannot go unnoticed and is relevant to the discourse on climate change.

---

[32] OCED, March 2006. *Putting Climate Change Adaptation in the Development Mainstream.* Paris: OECD. p6.

Scientists and scholars have been able to recognize the need to integrate Climate Change into Development policies given the continent's susceptibility to climate change effects as well as the role that development plays in climate change and vice versa. The gap has however been in the practise of the policies. One of the major challenges has been institutional capacity and the perceived cost of climate change adaptability. Focus has been on more immediate challenges such as poverty and inadequate infrastructure, which has left Governments and donor agencies few incentives to divert resources to investments that are seen as not paying off until climate change impacts are full-blown. Climate change expertise is typically the domain of environment departments in governments and donor agencies, and such departments have limited leverage over sectoral guidelines and projects. Lack of awareness of climate change within the development community and limitations on resources for implementation are the most frequently cited reasons for difficulties in mainstreaming adaptation to climate change within development activity. This study seeks to highlight the gaps between rhetoric and practice in climate change adaptation within the context of development and conflict in the Horn of Africa. We have substantive theoretical literature on what needs to be done as pertains the adverse climate change effects including the concept and principle of sustainable development but if implementation is a challenge we need to evaluate why. We will also ascertain if the concept of sustainable development for the Horn of Africa has been framed from the lens of its constituents and whether this will have any bearing on solving the challenge of the adverse effects facing the region.

1.6 Research questions

The study answers the following questions:

i. What is the impact of climate change on conflict and sustainable development in the Horn of Africa sub-region?

ii. What are the issues and perspectives in climate change, conflict and sustainable development and their interlinkages focusing on the Horn of Africa?

iii. What the structural and legal mechanisms available in the Horn of Africa as pertains climate change for their effectiveness and the role that they play in sustainable development.

1.7 Conceptual Framework

Climate change has been attributed to both natural and human causes. Beck argues that climate change issues are primarily the product of humans' modernization of science, technology and economics[33]. The relationship between climate change, conflict and development founded on various development theories and conflict theories. There is a direct link between the three paradigms. The process of development has been a major contributor to global warming which is the root cause of climate change. Some scholars argue that climate change has and will continue to reduce the environmental product of the world leading to supply induced scarcity which leads to conflict.

---

[33] Beck, U., 1992. Risk Society: Towards a New Modernity. London: Sage p 40.

In the 1950s and 1960s, development mainly focused on economic growth and increases in outputs based on efficiency theories**.** It was driven primarily by an economic theory of development in which the right quantity and mixture of saving, investment, and foreign aid were all that was necessary to enable developing nations to proceed along an economic growth path that historically had been followed by the more developed countries. One proponent of this school of thought was Rostow who came up with the 'linear stages of growth model'. He argued that the advanced countries, had all passed the stage of 'take-off into self- sustaining growth' , and the underdeveloped countries that were still in either the traditional society or the 'preconditions' stage had to follow a set of rules of development to get into self-sustaining economic growth. This theory was not sufficient as other factors such as structural, institutional and attitudinal variables also contributed to the development process but were not factored in, in the 'linear stages of growth model'. [34]

Another development theory is the structural change theory of development which focused on the sequential process which the economic, industrial and institutional structure of an under-developed economy is transformed overtime to permit new industries to replace traditional agriculture as the engine of economic growth.[35] These paradigms offer an elaborate understanding of development and development regions but are themselves a flawed explanation of the development process. They focused on certain

---

[34] Todaro, M, Smith, S.,2003. Economic Development, Chapter Four, Essex,Pearson Education Limited, p 111-127.

[35] Ibid.

prescriptions necessary for development that focused only on economic growth and that were assumed to hold true for all countries. These prescriptions did not take cognisance of the various diversities between countries. 'Developing regions' or 'developing societies' are cultural and social political constructions. The paradigms also do not offer means of which to sustain the resources that are necessary for the development. This is why new development models and particularly in the Horn of Africa need to be put within the context of the countries socio, political and economic needs. There is a dual relationship between sustainable development and climate change. Climate change influences key natural and human living conditions and thereby also the basis for social and economic development, while society's priorities on sustainable development influence both the green house gas emissions that are causing climate change and the vulnerability of communities[36]. Recognizing the dual relationship between sustainable development and climate change points to a need for the exploration of policies that jointly address sustainable development and climate change.

1.8 Justification of the Study

Most responses to climate change adaptation have been interventions designed based on globalised scenarios. These have largely disregarded local complexities that include the social, cultural and other economic and political realities that drive systems particularly within a developing country context. This study will offer policy proposals on how to marry climate adaptation and mitigation needs and sustainable development goals for the

---

[36] IPCC (2007) *IPCC Fourth Assessment Report***.** Climate Change 2007.Working Group III: Mitigation of Climate Change

Horn of Africa. The findings will address the gaps in structural, legal and legislative mechanisms towards climate change adaptation and mitigation will inform measures for compliance. The findings of the study may also inform policy makers on the effectiveness of several interventions that have been put in place to mitigate climate change. The findings will further assist in seeking ways of addressing such technical factors that hinder compliance of such interventions. It is the aim of the study that the findings of this study will broaden the development visions of the Horn of Africa to one that includes practical measures to protect the environment.

1.9 Research Methodology

The study will explore both qualitative and quantitative research designs. Descriptive survey research design will be used in its both qualitative and quantitative approaches. The study shall use both inductive and deductive research in attempting to find out the implications of climate change on the development road map for specific countries in the Horn of Africa. This will involve getting information from actors dealing with climate change, conflict and sustainable development from Government, Non-Government and Inter-Government Agencies. We shall use a judgmental sampling. This will be applicable because the sample size will be small.

A mix of both qualitative and quantitative methods will be employed to gather primary data and generate findings for this research. The study shall require interviews with various respondents on different agenda items. The respondents will include government officials in relevant ministries and/or institutions; experts/specialists in different fields

and with knowledge on specific agenda items; individuals with key knowledge on certain issues. Secondary data will be obtained by reviewing existing data and reports from the government and other agencies, media reports and reports by nongovernmental organizations. United Nations agencies reports, human rights reports, scholarly articles and journals and other studies.

The study will focus on the period between 1986 and 2012. The period is relevant because it is also marks the entry of a sub-regional body focusing on issues affecting the Horn of Africa in an integrated fashion. The Intergovernmental Authority on Drought and Development (IGADD) was formed in 1986 focusing on issues of drought and desertification. Our main limitation will be accessibility of the information. The study focuses on countries that are outside the domicile of the researcher. The research will therefore rely on regional players based in Nairobi.

1.10 Chapter Outline

The study will have five chapters namely:

- **Chapter One:** Introduction to the Study
- **Chapter Two:** Marrying Theory with Practice: Climate Change, Conflict and Sustainable Development in the Horn of Africa.
- **Chapter Three:** Approaches to Climate Change, Conflict and Sustainable Development in the Horn of Africa.
- **Chapter Four:** Issues and Perspectives in Climate Change, Conflict and Sustainable Development in the Horn of Africa: A Critical Analysis.
- **Chapter Five:** Summary, Key Findings and Recommendations

CHAPTER TWO

MARRYING THEORY WITH PRACTICE; CLIMATE CHANGE, CONFLICT AND SUSTAINABLE DEVELOPMENT IN THE HORN OF AFRICA

2.1 Introduction

Climate change is broadly termed as, any change in climate over time, whether due to natural variability or as a result of human activity.[37] Africa as a whole is one of the most vulnerable continents to climate change mostly because of its multiple stresses and low adaptive capacity.[38] Africa indeed has been considered as the continent which will be most impacted greatly by climate change due to a combination of vulnerabilities[39]. At the same time, Africa's risk of climate-induced armed conflict is often considered high with estimates suggesting a 54 percent increase of violent conflicts in Africa until 2030 compared to 1980-2000[40]

The population of Africa is rapidly growing and urbanizing for the foreseeable future. As that happens, its demand for resources will continue, and increase. Both are major converging trends, which will aggravate the impacts of climate change as well. Generally, Africa is lagging behind other developing continents and regions such as

---

37 IPCC. 2007, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Available from: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf> p 21.

38 Ibid (IPCC, 2007) p13.

39 Oli Brown and Alec Crawford, 2008 "Assessing the Security Implications of Climate Change for West Africa: Country Case Studies of Ghana and Burkina Faso". Available at http://www.iisd.org/pdf/2008/security_implications_west_africa.pdf. p39.

40 Marshall Burke et al.,Warming (2009) Increases The Risk Of Civil War In Africa. In: *Proceedings of the National Academy of Sciences*, 106:49, p 20670-20674,

Asian countries with regard to development. It is also significantly behind schedule regarding the Millennium Development Goals (MDGs)[41]. Most African states currently face difficulties or fail to deliver basic services and their economic growth can hardly substitute by providing the necessary funds. Aside from the political fragility of many countries, violent conflict remains prevalent throughout the continent, with the Sub-Sahel region from Central Africa to the Horn of Africa being particular worrisome. Globally, Africa is therefore seen often as the continent most likely at the risk of violent conflict due to its fragile situations, history of political and ethnic conflict and climate-dependent sectors[42].

This study will continue to discuss and analyze the nexus between climate change, conflict and development. In effect, it will establish if adverse effects of climate change undermine economic development, livelihoods and further compromises human security which with interaction with socio economic and political factors, combusts into intrastate and interstate conflicts as witnessed in the Horn of Africa region.

2.2 Background

Climate change poses significant threats on ecology and human life worldwide. In the Horn of Africa, the effects of climate change are distinctive given by the region's high poverty levels, weak infrastructure, poor natural resources management and dependency

---

[41] Jens Martens. (2007): Armutszeugnis. Die Millenniumsentwicklungsziele der Vereinten Nationen. Available at http://www.globalpolicy.org/eu/de/publ/armutszeugnis.pdf. Accessed 10 December 2012.

[42] Oli Brown and Alec Crawford. (2009) Climate Change and Security in Africa. A Study for the Nordic-African Foreign Ministers Meeting. Winnipeg: *International Institute for Sustainable Development.* p267

on rain-fed agriculture systems[43]. The climate in the region has indeed shown various changes during the past decades. These changes have included an accelerating rise in night time temperature; an intensifying bipolar rainfall pattern, with increasing rainfall over the northern sector of the Greater Horn of Africa, and declining amounts over the southern sector (large parts of Kenya, Uganda, as well as Burundi, Rwanda and Tanzania- identified by an increase in the frequency of strong rainfalls causing floods; large geographical and temporal variation in the observed rainfall[44].

There has been a gradual but definite progress to identifying threats to security such as environmental threats, from the traditional focus on national security being the protection of the territorial integrity and political sovereignty of the state from 'military aggression from other states'. This involved forming alliances and investing a lot on military assets in order to deter potential adversaries and use force effectively when required. However in recent years, there has been increased emphasis placed on expanding the traditional conception of security to include non-conventional threats such as resource scarcity, human rights abuses, outbreaks of infectious diseases, and environmental degradation caused by toxic contamination, ozone depletion, global warming, water pollution, soil degradation and the loss of biodiversity- rather than external threats[45]. These discussions, in turn, have stimulated research on examining the specific relationship between environment and security.

---

[43] Slingo, J.M., A.J. Challinor, B.J. Hiskins and T.R. Wheeler (2005). "Introduction: food crops in a changing climate" *Philosophical Transactions of the Royal Society*, Series B 360, pg. 1983–1989.

[44] J.R. Christy, W.B. Norris, and R.T. McNider (2009)."Surface Temperature Variations in East Africa and Possible Causes." *J. Climate*, in press p 1.

[45] R.H. Ullman. (1983) Redefining security. *International Security* 8(1): p129 - 153.

The meanings attached to the term security range from a narrow state-based definition of safety from armed conflict, to a much broader conception of security as synonymous with human well-being has therefore gained much growth and acceptance. This notion of security has birthed the securitization of environmental sector in understanding the environmental-security nexus. It is important to distinguish between the concepts underlying the terms conflict and security. Conflict, and specifically violent conflict, is an empirical and observable phenomenon. Security, on the other hand, is a subjective and socially-constructed perception that evolves and depends largely on the perspective of the entity (individual, group, state, international, or transnational) being secured and/or providing security. Conflict is a condition commonly considered a threat to security. Hence the terms are often treated together but should not be considered synonymous.

Since the 1990s, a number of researchers have tried to circumvent this discussion by ignoring the term security and concentrating specifically on the role of environmental change and resource depletion as potential causes of violent conflict[46]. Such violent conflict, in turn, could pose a serious threat to the security of individuals, regions and nation-states. The general discussions on the nature of security and the role of environmental degradation as a contributor to insecurity and conflict are discussed by Levy[47] as the first wave of environment and conflict research; while labelling the

---

[46] G. Bächler.. (1998) "Why environmental transformation causes violence". Environmental Change and Security Project Report 4. Washington, D.C.: Woodrow Wilson Center. p 24-44.

[47] M.A. Levy. 1995a. Is the Environment a National Security Issue? International Security 20(2): 35-62.

empirical research that attempted to 'prove' a link between environment and conflict, as the second wave of environment and conflict studies.[48]

Despite the range of case studies that was undertaken, the evidence for a direct causal link between environmental degradation and violent conflict, implied by Homer-Dixon's statement above, remains speculative and anecdotal. It should also be noted that most of the researchers writing in the environment, conflict and security area are from the disciplines of international relations and political science, and deal primarily with issues of state and military security. Their emphasis generally has not been on the interrelationships between environmental change and various aspects of what is being termed human security (that is food security, economic security, political security, and community security, all of which affects both individuals and groups of people). Rather, their research has focused largely on a very limited set of cases dealing with inter- and intrastate violent conflicts and state security. It appears that several types of environmental threats may have the capacity to contribute to insecurity and to produce conflict as well. Constraints on resources are a crucial factor that is often discussed in the literature[49].

The world has come a long way since attention was first drawn to the need to think about the environment and consciously connect the economic, social and environmental components into in integrated development process that is now referred to as sustainable development. Gradually, over the past forty years, global consciousness of

---

[48] M.A. Levy. 1995b. Time for a Third Wave of Environment and Security Scholarship? The Environmental Change and Security Project Report 1: p44-46.

[49] N. Choucri (1991). Resource Constraints as Causes of Conflict. Ecodecision 2: p52-55.

and concern for sustainable development have increased enormously in response to the scale of the environmental and social problems that have arisen worldwide as a result of unsustainable development.[50]

The suggestion to broaden the definition of security to include environmental threats was by no means limited to western origins. Although the report of the World Commission on Environment and Development, 'Our Common Future', is best known for its definition of sustainable development, the Commission also called for recognition that security was partly a function of environmental sustainability. The Commission highlighted the causal role environmental stress can play in contributing to conflict while also stating that "a comprehensive approach to international and national security must transcend the traditional emphasis on military power and armed competition"[51]. Westing[52] elaborates on this statement by noting that comprehensive security has two intertwined components: political security, with its military, economic and humanitarian sub-components, and environment and security, including protecting and utilizing the environment.

There is a growing need to better understand the human sources of environmental change, and the ways in which environmental factors combine with economic, social and political forces to trigger, amplify or cause violence and insecurity. The development community has already demonstrated its awareness of the importance of these linkages, and expressed its commitment to finding effective ways of managing them.

---

[50] Ibid. p53

[51] A.H. Westing,.(ed.). (1989) Comprehensive Security for the Balkans: An Environmental Approach. International Peace Research Institute, Oslo (PRIO), and UN Environment Programme. London: Sage Publications pg301.

[52] Ibid.

Environmental security specialists can contribute to this analysis as well as to the actions that it generates.

It is important to understand that environment and security does not automatically relate to sustainable development, although in practice the concerns of both communities may often intersect. Development implies a gradual improvement in human welfare and the expansion of the opportunities individuals have to live safe, healthy, and dignified lives. Security suggests freedom from danger. At times, this may mean freedom from the things that threaten the process of development or the fruits of development. But security also has a conservative aspect: the development process can become a threat to security insofar as it inadvertently, or intentionally, subverts traditional security mechanisms by redistributing power in a society or region.

Sustainable development is a well-established concept. This study is guided by the definition advanced by the Brundtland Commission: development that "meets the needs of the present without compromising the ability of future generations to meet their own needs".[53] Sustainable development places challenges facing growth and development within the context of the absorptive or carrying capacity of natural ecosystems and recognizes the limits of such systems. It also places emphasis on intra- and intergenerational equity. In the 1970s, the main developmental concern was economic sustainability, with ecologists pointing to the limits of growth. Since then, concerns have shifted to a state of equilibrium that allows environmental issues to be addressed. Thus, the concept resulted from a gradual shift in the focus of development

---

[53] A.H. Westing, (ed). 1986.Global Resources and International Conflict: Environmental Factors in Strategic Policy and Action. Oxford: Oxford University Press, p209.

theories. In the 1950s and 1960s, development mainly focused on economic growth and increases in outputs based on efficiency theories. The analysis of the concept of sustainable development is generally based on three pillars namely: economic, social and environmental sustainability. There is a strong consensus on them in the international community and among development management institutions and development practitioners.

By 2002 more than 95 per cent of African countries had ratified the Rio conventions: the Convention on Biological Diversity, the UN Framework Convention on Climate Change, and the UN Convention to Combat Desertification. National policies and laws relating to environment and development had been agreed upon and international environmental treaties had been signed by most African countries. At the national level, a number of countries had made some progress in developing national policies and laws that addressed issues related to sustainable development. Laws had been promulgated on environmental impact assessment; sustainable use of water, forests, and biodiversity; and management of solid wastes. At the local level, a growing number of sustainable development activities were being implemented in some 28 African countries.

The pursuit of environmental sustainability has been an essential part of the region's effort to reduce poverty, as environmental degradation is inextricably and causatively linked to problems of poverty, hunger, gender inequality, and health. Livelihood strategies and food security of the poor often depend directly on functioning ecosystems and the diversity of goods and ecological services they provide. Insecure rights to environmental resources, as well as inadequate access to environmental

information, markets, and decision-making, limit the capacity of the poor to protect the environment and improve their livelihoods and well-being.[54]

Africa as a case study and particularly the Horn of Africa is of great importance. More than 30 per cent of global dry lands are located in susceptible dry land regions in North Africa, the Sahel and the southern part of Africa. They cover almost two billion hectares in 25 countries, representing 65 per cent of the continent's land mass. Over 400 million people live in the dry lands, the majority of them the rural poor with an annual population growth rate of three per cent. The dry land is under threat from deforestation, soil erosion, nutrient mining, recurrent drought and climate change, potentially resulting in land degradation and desertification, and aggravated poverty. Sustainable agricultural innovations are key to limiting adverse impacts on the environment and on the livelihoods of rural populations[55]. Without complementary societal and government action, markets can be weak on environmental sustainability, and therefore will tend to create the conditions for environmental degradation[56].

Rapid industrialisation and population growth in many regions have resulted in an increased demand for both renewable and non-renewable natural resources and, as Ullman[57] and others have noted, competition for resources has historically been a major cause of conflict. This simple statement seems intuitively reasonable; however, there are some who feel it overstates the importance of resources and the environment as

---

[54] United Nations Economic Commission for Africa (2008). Sustainable Development Report on Africa Five-Year Review of the Implementation of the World Summit on Sustainable Development Outcomes in Africa (WSSD+5). Addis Ababa.

[55] ECA and OECD, (2011) *Interim Mutual Review of Development Effectiveness in Africa* (MRDE), available at http://www.uneca.org/gpad/main110524mrde2011.html

[56] United Nations Development Programme Human Development Report (2010). *The Real Wealth of Nations: Pathways to Human Development*. New York.

[57] R.H. Ullman (1983). *Redefining Security*. International Security 8(1): p129 - 153

contributors to conflict[58] In addition, land degradation, or land use change in general, may directly affect society's ability to provide food resources for a growing population, or may indirectly affect other changes, such as global warming. Homer-Dixon[59] provides some evidence of these relationships and concludes that environmental scarcity (which includes environmental change, population growth, and an unequal distribution of resources) causes violent conflict. While this contention remains open to debate, it is increasingly accepted that environmental degradation is at least a contributor to conflict and insecurity.

The development of the climate change regime in the late 1980s and early 1990s rode a wave of environmental activity, which began in 1987 with the discovery of the stratospheric "ozone hole" and the publication of the Brundtland Commission report, Our Common Future (World Commission on Environment and Development, 1987), and crested at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. An earlier wave of international environmental activity, culminating in the 1972 Stockholm Conference and the establishment several years later of the United Nations Environment Programme (UNEP), had tended to focus on local, acute, and relatively reversible forms of pollution such as, oil spills and dumping of hazardous wastes at sea, by regulating particular pollutants. The more recent cycle of environmental activity has concerned longer-term, irreversible, global threats, such as depletion of the stratospheric ozone layer, loss of biological diversity, and greenhouse

---

[58] R.D Lipschutz. (1995a). *Negotiating the Boundaries of Difference and Security at Millennium's End. In: Ronnie Lipschutz*, ed., On Security, New York: Columbia University Press. p 212-228.

[59] T. Homer-Dixon, Environment, (1999) *Scarcity, and Violence* (Princeton: Princeton University Press.

warming,[60] and has focused not merely on environmental protection per se, but on the more general economic and social policies needed to achieve sustainable development. The development of the climate change regime until the conclusion of the Kyoto Protocol in 1997 can be traced into five historic periods in the 1980s and 90s: 1)the foundational period, during which scientific concern about global warming developed; 2) the agenda-setting phase, from 1985 to 1988, when climate change was transformed from a scientific into a policy issue; 3) a pre-negotiation period from 1988 to 1990, when governments became heavily involved in the process; the formal intergovernmental negotiations phase, leading to the adoption of the FCCC in May 1992; 4) and a post-agreement phase focusing on the elaboration and implementation of the FCCC and; 5) the initiation of negotiations on additional commitments, leading to the adoption of the Kyoto Protocol in December 1997.

Since then, under the umbrella of the United Nations (UN), member states have been making effort to reach into agreements in regard to take measures to combat and deal with global climate change effects. Due to the limited relevance of past and current global climate change agreements to Africa's climate and environmental problems, the hardest hit region has benefited least from the international climate change regime, which relates almost exclusively to funding and investments for green, low carbon growth.

The African political leadership has acknowledged the importance for Africa to actively engage in global climate change negotiations in order to protect the continent's interest. Regional and sub-regional organizations and institutions – the African Union

[60] Ibid.

(AU), United Nations Economic Commission for Africa (UNECA), Africa Development Bank (AfDB), Southern African States development Community (SADC), Economic Community for West African States (ECOWAS) among other, are at the forefront in making efforts to promote Africa's active participation in global efforts to meet climate change adaptation and mitigation objectives which will be relevant to Africa's interests.

The Horn of Africa is a region characterized by a particularly large diversity of species and ecosystems. Its population suffers from serious environmental problems as well as chronic food shortages. Plagued by regular droughts, the degradation of natural resources in the region endangers sufficient food supplies to the population. Due to the decline in natural resources in the Horn of Africa, there is a real danger of increasing conflicts over natural resources such as water and land. The population in the region (Ethiopia, Eritrea, Sudan, Djibouti, Somalia, Kenya and Uganda) has increased fourfold in the past 50 years and continues to grow rapidly[61]. An increasing demand for natural resources fueled by population expansion in combination with a dwindling supply of natural resources brought on by ecological degradation augments the propensity of completion for resources which in interaction with social and political conditions can lead to armed conflicts.

Famine and conflicts have been a persistent challenge in the Horn of Africa region. In the 1980s major famine brought the Horn of Africa – and especially Ethiopia

---

[61] M. Nori & Davies J, (2007), *Change of Wind or Wind of Change? Report on the e-conference on Climate Change, Adaptation and Pastoralism*, organised by the World Initiative for Sustainable Pastoralism http://www.iucn.org/wisp/resources/?2339/ 3 April 2013

and Sudan - in the spotlight of global media attention.[62]. The region has also been ravaged by interstate and intrastate conflicts in the last three decades. Environmental security has a lot of bearing on the peace and security of a region. Khadiagala[63] asserts that the characteristics of conflict in the Horn of Africa made the development of peace and security mechanisms both more urgent and more difficult than in other regions of Africa. It is important to see the Horn of Africa as a regional security complex, in which the security problems of one region depend very much on the security of all. According to Barry Buzan[64], a security complex is made up of "a set of states whose major security perceptions and concerns are so interlinked that their national security problems cannot reasonably be analyzed or resolved apart from one another". The Horn of Africa, as a security complex means that climatic variances of one country have implications on the security -both physical and human security - of the other states in the region.

2.3 Perspectives on Climate Change, Conflict and Sustainable Development

Lives and livelihoods in the Horn of Africa have been severely affected by climate changes such as droughts, which have led to widespread famine. The ensuing loss of household assets, particularly, livestock, means that households face difficulties in rebuilding their livelihoods even after conditions have improved. A review by the

---

[62] S. Healy. (2008). Lost *Opportunities in the Horn of Africa: How Conflicts Connect and Peace Agreements Unravel.* Published by Chatham House - Royal Institute of International Affairs, London, United Kingdom, p64

[63] G.L Khadiagala. (2008a). Eastern Africa: *Security and the Legacy of Fragility*. New York: International Peace Institute.

[64] Barry Buzan. (2003) *Regions and Powers: The Structures of International Security.* Cambridge: Cambridge University.

Institute for Environmental Security (IES)[65] notes the following climatic changes in the Horn of Africa over the past few decades: higher night-time temperatures; an increase in rainfall in the northern areas and a decrease in southern areas; and an increase in wet extremes, often causing flooding. Overall, a continued rise in temperatures is expected, alongside an increase in rainfall, more frequent extreme weather events and rising sea levels, putting large numbers in coastal states at risk from inundation and intensification of storm surges. These climate changes will further affect food security.

Pastoralists and subsistence farmers, who are particularly vulnerable, are likely to form the bulk of eco-migrants in the Horn of Africa. Migration has been linked to an increased risk of conflict, as it often results in people encroaching onto the land of other tribes or groups, amplifying social tensions. This is purported by Hendrix and Glaser who argue that conflict is more likely if climate acts as a trigger (as a result of extremes in climate variability) rather than as a result of long-term trends (climate change). They argue that low rainfall in a given season or year yields a higher probability of causing conflict in the following year than a continuously decreasing trend over decades. Several authors try to establish migration – induced through climate-affected changes in the environment – as the main pathway through which climate change leads to conflict. However, others report rather different findings, arguing that climate change cannot explain Africa's civil wars and that – on the basis of a review of rainfall data for several decades – climate change is not the cause of the Darfur crisis.[66]

---

[65] Van de Giessen, E. 'Horn of Africa: *Environmental Security Assessment'*, Available at: <http://www.envirosecurity.org/espa/ PDF/ESA_HOA.pdf> (2011) Accessed on: 26 July 2013 .

[66] C. Hendrix and Glaser, S. Trends and Triggers (2007): Climate, Climate Change and Civil Conflict in Sub-Saharan Africa. Political Geography, 26 (6), p 695–715.

2.3.1 The Concept of Human Security

Some studies have looked at the relation between climate and the incidence of conflict among pastoralists. One such study[67] found that violent social conflicts (including cattle raiding) in East Africa are most common in wet years. It is not clear, however, whether such a conclusion advances explanation of the link between climate change and conflict, as cattle raiding is linked to complex social traditions such as the payment of dowry to the parents of a prospective bride. The practice seems more related to resource predation than to desperation resulting from resource scarcity. This can be supported by the concept of human security, which refers to the security of individuals and communities, such as, 'freedom from fear': security and 'freedom from want': development. The concept places greater focus on the security of individuals, rather than the state, proposing that the scope of security should be broadened to include seven threats to an individual's or a community's human security namely: economic, food, personal, environment, health, community and political security. In this case, climate change seems to affect recourses that are required by pastoralists and eventually trigger violent social conflict.

Human security is particularly important in Africa as Africa has experienced social, economic, political, environmental and cultural hardships, caused by and resulting in interstate and intrastate conflicts, environmental degradation, poor governance, economic instability, inequality and other issues.

---

[67] C. Hendrix and Salehyan, I. 'The Brewing Storm? Climate Change, Rainfall, and Social Conflict in Africa', Available at: <http://ccaps.strausscenter.org/system/research_items/pdfs/43/original.pdf?>1299598361 (2011) Accessed on:2 December 2012.

Another study[68] analysing data from the Conflict Early Warning and Response Mechanism of the Intergovernmental Authority on Development (IGAD-CEWARN) found that vegetation cover rather than precipitation is associated with a higher incidence of cattle raiding in the Karamoja Cluster, situated in the border zones of Kenya, Uganda, Sudan and Ethiopia. Avoiding detection and a lesser need to water animals while tracking them to another destination may have greater explanatory value than the higher rainfall itself. This is demonstrated by the concept of 'deprivation-vulnerability framework', which is a development-oriented conceptualization to human security that seeks to establish clear research and policy priorities. Busumtwi-Sam argues that human security and human development are mutually fortifying despite both of them being discrete, therefore arguing that human development is a longer-term process that works to improve health and well-being, livelihoods, dignity, survival, safety and knowledge. Busumtwi-Sam[69] further proposes a middle ground between the broad definition of human security and the limited security discourse, so that human security aids in human development and vice versa, rather than replicating each other. In light of the above definition, the deprivation-vulnerability approach proposed considers: 1) Threats: essentially the likelihood of an incident occurring that will cause harm. For the intent of this study, threats also refer to the impacts of climate and environmental change, such as water scarcity, desertification, drought and competition over arable land for grazing and farming, as seen in the case of the Karamoja Cluster. 2) Vulnerabilities: where some

---

[68] P. Meier, Bond, D. and Bond, J. (2007) Environmental Influences on Pastoral Conflict in the Horn of Africa. Political Geography, 26 (6), p 716–735.

[69] Ibid. p16.

groups of people or individuals more susceptibility to harm, though the threats do not necessarily cause harm.

Study on the riparian states - Egypt and Ethiopia illustrates that conflict may erupt between downstream and upstream riparian countries. This situation is particularly dangerous if the downstream country also believes it has the military power to rectify the situation. A 2003 study on the causes of conflict in Darfur from 1930 to 2000 has exposed "very strong" linkages between the environment and conflict. In fact, competition for pastoral land and water has been a driving force behind the majority of local confrontations for the last 70 years in some African societies.[70] Indeed climate change can alter the distribution and quality of natural resources such as fresh water, arable land, coastal territory, and marine resources. These changes could in turn cause or prolong already existing armed conflict. Indeed, the general link between the environment and armed conflict is well established: competition for natural resources (such as diamonds, timber, oil, water, and even narcotics) has motivated violence in such disparate places as Kuwait, Colombia, and Afghanistan. Natural resources have also helped finance insurgencies in Angola, Sierra Leone, and elsewhere. The connection between climate change and the outbreak of violence is unlikely to be as strong as when natural resources can be exploited for quick financial reward. And because climate change happens gradually, global warming is not likely to be the primary cause of any particular armed conflict, nor will its contribution to conflict be particularly visible.

---

[70] Gerald Ekenedirichukwu Ezirim And Prince Chiemezue Ohiaegbu, (2011) "*Governance Of Global Environment, Challenges Of Sustainable Development and Africa's Security Dilemma In The 21st Century* " Journal of Sustainable Development In Africa (volume 13, p.8), Clarion University Of Pennsylvania, Clarion, Pennsylvania

Nevertheless, regional climate changes, as with other causes of environmental degradation, could make armed conflict more likely. The second threat is that of natural disasters and humanitarian crises. For instance, a warmer world will generate more natural disasters and therefore more humanitarian crises. Indeed, natural disasters are already a major security threat: between 1990 and 1999, an estimated 188 million people per year were affected by natural disasters, six times more than the 31 million annually affected by armed conflict.[71]

Many people affected by natural disasters become refugees or internally displaced persons (IDPs). Both refugees and IDPs are vulnerable not only to the physical and socio-economic effects of disease, malnutrition, and loss of income, but they also can become personally insecure and subject to crime, violence, and broader militarized conflict. Natural disasters become wider security challenges when countries lack the capability or willingness to help affected populations, undermining local and/or national government's perceived legitimacy and increasing popular grievances. The third threat is that of destabilizing forces. Conditions of drought, disease, and economic stagnation as an outcome of climate change, may reach critical levels or tipping points beyond which state's failure becomes more likely. [72]

---

[71] UN/ISDR. (2003). Living With Risk: A Global Review Of Disaster Reduction Initiatives. Geneva: United Nations Inter-Agency Secretariat of The International Strategy For Disaster Reduction (UN/ISDR). Available from http://www.unisdr.org/eng/about_isdr/basic_docs/LwR2003/lwr-03-ch2-2-eng.htm#1

[72] A. Haines, and J.A. Patz. (2004). "*Health Effects Of Climate Change*." Journal of the American Medical Association 291 (9):p99-103.

2.3.2 The Impacts of Climate Change

The Inter-governmental Panel on Climate Change - IPCC has played a major role in redefining issues around climate change. In the beginning, the IPCC had advised that most dangerous effects of climate change are those on human migration as millions are displaced by shoreline erosion, coastal flooding and severe drought and other outcomes.[73] Since 1990, IPCC's position has significant changed as it recognized that a variety of complex interactions mediate migratory decision-making. Subsequent reports have adopted more significant descriptions of migration, primarily by redirecting the focus in terms of "human vulnerability"[74]. Indeed, reference to human migration as a consequence of climate change was eliminated from the IPCC 2001 Policy Maker's Summary[75]. Vulnerable demographics, as opposed to migration specifically, are contextualized by various statuses of economic development, land entitlements, public health challenges and are rightly the new focus[76]. The later 2007 report continued to focus on vulnerability, or adaptive capacities, of populations to climate change, instead of migration[77]. Here, migration is addressed as a consequence of climate change through two channels: drought and cyclones. Interestingly, in relation to sea-level rise, migration is not considered a direct consequence, but as a projected cause of poorer health. Certainly, the causal

---

[73] IPCC. (1990) Policymakers' summary of the potential impacts of climate change. Report from Working Group II to IPCC, Intergovernmental Panel on Climate Change, Commonwealth of Australia. p20.
[74] Ibid.
[75] IPCC. 2001a. Climate change, Synthesis report. Cambridge, Cambridge UP.
[76] W. Lutz. (2004) Information on Related Development, Demographic And Governance Futures. Proceedings Of The IPCC Expert Meeting On The Science To Address UNFCCC Article 2 Including Key Vulnerabilities. Buenos Aires, Argentina: Munasinghe Institute For Development (MIND)..
[77] IPCC. 2007. Climate change 2007: Synthesis report. Geneva, World Meteorological Organization (WMO), United Nations Environmental Program (UNEP).

pathways between climate change and human migration can be addressed with greater rigor.

In consideration of how a state and the community reacts to gradual or sudden climate changes, researchers increasingly rely on a conceptual framework which emphasizes the differentiated capabilities and vulnerabilities of countries and groups. Vulnerability is therefore a concept used to determine the relative risk experienced by individuals, households and communities to adverse changes in their environment.

The importance of the vulnerability approach is to emphasize that human beings live in 'politicized environment' where the costs and benefits associated with environmental change are distributed unequally among actors[78]. This is apparent on the international scale, where climate changes worsened by developed countries seriously affect the capabilities of developing countries, especially those economically that are dependent on the environment.

Developing countries are under pressure to incorporate adaptive and mitigation policies against climate change. Besmirched budgets and, in many cases, resource dependence and unstable political environments increase vulnerability. Differential vulnerability is most apparent within disaster affected countries, and indeed most of the work on responses to environmental changes is situated on the sub-national level. Within countries, researchers emphasize that the effects of chronic and sudden onset environmental disasters are exacerbated by uneven development and the narrow margin of sustainable livelihoods already present within least developed states

---

[78] R. Bailey and S. Bryant. 2003. Third World Political Ecology-2nd edition. New York: Routledge. p30.

This study adopts a vulnerability approach to assessing the implications of climate change on Africa, as opposed to adopting the bio-physical impacts approach. This is because the vulnerability to climate variability and change is stacked on an existing vulnerability, such that the impacts of climate variability and change are greatly exacerbated. Most studies that have assessed the impacts of climate change in Africa have used large-scale GCMs which provide very little information that is of practical use to decision- makers on the precise extent and impacts of climate change, especially for any specific location within a country in Africa. The few regional impacts are largely on Southern Africa where considerable capacity exists for regional climate modeling. It is acknowledged that making predictions of future climate change in Africa is problematic as a result of Africa's complex climate and the lack of data on the current climate to feed into models. This reduces confidence in projections of future change. However, available data are further reviewed in this report.

In direct relations between, climate change, conflict and sustainable development, the 'double-exposure conceptual framework ' is important. The concept can be used to analyze conflicts in this regard in the Horn region of Africa. This is because it recognizes the complex nature of social, political and economic outcomes in remote parts of the world. The framework recognizes that certain outcomes seen at the local level stem from local, regional and global dynamics. In accordance with the framework of double exposures, two forces which also commonly referred to as stressors are identified as influencing pastoralist livelihoods for instance, but are outside the control of the pastoralists themselves. These are worsening climatic factors and the policy environments. In the context of the Horn of Africa, prolonged and frequent droughts and

unpredictable rainfall patterns rob pastoralists of their only capital, their livestock. The effects that these frequent and devastating droughts have on pastoralist livelihoods, and pastoralist responses to them, serve as a good lesson on what can be expected when the detrimental effects of climate change start to kick in.

Furthermore, the complex nature of climate change has different social and political outcomes in remote parts. The policy environment can be seen at different levels. First at national economic policies -which have higher economic growth as their main goal often impinges upon pastoralist livelihoods. The push towards market-oriented development paths by international financial institutions has had negative consequences for local communities.[79] Secondly, political processes have led to boundary disputes that have resulted in violent conflicts over the years. In Ethiopia for instance, the politics of ethnic federalism has sparked conflicts among different ethnic groups and different clans within ethnic groups[80]. In Northern Kenya, the competition among political elites from pastoralist communities to increase their political influence and expand their political constituencies has resulted in similar outcomes, albeit at a smaller scale[81]. Although the political processes in the two countries are completely different in their characteristics and their objectives, they tend to produce similar results: deteriorating inter-ethnic relations. These stressors operate in the contextual environment of population growth, continued environmental degradation and a culture of cattle raiding. These factors

---

[79] R.K. Rankin. (2001) 'Governing Development: Neoliberalism, Microcredit, and Rational Economic Woman', Economy and Society, p30-31.

[80] A. Mulugeta. .(2008) '*Pastoral Conflicts and State-Building in the Ethiopian Lowlands*', Afrika Spectrum, 43/1: 19–37

[81] CEWARN (2005) 'CEWARN Alert: Rising Tension and Series of Violent Incidents Subsequent to Marsabit Massacre of July 12th 2005', CEWARN [website], <http://cewarn.org/reports/Alerts/rising%20tension%20in%20Marsabit.pdf>, accessed 20 May 2013.

aggravate the influence of the stressors mentioned above, resulting in increased conflicts, small-arms proliferation and weakened customary institutions. Pastoralist responses to such outcomes are reflected in an increased arms race and endless border disputes to attain unchallenged access to land and water.

On the other hand, the human impact on climate during this era is greatly exceeding due to known changes in natural processes such as through the processes of urbanization, industrialization as well as the extraction and processing of natural resource which are part of development. Human activities contribute to climate change by causing changes in earth's atmosphere by increasing the amounts of greenhouse gases, aerosols (small particles), and cloudiness. The largest known contribution comes from the burning of fossil fuels, which releases carbon dioxide gas to the atmosphere than needed to achieve climate equilibrium. Greenhouse gases and aerosols affect climate by altering incoming solar radiation and out-going infrared (thermal) radiation that are part of Earth's energy balance. Changing the atmospheric abundance or properties of these gases and particles can lead to a warming or cooling of the climate system.[82].

Owing to the unsustainable levels of development of the 'developed' countries, it is imperative to fully revisit the way development has been conceived so far and completely reassess the usefulness of the dichotomy 'developed' versus 'developing' countries. The identification of prevailing development paradigms is a first step in this reassessment process.

---

[82] Daniel Botkin and Edward Keller. (2000) *Environmental Science: Earth as a Living Planet.Danvers,* MA.: John Wiley & Sons, Inc.

2.3.3 Linking Conflict, Climate Change and Sustainable Development

Sustainable development is simply understood as development that meets the needs of the present without compromising the ability of future generations to meet their own needs[83]. There are many alternative definitions, and none is universally accepted. Nonetheless, they all emphasise one or more of the following critical elements: identifying what to develop, identifying what to sustain, characterising links between entities to be sustained and entities to be developed and envisioning future contexts for these links.[84] Goals, indicators, values and practices can also frame examinations of sustainable development. The essence of sustainable development throughout is meeting fundamental human needs in ways that preserve the life support systems of the planet. Its strength lies in reconciling real and perceived conflicts between the economy and the environment and between the present and the future. Authors have emphasised the economic, ecological and human/social dimensions that are the pillars of sustainable development. The economic dimension aims at improving human welfare (such as real income). The ecological dimension seeks to protect the integrity and resilience of ecological systems, and the social dimension focuses on enriching human relationships and attaining individual and group aspirations, as well as addressing concerns related to social justice and promotion of greater societal awareness of environmental issues. The concept of sustainable development has permeated mainstream thinking over the past two decades, especially after the 1992 Earth Summit where 178 governments adopted Agenda 21. Ten years later,

---

[83] IPCC 2001b. Climate change (2001): *The Scientific Basis. Contribution Of Working Group I To The Third Assessment Report Of The Intergovernmental Panel On Climate Change.* Cambridge: Cambridge University Press.

[84] National Research Council. (2007). *Tools and Methods For Estimating Population At Risk From Natural Disasters And Complex Humanitarian Crises.* Washington, D.C.: National Academies.

the 2002 World Summit on Sustainable Development)[85] made it clear that sustainable development had become a widely-held social and political goal. However, implementation remains problematic, there is broad international agreement that development programmes should foster transitions to paths that meet human needs while preserving the Earth's life-support systems and alleviating hunger and poverty by integrating these three dimensions: economic, ecological and human/social of sustainable development. Researchers and practitioners in merging fields, such as 'sustainability science', multi-scale decision analysis and 'sustainomics', seek to increase our understanding of how societies can do just that. Climate change adds to the list of stressors that challenge the stakeholder's ability to achieve the ecologic, economic and social objectives that define sustainable development.

Other notions in regard to climate-change, conflict and sustainable development have been brought forward. These include Homer-Dixon idea of 'simple scarcity-group identity; deprivation', in regard to the outcome of decrease in human dependence. The decreasing availability of physical, environmental and land resources such as clean water, good agricultural land for arable and animal husbandry could create a condition of "simple scarcity", "group identity" and "deprivation" in the area,[86] which may provoke violent conflicts of high magnitude due to population movements and scramble for the available resources. This notion as championed by Homer-Dixon and his associates has its roots in the neo-Malthusian notions of carrying capacity which explicates the interface between human population and available resources. For instance, Darfur has experienced

---

[85] World Summit on Sustainable Development (WSSD, 2002)

[86] T.F. Homer-Dixon. (1991).*On the threshold: Environmental changes as causes of Acute Conflict. International Security*, 16(2): 76-116

severe climatic shifts over recent decades. Reduced rainfall has turned marginal grazing and into desert, placing a huge amount of stress on the livelihood systems of local groups. In northern Darfur, a 30% drop in precipitation was recorded over 80 years. The droughts of 1974–75 and 1984–85 have altered the diverse ecological features of the region.[87] The struggle between sedentary farmers and nomads, which has often been advanced as the main cause of the conflict, had been contained for centuries through traditional conflict management mechanisms and established rules for access to land and water. It is clear that climatic variations, as well as the governance issues mentioned above, have affected the intensity of disagreements over access to resources. Moreover, a quadrupling of population and livestock numbers over the past 50 years placed great strains on existing land-use arrangements.

Collier and Hoeffler[88] explain the risk of conflict in their model of 'greed and grievance'. The crux of their argument is that 'rent-seeking' activities based on resource abundance are prime factor in greed or opportunity models of internal conflict and war. Thereby indicating that resource abundance, not necessarily scarcity could be a veritable source of conflict as demonstrated by Anderson[89]. Deeper reflection reveals that most studies including those by the Development Economics Research Group at the World Bank find strong empirical support for the proposition that natural resources motivate rapacious behavior and allow the finance of civil war. This found that conflict is likelier

---

[87] UNEP (2007) 'Sudan: Post-conflict Environmental Assessment', Available at: <http://www.unep.org/sudan/> Accessed on: 26 March 2011.

[88] Paul Collier and Hoeffler, A. (2004). *'Greed and Grievance In Civil War'*. Oxford Economic Papers 56(4): p563–95.

[89] I. De Soysa. (2002). *Ecoviolence: Shrinking Pie, Or Honey Pot.* Global Environmental Politics 2(4): p1-34

when countries have a moderate level of renewable resources per capita but diminishes with abundance. Also from these empirical findings, it is concluded that relative availability of renewable resources per capita seems to be more problematic in terms of conflict and there are no direct links from renewable resource scarcity to conflict[90] .

Homer-Dixon and other neo-Malthusian scholars rooted their perspective in the 'eco-violence' maxim that 'shrinking resource pie' is supposedly fuelling violent civil conflict by aggravating strained social relationships among different groups sharing common natural resources, as against others that believe in the proverbial "honey pot" thesis of conflict onset. The eco-violence perspectives of conflict explains that conflict is generated by the scarcity of natural resources in at least two primary ways as has been incorporated by Homer-Dixon and others. It implies that the total effect of human activity on the environment in a particular ecological zone is mainly a function of two variables: first, the product of total population in the region and physical activity per capita, and second, the vulnerability of the ecosystem in that region to those particular activities. However, as stated above on the vulnerability approach eco-violence conflict is rarely mono-causal and there are clearly other underlying factors that act as stressors such as policical, cultural dynamics. [91]

As stated earlier in this chapter, the process of development has been a major contributor to global warming and a root cause of climate change, and that the future development has an even major role to the climate change mitigation and adaptation plans and in particular of developing countries whose master plan for development

---

[90] K. H. Anderson. (2003).: *Resources and Conflict in Angola: An `Economic Analysis*. Thesis for the Candidates .Degree, University Of Oslo.

[91] P. Ehrlich. and Ehrlich, A (1990): The Population Explosion. Hutchinson, London

remains generally borrowed from western countries particularly American and European, yet who contribute the most in green house gases emissions. Climate change thus has and will continue to reduce the environmental product.

Sustainable development, implies minimizing the use of exhaustible resources, or at least, ensuring that revenues obtained from them are used to create a constant flow of income across generations, and making an appropriate use of renewable resources. This applies to energy (oil and oil products in particular) but also to fish stock, wildlife, forests, water, land and air. Land degradation, due to soil erosion and salination, persistent water and air pollution, depletion of fish stock and deforestation are all examples of consequences of non-sustainable activities[92].Climate policies can be more effective when aligned within broader strategies designed to make national and regional development paths more sustainable. This is because the impact of climate variability and change, climate policy responses, and associated socio-economic development affect the ability of countries to achieve sustainable development goals. Conversely, the pursuit of those goals will in turn affect the opportunities for, and success of climate policies.

2.4 The Relevance of Theory

While science shows that the impacts of climate change on human livelihoods in Africa will be severe, the extent climate change will solely lead to violent conflict remains unclear. Indeed, scholars have argued that climate change though not solely-causing conflict does play a role in as a multiplier and also the role of prolonging conflict in the

---

[92] Lorenzo G. *Development and Development Paradigms. A (Reasoned) review of Prevailing Visions.* Rome: FAO, 2011.

future and current security situation in Africa, as also the existing socio-political structures are already prone to violent conflict. Generally, the following conflict constellations can be distinguished: 1) Decreasing availability of fertile soils and water for food production and employment may spur competition between different groups. In areas of social, political and/or ethnic polarization and incapable or perceived as inequitable governance, such competition could turn violent. 2) Increasing variability resulting from climate change and decreased access to food and water will make the remaining productive lands more precious. Indeed, a global food price hike would provide incentives to control productive lands and make a profit, while access to food could serve as political instrument to co-opt oppositions. Hence, incentives to control resources access may increase and become more politicized.[93] 3) Changing productive land patterns, changing patterns of diseases diminishing access to food, water and employment, as well as sea-level rise in densely populated areas may lead to increased population movements within and across countries. This could increase competition for resources and income in destination areas. As many countries are ethnically fragmented and polarized, the risk exists that this may turn violent as well. 4) The richness of Africa's natural resources will continue to draw external attention. Thus, globally increasing resource demands could manifest themselves in a scramble for Africa as international powers and companies attempt to secure supplies.

In summary, climate change will act as a threat multiplier: It will definitely a challenge for development and human well-being in Africa. Where this is not well

---

[93] Oli Brown and Alec Crawford. (2009) *Climate Change and Security in Africa. A Study for the Nordic-African Foreign Ministers Meeting. Winnipeg*: International Institute for Sustainable Development.

managed and result in polarization of societies, it may create social friction and increase conflict potentials. Together, it may arrest and potentially reverse Africa's gains in development in the past years and continue to trap the continent in poverty.

2.5 Conclusion

Climate change is very important in regard to human security and it plays an important role presently and in future as the changes in climate become more apparent. Some studies have solely linked climate change with conflict. Others disagree on the likelihood of environmental changes alone leading to conflict, that it is unlikely that climate and environmental factors alone will lead to conflicts, but that these environmental factors aggravate existing social, political or economic drivers of conflict. Response to climate change has become an urgent need given the rate at which the earth is warming as well as the already visible effects of climate change such as droughts, floods, tornados and other sudden and chronic climate changes. There is also an increase of natural resource based conflicts in the Horn of Africa region and while there is no direct link to climate change, their occurrence cannot go unnoticed and is relevant to the discourse on climate change.

CHAPTER THREE

APPROACHES TO CLIMATE CHANGE, CONFLICT AND SUSTAINABLE DEVELOPMENT IN THE HORN OF AFRICA

3.1 Introduction

The arid and semi-arid regions of the Horn of Africa are home to pastoralists, agro-pastoralists, sedentary agriculturalists, private ranches, national parks and various investment and development projects. This means that these various actors have to share the resources available to them and interact with one another in safeguarding their day-to-day activities. With deteriorating climatic conditions and resource capacity, peaceful co-existence becomes even more important. Although conflict has always been a part of the lives of populations in arid and semi-arid areas, the frequency, intensity and destructiveness of the conflicts have increased as never before[94]. Thus, it becomes essential to review the relationship between environment and conflict in light of the predicted effects of climate change for the region and on environmental degradation.

At the heart of the climate change/conflict relationship is the issue of natural resource scarcity and competition. This is not a simple one-way connection: climate change is one of a range of factors causing natural resource scarcity; while natural resource scarcity is one of a range of factors causing conflict. Climate change is often referred to as a 'threat multiplier' – a factor that will compound other drivers of conflict.

---

[94] K. A, Mkutu, *Guns and Governance in The Rift Valley: Pastoralist Conflict and Small Arms* (Oxford: Indiana University Press, 2008), p3.

The question is: how significant is, or will be, the threat-multiplying effect of climate change, and what measures can be taken to pre-empt or mitigate the threat?

Governments in the Horn of Africa, such as Uganda, Kenya, Ethiopia and others are investing resources to reduce the risk to climate deterioration. A close examination shows that more African countries are experimenting with different approaches to offset the impacts of climate change on their economies, security - and other areas affected by climate change-with contingency funds, emerging risk transfer schemes, as well as investments to address climate change and its implications, in their national and local public planning and policy making. The chapter seeks to find the existing approaches to prevention and management of climate change effects, by stakeholders including the regional institutions, governments, and non-governmental institutions as well as the communities themselves through indigenous methods.

However, the importance of efforts by countries and communities to address the risk of future natural hazards remains insufficiently recognized in discussions on climate change adaptation and these efforts are rarely identified as potential activities to be funded as part of adaptation financing despite the proven cost-effectiveness, the contribution to longer term development objectives and the sustainable nature of the impact. Despite efforts in mitigation and adaptation of climate change, there are dire challenges that serve as hindrance to implementation of plans, visions and policies. The importance of more research study in the areas of challenge cannot be further stressed, in order manage the complexity surrounding the climate change, conflict and sustainable development nexus, as discussed in the chapter.

3.2.1 Theory of Adaptation vs. Mitigation

According to the IPCC Third Assessment Report, climate change is already happening, and will strengthen even if global greenhouse gas emissions are curtailed significantly in the short to medium term[95]. This fact, combined with Africa's vulnerability to climate change means that measures must be taken to avert or deal with the impacts of climate change There are two types of response available to us:. The first involves reducing emissions of greenhouse gases to slow or stop the process of climate change, a process called mitigation. The second, known as adaptation, is learning to cope with the impacts of climate change.

Definitions of adaptation vary from institution to institution, with distinctions often attributed to political differences and negotiations-related concerns[96]. The study uses the United Nations Framework Convention on Climate Change (UNFCCC) definition, which describes adaptation as the "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates, harm or exploits beneficial opportunities"[97]. According to UNFCC adaptation refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change, or exploit the positive

---

[95] N. Adger et al., *Successful adaptation to climate change across scales (*Global Environmental Change, 2004), p11.

[96] E. Levina and D. Tirpak, *Adaptation to Climate Change: Key Terms* (Paris: cOECD/IE 2006)

[97] United Nations Framework Convention on Climate Change (UNFCCC). 2011. Glossary of climate change acronyms, "Adaptation." Available at http://unfccc.int/essential_bacground/glossary/items/3666.php. Accessed July 2013.

ones, by making the appropriate adjustments and changes[98]. Adaptation therefore aims at reducing vulnerability to climatic change and vulnerability of communities, regions, and nations to climate variability, and in promoting sustainable development. Adaptation varies in both spatial (global, regional, national and local) and temporal scales with options and opportunities ranging from structural to technological to behavioural changes. With respect to time scale, adaptation interventions can be short-term, or long-term, localized or widespread, and it can serve various functions and take numerous forms[99]. Various types of adaptation can be distinguished depending on its timing, goal and motive of its implementation[100]. These types according to IPCC[101] include; anticipatory, proactive, reactive, autonomous and planned, private and public adaptations. Anticipatory adaptation takes place before impacts of climate change are observed. This type is also referred to as proactive adaptation while reactive adaptation takes place after the initial impacts of climate change have occurred. Unlike planned adaptation which takes place prior to the events, the reactive adaptation is triggered by the events and starts after the impacts have been felt. The autonomous adaptation is the type of adaptation that does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. It is also referred to as spontaneous adaptation.[102] This adaptation involves changes that systems will undergo in response to changing climate, irrespective of any policy, plan or decision.

---

[98] UNFCCC, 2007: Climate change; Impacts, vulnerabilities and adaptation in developing countries, Available at unfccc.int/resource/docs/publications/impacts.pdf. Accessed 18 February 2013

[99] Ibid.

[100] J. Reilly, D. Schimmelpfennig, (2000) "Irreversibility, uncertainty, and learning: portraits of adaptation to long-term climate change" *Climatic Change* Vol.45 No.1 p253–278.

[101] IPCC, (2001c) "Summary for Policymakers: A Report of Working Group I of the IPCC(IPCC Geneva, Switzerland,

[102] Ibid.

It can be represented by the reaction of, for example, a household to a reduced water supply by storing water or by economizing its use. Natural systems such as plant communities usually develop autonomous adaptation that is, adapt reactively. The planned adaptation which according to the IPCC[103], is defined as "the result of a deliberate policy decision, based on awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state. It involves policy measures and strategies that aim at building the adaptive capacity across systems and sectors such as the use of a new drought-resistant crop variety or adopting agro-forestry approaches[104].

Managing climate change related risks requires the development and implementation of planned adaptation initiatives, the outcome of which must be assessed and systematically evaluated. Planned adaptation can be considered as more effective and less costly than reactive adaptation since the last will act on for example reclaiming the damage/retrofitting, while the former aims at minimizing the potential impacts. Long term benefits can also be gained from planned adaptation such as the increasing water availability due to the construction of water reservoirs and improving environment and air quality as a result of expanding green areas and shelter-belts.

The potential, capability, or ability of a system to adapt to climate change stimuli or their effects or impacts is referred to as adaptive capacity. Adaptive capacity greatly influences the vulnerability of communities and regions to climate change effects and

---

[103] Ibid.

[104] J. Ardö and Beshir, E. (2007), *Agroforestry:An Adaptation to Climate Change in the Sahel? Department of Physical Geography and Ecosystem Analysis* (Lund University, Sweden).

hazards[105]. Building adaptive capacity is an essential step to ensure lasting adaptation. In this respect, adaptation should be seen as a process and not a onetime action, particularly as climate is continuously changing and climate variability is expected to increase in frequency and intensity with increasing climate change[106].

Adaptation planning opens avenue for people at national and local levels to make use of opportunities and minimize the risks. In this regard adaptation to climate change will involve climate proofing development as well as reducing vulnerability of the poor by building their adaptive capacity. These objectives can only be achieved through adopting an innovative approach that builds on existing experiences and knowledge.

Adaptation is central to many proposed strategies for reducing the negative impacts of climate change. Adaptive capacity building is increasingly embraced by governments and other institutions as a means to improve economic and ecological resilience. Policymakers draw linkages between a country's financial, human, and institutional capital and its adaptive capacity[107]. Evidence from available studies indicates that high income nations are most likely to adapt, the most vulnerable are least likely to adapt, and proactive adaptation is often government driven. The task of distinguishing climate change impacts from economic ones is tremendously challenging, leading to calls for the mainstreaming of climate adaptation in development[108]

---

[105] H.G. Bohle et al., (2000): "*Climate Change and Social Vulnerability; Towards A Sociology And Geography Of Food Insecurity*", Global Environmental Change, Vol 4 (1994): 37–48. Also R.W Kates, "*Cautionary Tales; Adaptation And The Global Poor*", *Climatic Change*, Vol 45 (1) p5–17.

[106] IPCC, 2007 op cit.,

[107] G. Robert et al., (2009). Current Adaptation Measures and Policies, in *Adaptation of Forests and People to Climate Change.* R. Seppälä, A. Buck, and P. Katila, eds. (Helsinki, Finland), p123–134.

[108] D. Conway and E.L.F. Schipper. (2011). *Adaptation to Climate Change In Africa: Challenges And Opportunities Identified From Ethiopia. Global Environmental Change* 21(1): p227–237.

For Africa the climate change debate has primarily focused on adaptation rather than mitigation as historically Africa's contribution to global GHG emissions has been small - approximately 1.75% of global energy CO2 emissions from 1950-2000; and 3.85% of annual GHG emissions in 2000 whereas the African continent has been identified to be the worst affected by the impacts from climate change[109]. Therefore understandably the focus amongst practitioners, particularly in the context of the UNFCCC climate negotiations, has been on attracting finance to build Africa's adaptive capacity, whilst, it is excluded from any quantified mitigation commitments under the UNFCCC, and therefore less emphasis is placed on mitigation. Yet according to the Stern Review[110] even if the developed world takes on responsibilities for absolute cuts in emission of 60-80% by 2050, developing countries must take significant action too, in order to avoid temperature increases above 2.0, 2.4°C. Furthermore Africa needs to develop economically to meet her priority of eradicating poverty. Developing along a cleaner energy path and moving towards low carbon development will be necessary in order to maintain economic competitiveness in a global economy. Therefore mitigation is an opportunity for Africa as there are many environmental, social and economic benefits from shifting towards low carbon development paths and the 'green economy' is seen as an opportunity for job creation and developing new markets – both attractive for Africa.

---

[109] IPCC, (2007). Impacts, adaptation, and vulnerability; Contribution of Working Group II to the Fourth Assessment Report of the *Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK,

[110] Stern Review, (2006), The economics of climate change. N Stern London, Treasury. Available at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm . Accessed on September, 2013.

For Africa, climate change mitigation considerations are anchored on Article 3 of the United Nations Framework Convention on Climate Change (UNFCCC), that is the principle of equity and of "common but differentiated responsibilities and respective capabilities"[111]. The CBDR principle recognizes the historical differences in contributions by developed and developing country Parties to GHGs concentrations in the atmosphere, and also takes cognizance of differences in their respective economic and technical capacity to tackle mitigation. This principle is particularly relevant when considering that the African continent's total emission of greenhouse gases to the atmosphere is much less than other continents. Nevertheless, there is a global need to mitigate from the point of view of long-term horizons - "stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"[112].

On policy approaches on issues relating to the UN-Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD), African Country Parties are willing to undertake the following mitigation measures commensurate with their respective capabilities and national circumstances: Reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests, and enhancement of forest carbon stocks.

---

[111] CBD / Convention on Biodiversity: (2011). http://www.cbd.int/climate/; last accessed 24 June 2013.

[112] UNFCCC, 2010: Decision 1/CP.16; The Cancun Agreements; Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, Document FCCC/CP/2010/7/Add.1. Available at .http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf. Accessed 20 April 2013.

National emission profiles vary across different African countries depending on the structure of the economy and sectoral activities. Therefore the focus of mitigation efforts will also vary accordingly. Although mitigation has not historically been the focus for the Africa region, there is recognition that moving to a low carbon development approach could be beneficial for a developing country economy competing in the global context. While climate change has made new challenges emerge for African countries, it has also provided new opportunities for both public and private investments which, if embraced, can create new development opportunities and drive economic growth. Substantial political efforts will be required in order to promote increased and improved climate change investments especially as increasing investment to mitigate climate change and co-benefit the ongoing adaptation effort can also provide an opportunity for African countries to sustain national efforts aiming at achieving Millennium Development Goals (MDGs) and poverty Reduction strategies. The resources necessary to help Africa's adaptation and mitigation efforts including managing disaster risk and following a low carbon development are limited and scattered among many national priorities and competing agenda such as poverty reduction, and conflict resolution. Total existing commitments to funds for dealing with climate change is inadequate as compared to the substantial requirements. And the current carbon finance mechanisms are not delivering the resources which Africa needs. The large deficit of funding and the impediments that hold back Africa from accessing these funds have made financing a major concern in the fight against climate change. Moreover, the ability of Africa to access these resources is constrained by the lack of capacity to develop fund-able projects and get sufficient funding. Disbursing adequate financial resources to Africa would assist

the continent address adaptation needs, develop institutional capability, acquire and build capacity for applying technologies and promote long term investments.

3.2.1.1 Other Arguments on Adaptation and Mitigation in Africa

In the African continent, while adaptation to climate change is seen by most observers as the most preeminent issue, there is a strong parallel development of initiatives that aim to contribute to mitigation in connection with adaptation needs[113]. Many mitigation options will also provide adaptation benefits and several adaptation strategies can lower the release of GHG into the atmosphere. The question is how to balance between the two considerations in an African context: according to their development priorities vis-a-vis their responsibilities as part of the UNFCCC.

Compared to developed countries, least developed countries emit little of the world's greenhouse gases but remain incredibly vulnerable to its effects, particularly due to their inability to adapt[114] . In order to be classified as a highly adaptable state, one must possess: a stable and prosperous economy; a significant degree of access to technology; well-delineated roles and responsibilities for implementation of adaptive strategies; systems for national and local information dissemination; and an equitable access to resources. Yohe [115] argues that the determinants of adaptive capacity includes: range of available technological options for adaptation; the stock of human capital including

---

[113] B. Muys et al. (2009) *Integration of Climate Change Mitigation and Adaptation Strategies in the South.* (KLIMOS, KU Leuven, and ICRAF/South Africa, Lilongwe, Malawi,

[114] The UN Office of the High Representative of the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (*UNOHRLLS*: 2009)

[115] G. Yohe and Tol, R.S. "Indicators for social and economic coping capacity – moving towards a working definition of adaptive capacity" *Global Environmental Change*, Vol. 12, No. 1, (April 2002) 25-40.

personal security and education; the stock of social capital including property rights; the system's ability and access to spread risks; decision makers ability to manage information; their ability to determine which information is credible and the credibility of the decision makers themselves; the availability of resources and distribution of resources across populations; The attribution of the source of stress and the importance of the exposure to its local manifestations. As such, it is presented that these states, in addition to other developing states not classified as LDCs will be the most vulnerable to climate change and its effects.

Although many arguments and documents appropriately emphasize adaptation even as Africa ensures that it captures the benefits and development dividends in mitigation options, contributions from many climate change works indicate inadequate appreciation of these critical issues in global climate change negotiations. There is the need to maintain a strong balance between adaptation and mitigation, without entirely implying that mitigation is a worry for the North with little, if anything, to do with Africa. This is so because, while it is perfectly in order for Africa to aggressively pursue special adaptation funding, even as compensation for harm caused by the effects of unchecked development by North, it is an untenable argument to harp on its poverty and vulnerability as a license to pursue unsustainable development paths. [116]

It is important to note that a large proportion of the mitigation discourse revolves around reinforcing sustainable development pathways, such as cleaner production technologies in industry and investments in renewable energy options. Furthermore,

---

[116] AMCEN Session Final Document: Nairobi Declaration on the African Process for Combating Climate Change, Nairobi, 29 May 2009 <http://www.unep.org/roa/Amcen/Amcen_Events/3rd_ss/Docs/nairobi-Declaration-2009.pdf>

mitigation measures built into the flexible mechanisms and such issues as REDD, if properly captured, could provide development dividends and additional resources to support adaptation to climate change. What is needed is to ensure a close evaluation and monitoring of proposed and existing systems to ensure they deliver on their expected promises.[117]

3.2.2. The Sustainable Development Approach

The concept of sustainability was first employed in relation to natural resources and how they should be used. Many theorists feel that natural resources are finite and cannot support the world's projected population at current levels of resource utilization and growth. There are those theorists who argue, however, that resources should be defined more broadly to include stocks of technology and know-how. As knowledge and human capability have increased over time, resources have actually increased[118]. Sustainability then involves sustaining free markets and human knowledge capacities. In the first view, the threats to sustainability come mainly from overpopulation and consumption, while in the second view the threats to sustainability come from bad policies.[119]

There are pillars of in which sustainable development is based upon the analysis of the concept of sustainable development is generally based on three component pillars namely: economic, social and environmental sustainability. There is a strong consensus

---

[117] Ibid.
[118] Taylor J. (1993). *The Growing Abundance of Natural Resources" in Market Liberalism: A Paradigm for the 21st Century*. CATO Institute
[119] Ibid.

on them in the international community and among development management institutions and development practitioners. [120]

The Bruntland Report's definition of sustainable development is "a process of change in order to create a harmony environment between resource exploitation, investments, technological and institutional changes to enhance the current and the future potential of human needs".[121] This definition affirms that the concept of sustainable development tries to test the coexistence of environmental protection and economic development in a global and long - term point of view.[122]

Sustainable development is neither a doctrine nor a theory, much less a synthesis between economics and ecology. It is a pragmatic approach to implement economic tools for planet management. Sustainable development is a new term for an old idea: there is no viable economy without natural resources and no resources management without economic rationale. Two types of redundant views related to the concept of sustainable development can be distinguished: a vision of a global economic space and an environmental vision. Global economic vision for sustainable development involves complex conditions and factors that enable the revenues to increase involving economic welfare aspects as population growth rule, classification of resources reflecting their relative scarcity, changing production and consumption structure in order to maintain the stock of scarce resources. The environmental vision of sustainable development involves the management and the maintenance of resource stocks and factors yielding a consistent

---

120 United Nations, (2003): *Political Declaration and Plan of Implementation*, Johannesburg, 2002. World Summit on Sustainable Development.

121 G. H. Bruntland. (1989) *Sustainable Development: An Overview*. Development p2-3.

122 M. Zgurovsky, (2009) *Global Analysis of Sustainable Development In Context Of Quality And Security Of Human Life*. System Research and Information Technologies 1, p7–21.

productivity, at least, in the spirit of equity between generations and countries. The resource stock includes two different components: "artificial" capital stock (includes all production factors made by human civilization) and "natural" capital meaning all renewable and non-renewable resources (water, fauna, flora and soil)[123].

Issues on sustainable development include the following: resizing of economic growth given a more equitable resources distribution and an increased production quality; conditions to eliminate poverty in the context of people's essential needs assurances such as employment, food, energy, water, housing and health; reduction of uncontrolled population growth; preserving and enhancing of natural resources; maintenance of ecosystems' diversity; monitoring the environmental impact on economic development technology diversion and risks control; government decentralization; increasing people's participation of decisions on environmental and economic problems.[124]

3.3 Relationship between Sustainable Development and Climate Change.

Africa has some of the richest environmental resources in the world. Africans depend on a healthy and vibrant ecosystem and for their livelihoods for everything from forest products, water, food from agricultural products to tourism. Yet unless Africa is able to foster sustainable use and stewardship of its resources, the continent will face many threats to these treasures in the future.

For Africa's development process to be sustainable, it must be made more resilient to climate change. Further, Africa must be proactive in preparing for change.

---

123 Ibid. p17.

124 S. Upton, S. (2004) 'The international framework for action: is the CSD the best we can do?', in Bigg, T. (ed.) Survival for a Small Planet, Earthscan/IIED, London, p85–100.

The overall threat from climate change on development in Africa is severe. Many of the changes are expected to occur earlier and are likely to be more serious in Africa than elsewhere. In addition, Africa is highly vulnerable to climate change on account of its large rural population that remains highly dependent on rain-fed agriculture for food, its natural resource-based economy, and constraints on internal trade. Wealthy communities have more resources and hence more choices when it comes to adapting to change[125].

Sustainable development cannot be attained without ensuring environmental sustainability and pursuing a green economy, meaning a decoupling of economic progress from human- induced environmental damage. In spite of growing public awareness, the dire environmental challenges have worsened considerably during the twenty years between the Rio Earth Summit in 1992 and Rio+20 in 2012: climate change, pollution and unsound chemicals management, unsustainable water use, unsustainable agriculture, unhealthy cities, massive biodiversity loss, emerging diseases, deforestation, desertification, and the depletion and degradation of oceans.[126]

It is necessary and possible to reverse these trends, but countries lack long-term strategies to address these deep challenges, and there remains far too little environmental understanding and problem solving at local, national and global scales. The poor often depend heavily on natural resources for their livelihoods and survival and are most vulnerable to environmental change, so extreme poverty can only be ended if environmental degradation is halted and reversed. This will require a drastic reduction in

---

[125] S/ Willett, (2000) 'Introduction: globalisation and insecurity', IDS Bulletin, 32,2, p1–12.

[126] M. J. Watts, (2004) '*Violent Environments: Petroleum Conflict And The Political Ecology Of Rule In The Niger Delta, Nigeria*', in Peet, R. and Watts, M. (eds) Liberation Ecologies: Environment, Development, Social Movements, Routledge, London, second edition, p273–98.

key dimensions of primary resource intensity of production and consumption in high-income and middle-income countries.

3.4 Indigenous Methods of Adaptation

Indigenous Knowledge (IK) has become a more commonly used concept in recent years largely thanks to a range of non-governmental organizations and social movements that have demonstrated its relevance to problem-solving in the conservation and development field, especially among poorer segments of the population. So successful has the campaign for greater respect for IK been that the World Bank is now one of the most enthusiastic sponsors of projects aimed at identifying relevant such knowledge and its successful application. These efforts have resulted in a small but growing literature on farmers as informed innovators.

In spite of the low adaptive capacity of Africa, people have developed traditional adaptation strategies to face the great climate inter-annual variability and extreme events. Communities which have faced harsh environmental conditions over prolonged periods developed various coping mechanisms. An unusually persistent drought may increase people's vulnerability in the short term, but it may encourage adaptation in the medium to long term[127]. This reinforces the observation that local people have perceived, interacted with, and made use of their environment with its meagre natural resources and changing climatic conditions in what could be seen as practical coping mechanisms. This is particularly true for the drought prone area in the Africa Sahel region, which is

---

[127] M. Mortimore, (2000) *Profile of Rainfall Change and Variability in the Kano-Maradi Region,* 1960-2000, Working paper 25, Drylands Research.

susceptible to frequent climatic hazards. It is more important that local communities have early warning systems than relief or development agencies because at the onset of adverse environmental changes the critical decisions are made at the household level[128].

Excellent examples of local innovations and discoveries among African farmers include crop breeding, grafting against pests, water harvesting, soil management and conservation. A World Bank brief linking agricultural innovations to knowledge sharing in Africa reports that the informal agricultural sector in Nigeria, mostly using indigenous methods and techniques, has an estimated worth of about US$ 12 billion, providing income for an estimated 81 million people. Making sense of local knowledge in climate change and development requires, among other things, the need to disaggregate the concept of the "poor" in relation to natural resources. It is deemed important to firstly discuss the means to supporting livelihood in order to offer an understanding of their adaptation to climate change. Not all poor people of the world are the same. They differ in terms of livelihood and location. An increasing number of the world's poor live in urban areas. Two groups of poor concern: The first are the pastoralist herders, many of whom can be found in Africa. The Maasai of East Africa is one case in point, the Somali in the Horn of Africa another. The second are small scale farmers. They are sedentary agriculturalists, but often living in close interaction with nature hence highly vulnerable to climate change. They are typically among the most natural resource-dependent of all tillers of the land. Their socio- economic status may vary somewhat, but what they all share in common is that they own their land.

---

[128] A. Tarhule and P.J. Lamb, (2003) *Climate Research and Seasonal Forecasting For West Africans. Perception, Dissemination, and Use*? Bull. Am. Meteorol. Soc., Boston, 8(12), p1741-1759.

Pastoralists, having become confined mainly to semi-arid or arid lands, maintain their livelihood by moving their herds of animals according to shifting resource availability in their ecosystem. Measuring their impact on the environment has for a long time been a controversial issue. International development agencies like UNESCO, UNEP, FAO, and the World Bank maintained for a long time that the heavy grazing by pastoralist herds of animals reduced species diversity and in the long run destroyed also the ecosystem[129], Other studies however, indicate first of all the difficulty of measuring what is seasonal variation as compared to detrimental impact from grazing. The savannah systems in Africa that many pastoralists depend on for their living are remarkably variable and capable of renewing themselves. Yet, with pastoralists being increasingly forced to subsist on more limited stretches of land due to incursion i.efrom agriculture and other activities, one cannot ignore the fact that the risk of loss of biodiversity is likely to grow in the future. Species of plants and animals as well as the ecosystem at large are both in danger of suffering losses.

3.5 Climate Change Adaptation Efforts in the Horn of Africa

Many organizations and states initiatives have been initiated or supported projects aimed at enhancing the ability of communities to manage natural resources in a sustainable way, to adapt to climate change, to prevent resource disputes or to settle these disputes peacefully. Others have been set up to raise awareness and advocate environmental protection.

---

[129] K. Homewood and W. A. Rodgers (1987). "*Pastoralism, Conservation and the Overgrazing Controversy" in D. Anderson and R. Grove* (eds.), Conservation in Africa. Cambridge: Cambridge University Press, p111-28.

A modest selection of organizations and initiatives is presented. Some of these organizations initiatives are summarized below. UNDP is active in most countries in the Horn, on a variety of resource-related topics including resource based conflicts among pastoralists and farmers. In Sudan, UNDP implemented the Reduction of Resource Based Conflicts project, from 2004 to September 2009. Supported by the Netherlands and the Canadian International Development Agency (CIDA), this project focused on participatory route demarcation, conflict prevention, empowering pastoralists and community development, among other things. In Eritrea, UNDP has worked with the Eritrean government, on various topics including promoting and using renewable and other energy sources, a wind power project has been set up. Also much work has been done to enhance sustainable management of Eritrea's coastal, marine and island biodiversity. The current support of UNDP to the Eritrean government includes a component on food security, natural resources and sustainable environmental development. [130]

In the Horn of Africa, CARE International, a humanitarian NGO, has programmes in Sudan, Uganda, Kenya, Ethiopia, Eritrea and Somalia, Somaliland and Puntland. Many activities specifically relate to environmental security, including in: Sudan, by natural resource management as a tool for conflict mitigation; agricultural support to returnees and vulnerable households (North and South Kordoffan); disaster mitigation through water management and increasing food production (Darfur); Uganda: empowering civil society for participatory forest management (in various areas close to protected areas;

---

[130] UNDP Website accessible at http://www.undp.org, viewed on 6th August 2013

assisting IDPs on water and sanitation, livelihood support and peace building (Northern Uganda); Eritrea: providing water for livestock and drought and war-affected pastoralists through the construction of micro-dams, and reducing firewood consumption through improved household stoves and planting trees; Kenya: improving access to clean water for pastoralists and their animals. [131]

Another organization is the Green Belt Movement (GBM). The Green Belt Movement has two divisions: Green Belt Movement Kenya and Green Belt Movement International. Nobel Peace Prize Winner Prof. Wangari Maathai founded the Kenyan organization in 1977, under the auspices of the National Council of Women of Kenya. The mission of this initiative is to mobilize community consciousness for self-determination, equity, improved livelihoods, security and environmental conservation. It mainly works in the fields of reforestation, advocacy and networking and environmental education. [132]

Additionally, the Horn of Africa Regional Environmental Network – HoA-REN: network of members and partners consisting of environmental CBOs, NGOs and higher learning institutes from six countries in the Horn of Africa. The network promotes intensive cooperation among and exchange of information and experiences between the member organizations. Annual network meetings are organized and small scale environmental partnership programmes are set up to advance environmental governance.

---

[131] CARE International website available at http://www.care-in-africa.org/, accessed on 6th August 2013

[132] Greenbelt Movement website available at http://www.greenbeltmovement.org/ accessed on 6th August 2013

Main focus areas of the Network include adaptation to climate change, renewable energy solutions (solar cookers, small scale jatropha plantations) and biodiversity conservation.

The IGAD Climate Prediction and Applications Centre (ICPAC), formerly known as the Drought Monitoring Centre, Nairobi, is a specialized regional centre of the Inter-governmental Authority on Development (IGAD) charged with the responsibility of climate monitoring, prediction, early warning and applications for the reduction of climate related risks including those associated with climate variability and change. It is a specialized institution providing climate information, prediction and early warning for applications in support of environmental management. It is also responsible for the management of a recently set up programme, the African Monitoring of the Environment for Sustainable Development (AMESD) Programme, funded by the European Development Fund from 2010-2013. Objective of this programme is to enhance monitoring for sustainable management of the environment thereby contributing to poverty alleviation. The activities in the Horn of Africa will focus on the assessment and monitoring of land degradation and natural habitats for sustainable land management. [133]

Pastoral and Environmental Network in the Horn of Africa (PENHA): PENHA is an international NGO operating in Uganda, Sudan, Ethiopia, Eritrea, and Somalia/Somaliland. Its mission is to reduce poverty among pastoralists in the Horn of Africa through the empowerment of communities and to promote sustainable livestock-based and non-livestock-based livelihoods. Activities include capacity building, research, training, education and establishing fora for pastoralist communities, creating small-

[133] ICPAC website available at http://www.icpac.net/ accessed on 6th August 2013

income generating and micro-credit opportunities, and facilitating market links for pastoralists. Together with Oxfam Novib, PENHA is highly involved in mitigating resource based conflicts in the region. [134]

3.6 Developmental Visions of Horn of Africa Countries

The IGAD Secretariat has embarked on a revision of the Strategy on Combating Desertification and Protection of the Environment that was developed in 1990, prior to the IGAD revitalization process six years later. This and other related changes, as well as newly emerging issues and initiatives such as the Global Environment Outlook (GEO), the African Environment Outlook (AEO), the Millennium Development Goals (MDGs), NEPAD, the World Summit on Sustainable Development (WSSD) and TerrAfrica have drawn attention to the needs of ensuring environmental sustainability and sustained growth in the region.[135] Following the endorsement of the IGAD Environment and Natural Resources Strategy by the Council of Ministers 24and the Summit of Heads of State and Government, IGAD has undertaken a number of activities to implement it. In 2009, a draft implementation plan for the strategy was developed with funds from the UN Office for Somalia. Later on, a regional workshop was organized to review the draft implementation plan in February 2009 that was duly presented to the IGAD Committee

---

134 PENHA website available at http://www.penhanetwork.org accessed on 6th August 2013

135 IFPRI, Climate Change in Africa: Key Facts and Findings. *IFPRI:* International Food Policy Research Institute. Web. 22 June 2011. <http://www.ifpri.org/publication/climate-change-africa-key-facts-and-findings>

of Experts the following month. IGAD Policy Organs finally approved the implementation plan in December 2009.[136]

Based on recommendations from a workshop on environmental security and sustainability, a regional programme on climate security and climate adaptation was also developed. Some of the activities planned for 2010 include: Identifying priority programmes; establishing a Ministerial Committee on Environment and Natural Resources; and Mobilizing resources for the implementation of programmes, such as the Regional Programme on Climate Security and Climate Adaptation. African Monitoring of the Environment for Sustainable Development (AMESD) is a continental project being implemented by ECOWAS, IGAD, IOC, CEMAC and SADC under the aegis of the AU. Its objective is to help the African Regional Economic Groupings implement their regional policies in the field of Environment and Sustainable Development (ESD) and to meet their international obligations, particularly with respect to implementation of Multilateral Environmental Agreements/Conventions. [137]The project is funded in the amount of €21 million under the 9th EDF programming. Some of the activities accomplished this year included: Developing a thematic grant proposal that was officially submitted to the EC Delegation in Addis Ababa for their consideration; Following up on implementation of the project, particularly in the development of the AMESD Global Vision and Strategy; Serving as Chair of the AMESD Steering Committee in the first quarter; Attending the third AMESD Steering Committee meeting in Nigeria and a workshop organized by EUMETSAT in Germany; and Participating in AMESD and

---

[136] Ibid
[137] Ibid.

Global Monitoring for Environment and Security (GMES) meetings held in Ethiopia and Italy, respectively.

Planned activities for 2010 include: Ensuring that the grant proposal is endorsed; Implementing the AMESD project on assessment and monitoring of land degradation and natural habitats for sustainable resource management in the region ; Following up the Post-AMESD Initiative; and Continuing the collaboration with other RECs in the development of GMES in Africa. The first IEO that presented the State of the Environment Report for the region was produced in 2007 as part of the African Environment Outlook (AEO) process. That report focused primarily on available environmental resources, which are the assets for sustainable development in the region.[138]

The Charter Establishing IGAD stipulates that the Member States strengthen their cooperation in order to address trans-boundary challenges, concerns and issues that would be difficult for a single country to handle alone for reasons of financial, technical and skilled manpower shortages. The Environmental Protection Programme focuses primarily on the harmonization and development of policies, cooperation on development, transfer of technologies, capacity building and addressing new emerging issues in the environmental fields. One of the basic problems facing the IGAD region is the degradation of its environmental resources that include soil, vegetation, water, biodiversity and atmosphere. It is, therefore, imperative to create awareness, and to educate and involve every individual in the search for solutions to the various

[138] Ibid.

environmental problems such as land degradation, loss of biodiversity and desertification. Public education, both formal and informal, must emphasize the application of simple, practical approaches to sustainable management of natural resources and the environment.[139]

The IGAD region is faced with environmental pollution threats arising from the production, usage, storage and transportation of hazardous and toxic wastes. The hinterlands are intensely cultivated and are prone to soil erosion that transports agro-chemicals to marine and fresh water bodies. The biggest challenge comes from the long coastline bordering the Indian Ocean and the Red Sea where, due to its magnitude and the absence of monitoring mechanisms, the coastline is prone to unscrupulous dumping of toxic wastes. In both the hinterlands and at the coastline, IGAD Member States lack the capacity to maintain adequate surveillance and provide early warning of major calamities arising from environmental pollution.[140]

3.6.1 The Importance of Incorporating Climate Change Visions in State's Policies

A number of countries have or are in the process of developing strategies to address climate challenges. These strategies manifest in form of NAPAs, NAMAs, INCs, PRSPs, National Climate Change Strategies (NCCS) and more recently NAPs or specific sectoral strategies.[141] A key thread in these broad strategies is the identification of extent of risks

---

139 S.R. Dovers,.and A.A. Hezri, (2010): *Institutions and Policy Processes; The Means to the Ends of Adaptation*; John Wiley, &Sons Ltd, *WIRES Climate Change*, Vol.1 p 212-231.

140 Ibid. p 222.

141 A. Gosh., N. Woods, (2009): "*Governing Climate Change: Lessons from other Governance Regime*"; in D. Helm, C. Hepburn, (eds), The Economics and Politics of Climate Change, Oxford, Oxford University Press: p454-477.

and vulnerabilities on the backdrop of which interventions or projects are identified and prioritized. From continental to national level, the most dominant approach is the project-based planning and implementation of climate change investments. Through multi-lateral, bilateral and other financing arrangements, funding streams are likely to increase with high confidence. But as funding gets available and Africa taps into the opportunities, three main approaches to investing in climate change related strategies are important to evaluate. The choice of the approach will differ from one country to another and between strategies al different levels. These approaches are the project-based approach, the program-based approach, and the sector-wide approach. [142]

National constitutions usually set the framework and the opportunity for revising national policies and laws. Also on national level human rights impacts of climate change can become relevant. Such impacts and outcomes of climate change are likely to affect constitutionally protected rights such as rights to life, dignity, food, water, shelter, and health or rights associated with gender, children and indigenous peoples. These must be addressed in the national context. Moreover, an effective climate change policy recognises the need to promote gender equality and equity and hence shall strive to enhance the contribution of women toward sustainable development. Women, especially those in African rural areas, particularly suffer from adverse effects of climate change. Other vulnerable groups include the poor, the elderly and other marginalised groups. [143]In many African countries are currently in the process of formulating (or re-formulating) a climate-change-specific policy which guides the development and implementation of

---

142 Ibid. p 467.

143 Harita, 2010: *The Horn Of Africa Risk Transfer For Adaptation*; Harita Quarterly Report, October, 2010–December 2010

national climate interventions. In terms of national sectoral (statutory) legislation, if successfully implemented, these laws can lead to sustainable development, promote and affect existing climate change policies. [144]Apart from a climate change law and policy, a broad bundle of other national laws and policies directly or indirectly deal with climate change related effects and regulatory requirements. Such laws and policies deal inter alia with mining, water supply and sanitation, agriculture, regional planning and development, forestry, fishing, tourism, land-use planning, resettlement policy, health and many more.

3.6.2 Challenges towards Implementation of Climate Change Approaches

Climate change adaptation is especially important for African countries since the since they are already suffering the effects of climate change in line with the scientific predictions. These countries also have low adaptive capacity due to the level of their socioeconomic development. The institutional and technological capacity are weak and need to be enhanced, including the lack of reliable climate information, the early warning facilities so as to improve forecasts and planning and to develop new coping strategies.[145] Major support is therefore required from the international community and the involvement all stakeholders including the private sector. Key areas that need urgent attention are: the gap in raising awareness for broad ownership, support and communication to adapting to climate variability and change; the gap in climate risk

---

[144] Ibid.

[145] N. Helme and Davis S., 2011: Nationally appropriate mitigation actions (NAMAs) and the Clean Development Mechanism (CDM); Washington, Center for Clean Air Policy, http://tinyurl.com/3h4l7vu accessed 5 July 2011.

management for strategic planning and disaster risk reduction; climate-based services support to governments, the private sector and civil society; and, observations, data management and infrastructure to provide essential data to cover the first three gaps, as well as the transfer of low-carbon technologies to Africa where very limited engagement by the private sector and continuing concerns about intellectual property rights that have severely restricted technology transfer. In spite of the recognition of the continents vulnerability, support from the international community has not been commensurate with the level of support need to build the resilience of the African countries. [146]

There are a number of studies estimating the costs of adaptation in Africa and other regions. An issue that needs to be dealt with is the 'absorptive capacity' to receive and spend this money in a cost effective manner in order to build the adaptive capacity of vulnerable communities on the ground.[147] Many of the most vulnerable developing countries do not have or are at several different stages of developing their comprehensive climate change strategies, policies or putting in place mechanisms to deal with the receipt and disbursement of adaptation funds and the implementation of climate change actions.

---

[146] Ibid.

[147] C.S Hendrix and S.M. Glaser, 2007: Trends and triggers; Climate change and civil conflict in Sub-Saharan.
Africa, Political Geography, 26, 695-715.

3.7 Conclusion

Changing the trend and moving towards a Horn of Africa that is more ecologically, socially and economically sustainable is not easy. But it is possible. Many enthusiastic individuals in various private sector, governmental, non-governmental, academic and donor organizations can make a difference together. Already all kinds of initiatives and projects have been, or are being explored, in order to tackle environmental security threats. Some of them do not work, some do.

CHAPTER FOUR

ISSUES AND PERSPECTIVES IN CLIMATE CHANGE, CONFLICT AND SUSTAINABLE DEVELOPMENT IN THE HORN OF AFRICA: A CRITICAL ANALYSIS

4.1 Introduction

Climate Change is a multi sectoral issue. It's an issue that affects all aspects of a society be it political, social, economic or security. Nevertheless, it has remained an issue marginalized from the fore of these discussions. One of the major challenges has been the issue of classification and attribution. Climate Change cannot be addressed in isolation neither can nor should it be regarded as only an environmental issue. Through our study we have been able to establish the link between climate change, conflict and development. Climate Change undermines economic development, increasing poverty and livelihoods further compromising human security which with interaction with socio economic and political factors, combusts into intrastate and interstate conflicts as witnessed in the region. Therefore as a multi-sectoral issue, it is an issue that needs multi-stakeholders. In this section, we look at key emerging issues as relates the climate change, conflict and sustainable development.

4.2 Emerging Issues in Climate Change, Conflict and Sustainable Development

Climate Change, Conflict and Sustainable Development are not new concepts. However, as the world evolves, man and his interaction with the environment and other people also evolve and with that emerge issues that impact on the future of the world as we know it. The world cannot ignore climate change any more than it can ignore conflicts resulting from resource scarcity. Nevertheless it is pragmatic to have practical and context specific solutions to the challenges of conflict and climate change. While certain concepts such as sustainable development, adaptation and mitigation have been fronted as some of the ways in which to safeguard the environment and control climate change, these have to be domesticated within the African context and made not only practical but have the buy in of multiple stakeholders including the grass root communities who are impacted the most by climate change. Some of the issues around this process are discussed in the following section.

4.2.1 Policy Frameworks for Climate Change Adaptation and Sustainable Development

There are significant analytical and policy challenges associated with the economic assessment of adaptation. It can be hard to define what falls within the scope of adaptation. For example, adaptation costs are higher if they follow a broad definition including actions to increase adaptive capacity, such as investments in nutrition or education, than if the definition of adaptation is confined to measures that directly reduce climate change damages. The comparison of costs and benefits also raises several methodological issues, including valuation, discounting and distributional consequences.

Additionally, unlike mitigation, which has to be coordinated internationally, adaptation decisions are largely decentralised. Adaptation actions will be undertaken not only by governments but also by private agents, such as individuals and firms. The way different actors will consider costs and benefits of adaptation in their decision making process is not easy to foresee.

Reducing the risks of climate change impacts on people, places, and livelihoods–and anticipating and building resilience to manage these potential impacts—depends on the deliberate and strategic integration of adaptation considerations into development plans and actions. For this reason, stakeholders in policy making will consider the role of climate variability and change in constraining development across their portfolio, and work with partners to build climate resiliency into national, sub-national, and local plans and actions in climate-sensitive sectors. This integrated approach will allow them to advance missions and plans and development objectives while ensuring the long-term sustainability of the planned programs and operations.

This will ensure that for instance the Horn of Africa governments development portfolio and operations are sustainable in the face of an uncertain and changing climate by: working with experts in key climate-sensitive sectors such as agriculture, health, disaster preparedness, and water management to integrate climate change considerations into strategic planning, program design, and implementation; evaluating past climate change programs and other relevant examples of integrated programming to develop lessons that will inform their next generation of programming, and by developing an evaluation plan for climate change mitigation and adaptation programming in accordance with these government's evaluation policies.

Effective and efficient climate policies will require a mix of both greenhouse gas mitigation and adaptation to the impacts of climate change. Irrespective of the stringency of mitigation efforts, some impacts of climate change is unavoidable, thus making adaptation an important objective to pursue. Adaptation entails taking the right measures to reduce the negative effects on climate change by making the appropriate adjustments and changes.

Some of the policy frameworks cited as relevant to enabling climate change mitigation and adaptation include: national policies, integrated planning and policies, financial incentives (e.g., eco-taxes, environmental friendly subsidies), research and development policy, standards and regulations that incorporate climate change considerations, integrated land use planning, and linkages across policy sectors and to 'sustainable development'.[148]

One of the indicators for African countries engagement in the global frameworks for climate change mitigation and adaptation is the submission of each country's Initial National Communication (INC) and National Adaptation Programme of Action (NAPA) to the UNFCCC. Without Climate Change Policy framework or at least elements of it in place, host countries cannot approve CDM projects and are limited in their access to adaptation funding, which poses an additional investment risk to potential project developers or hinders the funding of adaptation projects or programs[149]. However, the established institutional frameworks to support the development of mitigation and

---

[148] S.R. Dovers and A.A. Hezri, (2010) Institutions and Policy Processes; The Means to the Ends of Adaptation; John Wiley, &Sons Ltd, WIRES Climate Change:Vol.1 p212-231.

[149] UNCCD, (2009): Land and Climate Change Finance in Central Africa; *Climate Change Mitigation and Adaptation Activities in Central Africa and Options for Improving Access to Climate Change Finance Supporting the UNCCD*; The Global Mechanism of the UNCCD, Rome, Italy.

adaptation projects in Africa are generally weak. The INCs are of variable quality and in many cases offer limited guidance as to the mitigation and adaptation priorities of each country. More encouraging is the overall quality of the NAPAs that appear more focused and propose several detailed project examples for which clear goals, objectives and funding requirements are established. Many of the project ideas relate to the agricultural land-use, forestry, and renewable energy sectors.

More specifically, activities that focus on reforestation and improved forest management, improved agricultural land management, installation of solar voltaic panels and improved cooking stoves, and improved grazing land management have all been proposed. However, the lack of clarity observed in some of these key documents raises concerns as to the degree that mitigation and adaptation priorities have been identified and incorporated into national policies. While the region has received little in the way of financing for on-the-ground mitigation or adaptation activities, the sheer number of initiatives, particularly in relation to REDD, are an encouraging sign that this region will take a more prominent role within the carbon markets in the future[150].

The argument for a strong response to climate change from those responsible for development policy is becoming clearer and more urgent, and is now widely supported. The policy response that is required needs to be better, quicker and more coherent to capture natural dynamics and encompass human systems[151]. In this regard, however,

---

[150] Ibid.

[151] Boyd, E., N. Grist, S. Juhola, and V. Nelson, (2009): *Exploring Development Futures in a Changing Climate; Frontiers for Development Policy and Practice*, Development Policy Review, Vol. 27 (6): p 659-674.

government responses have been low and face constraints in driving adaptation[152] and much of the adaptation efforts have been done by private sectors.

So far, the region has been unsuccessful at accessing adaptation funding. Although the CDM is the largest project-based market currently operating for GHG mitigation projects; Africa's presence within the voluntary carbon markets is similarly limited. Up to 2008, CDM projects hosted in African countries accounted for only 2% of all over-the-counter transaction volumes in 2007[153]. On the 1st February 2009, only 28 African CDM projects, representing 2% of all projects were registered for Africa. The majority of these projects were located in South Africa (14 registered projects), Morocco (4), Egypt (4) and Tunisia (2). Nigeria, Tanzania, Kenya and Uganda also registered one project each. As of yet, there were no registered projects in the Central African sub-region[154].

In light of the constraints, African countries face in mitigation and adaptation processes, Africa's greatest mitigation potential lies in the AFOLU sector. This recognition has led to a series of regional and sub-regional programs being established to improve the continents access to carbon markets. The UNFCCC launched the Nairobi Framework, while the efforts of the Common Market for Eastern and Southern Africa (COMESA), ECOWAS, SADC and Commission for the Forests of Central Africa

---

[152] Penning-Rowsell, E.C,, C. Johnson, C. S.M.Tunstall, (2006): 'Signals' from precrisis discourse; lessons from UK flooding for global environmental policy change, Glob Environ Change, Vol. 16: p323–339.

[153] K.Hamilton, Bayon R., Turner G., Higgins D., (2007): Forging a Frontier; State of the Voluntary Carbon Markets 2008, New Carbon Finance, London, UK, and the Ecosystem Marketplace, Washington, D.C., USA.

[154] UNEP RISOE Working paper, (2009): The role of small groups in the climate negotiations, Post 2012, CDM.

(COMIFAC) are most notable for their coordinated efforts at a ministerial and sub-regional level. Generally, adaptation must become an organizing principle across policy sectors and acted upon in the near term, inviting a focus on how that can be achieved through public policy and administration[155].

Some of the significant benefits for African countries to participate in the global initiatives of mitigating and facilitating adaptation from climate change impacts include the access of funding opportunities coming through the UNFCCC. Under the UNFCCC, industrialized countries recognize the responsibility to assist developing countries' adaptation efforts, primarily through the provision of financing for adaptation measures. These funds represent the most concerted efforts to date by the international community to finance activities and projects aimed at improving the adaptive capacities of communities in developing countries. In parallel to the Kyoto markets- fundamentally compliance markets shaped by governmental regulation - voluntary carbon markets have stimulated a growing number of project developers implementing projects, many of them in developing countries, to create offset credits for the voluntary markets.[156]

Despite initiatives in place to balance future climate conditions, there are indicators showing that determining the future of the climate regime is a complex process influenced by the need to balance the diverse interests and national circumstances of

---

[155] UNCCD, (2009): Land and Climate Change Finance in Central Africa; *Climate Change Mitigation and Adaptation Activities in Central Africa and Options for Improving Access to Climate Change Finance Supporting the UNCCD*; The Global Mechanism of the UNCCD, Rome, Italy.

[156] Ibid.

developed and developing countries, to enable continued economic development in all countries, and to promote significant energy development in developing nations[157].

4.2.2 The Role of the Private Sector in Climate Change Adaptation, Conflict Management and Sustainable Development.

With climate change adaptation being a multi-stakeholder, multi- pronged (mandatory and voluntary), and a multi-level approach (international, national, regional, and local), the private sector is a critical source of adaptation innovation, technology, as well as financing solutions. This is because climate change impacts will affect almost every aspect of business, but early action can reduce risks. However, despite growing awareness of the need for adaptation, the private sector has not yet risen to the task, thus the need for further private sector adaptation works. This chapter analysis aims to contribute to a wider understanding of private sector activities by analyzing: what motivates private actors to undertake adaptation the roles of the private sector in climate change adaptation and the role of government in supporting and enabling the private sector to take action.

Over the past few years, the global debate on climate finance has increasingly focused on the potential of the private sector to contribute to and/or leverage climate finance. At the outset, discussion on the role of the private sector in climate finance was focused on mitigation to reduce the level of greenhouse gases emissions. Today the role

---

[157] IISD : After Kyoto "*What Will Happen After 2012*?" IISD, 2009

of the private sector is increasingly relevant as regards the global adaptation debate. The private sector currently represents close to 75% of global climate finance flows. Private capital is essential to scale up climate finance in light of restricted public resources.[158] However, the term 'private sector' includes a highly diverse group of actors and activities operating at international, national and local levels. This makes analysis of the contribution of the private sector to adaptation especially challenging. Understanding the private sector's role in adaptation is crucial, as countries' success at adaptation will depend on the success of the private sector and other private actors in responding to climate change impacts and risks. Additionally, private sector responses may provide lessons and examples of innovative approaches of interest to the public sector. Significant national and international discussion is currently ongoing regarding the planning, financing and implementation of adaptation. However, to date, this has focused on the public sector, with discussion of the private sector tending to focus on its potential as a funding source for adaptation action. [159]

The focus on the private sector in the adaptation debate is wholly relevant because the private sector accounts for 85% of all investments worldwide; 90% of people in developing countries depend on private sector generated income and the fact that the private sector represents close to 75% of global climate finance flows. One of the first adaptation and private sector topics to be researched was the role of insurance in protecting developing countries and vulnerable communities. Subsequently, following the debate generated around the Green Climate Fund and the private sector facility, a number

---

158 B. Buchner et al., The Landscape of Climate Finance (2012) (Climate Policy Initiative: Venice

159 Brian Walsh. After Copenhagen, Getting Business into Green Tech. Time Magazine (2010, January 15). Available at http://www.time.com/time/ business/article/0,8599,1954019,00.htm

of reports emerged that, modelled on the support given by Development Finance Institutions (DFIs) to private sector development in developing countries, explored financial instruments for use to mobilise climate finance, including adaptation.[160]

A number of parallel lines of research have also attracted significant attention in the past couple of years. One of them looked at the possibility of creating an adaptation market mechanism based on the idea and similar principles of the carbon market.[161]Another important body of literature focuses on the policies and measures that can lead the private sector to internalise adaption costs in their business models and adopt measures to reduce their vulnerability, and by extension, that of their workers and neighbouring communities. At the same time, a number of challenges when using the private sector to channel and mobilise adaption funds have also been explored. There are severe limitations in respect to definitions, approaches and tools to account for and track private sector flows.[162] The lack of data has serious implications for the coordination of support to developing countries. Without clear information, it is difficult to ensure resources are equitably distributed among developing countries and sectors. Research has also identified important methodological inconsistencies that could lead to the overestimation of the potential of the private sector to mobilise and contribute to meet the adaptation needs of developing countries.[163]

---

[160] S. Venugopal et al. (2012), *Public Financing Instruments to Leverage Private Capital for Climate-Relevant Investment: Focus on Multilateral Agencies*. World Resources Institute: Washington DC ,

[161] K.H. Schultz, (2011). Financing Climate Adaptation With A Credit Mechanism: Initial Considerations, Climate Policy,

[162] C. Clapp et al. (2012). *Tracking Climate Finance: What and How?* Paris: Organisation for Economic Co-operation and Development and International Energy Agency,

[163] M. Stadelmann et al., (2011).Mobilising private finance for low-carbon development. Tackling barriers to investments in developing countries and accounting of private flows. Climate strategies,

There are also limitations for the private sector to cover the adaptation and mitigation needs of developing countries. A number of reports have pointed to important differences in private sector development between different countries, which could lead to uneven and inequitable distribution of adaptation finance channelled or mobilised through the private sector.[164] The private sector is especially weak in the poorest countries, when compared to many middle-income countries.[165] This limits the opportunities to mobilise finance from local companies. At the same time, investment opportunities for foreign companies also decrease with the level of income as a result of worsening business conditions and the increased informality of the economy.[166]

The concern is that, unless efforts are made to steer private finance in an equitable manner, it would mostly benefit a handful of developing countries, but bypass the poorest ones, where the needs are greatest. Based on the experience of multilateral development banks (MDBs) in development and the private sector, concerns have also been raised about the possibility that the private sector would mostly benefit multinational companies from major economies, instead of developing countries' local companies.[167]

Much of the recent attention to adaptation has focused on the role of the public sector. However, existing research on public sector adaptation may not be applicable to the private sector due to differences between the groups: the public sector is affected by different sets of incentives to the private sector, and may also face different risks. For the

---

[164] A. Atteridge, (2011) *Will Private Finance Support Climate Change Adaptation in Developing Countries? Historical Investment Patterns as a Window on Future Private Climate Finance.* Stockholm Environment Institute, Working Paper

[165] Ibid.

[166] J. Pereira, (2013) *Climate Fund and Pro-poor Climate Finance: Is There a Role for Private Finance?* Friends of the Earth: Washington DC.

[167] J. Pereira, (2012) *Cashing In On Climate Change? Assessing Whether Private Funds Can Be Leveraged To Help The Poorest Countries Respond To Climate Challenges*. Eurodad: Brussels,

purpose of this study, the private sector is defined as privately owned or controlled companies, organisations and entities, whereas the public sector is the part of the economy owned or controlled by the public, usually through public agencies. This definition of the private sector therefore does not include other private actors, such as individuals or households. Within the private sector there are a wide range of possible business structures, ranging from individual traders to multi-national corporations. Therefore, even within the private sector climate change risks to and impacts on different companies will vary. Additionally, climate change will affect companies in many different ways: it can affect the ways businesses operate, impact the profitability of their operations, and create opportunities.

Businesses may be exposed to different risks as a consequence of climate change, including systemic risks across the entire economy and specific risks at the sector, industry and company levels[168]. These risks can be both direct and indirect, and include: physical risks, supply chain and raw material risks, reputational risks, financial risks, product demand risks, regulatory risks, and litigation risks. Companies' exposure to these risks will vary depending on their business operations and on the sector in which they operate. This paper broadly categorises businesses as operating in three sectors – the goods sector (in which companies produce tangible items such as commodities, minerals or merchandise), the services sector (in which companies provide intangible products such as accounting, banking or education), and the joint goods and services sector (in

[168] Hoffman, A.J. and J.G. Woody, (2008) *Climate Change: What's your Business Strategy* (Boston: Harvard Business School Press.

which companies provide both goods and services, or rely on assets or raw materials to deliver services).[169]

One of the defining characteristics of adaptation is that the benefits are often local and private. Self- interest should be a powerful driver for companies to manage their exposure to risks and exploit opportunities. Economic theory suggests that this will lead them to adopt cost-effective adaptation strategies. However, there is only scattered evidence so far that companies are taking action on adaptation. For example, Ipsos MORI[170] contacted a range of UK businesses and only 23% of those surveyed reported having taken action in response to the risks of climate change. The first challenge in interpreting this is that companies' may not label their actions as adaptation. Actions to improve businesses' resilience or to manage environmental or climate risks may occur as part of standard risk management or planning processes, and may not be explicitly categorised as an adaptation response to climate change. The second challenge is that there are weak drivers for companies to publicise their actions on adaptation. Because the benefits of adaptation are often local and private, and therefore usually only benefit the company itself, adaptation does not fit neatly within standard Corporate Social Responsibility (CSR) narratives. This can make it harder for companies to effectively communicate how they are adapting to climate change. This contrasts with mitigation actions, such as greenhouse gas reduction goals or carbon offset policies, which have

---

[169] Ibid.

[170] Ipsos MORI (2010), Climate Change Adaptation: A Survey of Private, Public and Third Sector Organisations, http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17519&FromSearch=Y&Publisher=1&SearchText=GA0406&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description accessed 29 July 2013.

global and public benefits to society and are therefore easier to communicate as part of standard CSR strategies. Additionally, information regarding companies' climate vulnerabilities may be sensitive, because it could indicate potential weaknesses to competitors or negatively affect competitiveness or market valuations, so companies may not publicise the climate risks they face or the actions they have taken to manage these risks. Furthermore, if adaptation actions provide a competitive advantage, there is a disincentive for companies to share that knowledge more widely. These factors suggest that the degree of visible or publicised action may be a poor indicator of the extent of actual action. The third challenge in interpreting the amount of visible action is to do with the nature of adaptation. The effects of climate change are long-term, uncertain and context-specific. Frameworks for decision- making under uncertainty have suggested that it can be rational to delay significant and irreversible investments.[171] Secondly, it is difficult to draw broad conclusions about what companies ought to do be doing, because the appropriate risk management strategy will depend upon their particular circumstance. Lastly, some adaptation responses are open to different interpretations. This can be seen from the classification of generic adaptation responses. For example, tolerating losses can be part of an efficient adaptation strategy or it can be the result of companies failing to consider climate change.

To understand and interpret how the private sector is adapting to climate change, a three tier framework is used. The tier considers: (1) risk awareness, (2) risk assessment and (3) risk management. Risk awareness is the starting point for private sector

---

[171] N. Ranger et al. (2010) Adaptation in the UK: a decision-making process, ww.cccep.ac.uk/Publications/Policy/docs/PB-adaptationUK-ranger.pdf, accessed August 1, 2013.

considerations of climate change, and indicates that a given company is aware that climate change could affect their business. This can lead them to undertake a risk assessment that moves from a general awareness towards a specific understanding of the risks and opportunities for their business and operations. Depending on the results of this risk assessment process, they may decide that it is necessary to implement explicit risk management strategies. Each successive level builds on the results of the preceding one. Awareness if a prerequisite for action and risk assessment is needed to determine the appropriate risk management.

It is important to note that the policy debates about how to separate out the effects of current climate from the additional impacts of climate change are of less relevance to companies. The key question for them is what their risks are now and how these will evolve over time. As such, action that is in effect adaptation may not be viewed as such by the company in question.[172]

Companies may use their websites to demonstrate their awareness of climate change and engage in awareness-raising exercises: they illustrate climate change issues, highlight their initiatives to address them, and in some cases publicise the results of their awareness-raising campaigns. For instance, the chemical and pharmaceutical company Bayer has developed initiatives to raise awareness of climate change impacts among children: they publish a children's book "What's up with the Earth: The mystery of early spring"; they support education in climate change affected regions (for example, they support the CSIRO Carbon Kids educational programme in Australia); and they co-

[172] Ibid.

organise the "International Children's Painting Competition on the Environment" with the United Nations Environment Programme (UNEP)[173].

Engaging in and publicising training schemes and awareness raising campaigns can be a way for companies to illustrate their engagement in climate change issues and their awareness of risks, and may form part of wider CSR initiatives. However, these schemes may also form part of companies risk management strategies. For example, training may be intended to prepare employees to take action in the event of a disaster, and awareness-raising campaigns may attempt to influence public or customer behaviour.

Private sector financing of adaptation in the forestry, land use and agriculture sectors in the less-developed world is still in its infancy, and there are few relevant examples of project opportunities. Nevertheless, there are a number of options for involving private sector investors in adaptation that help to combat desertification. One option for increasing private sector involvement in adaptation activities is public- private partnerships (PPPs) that aim to harness private efficiency and resources to meet goals that benefit the public. In line with the GM's aims, the establishment of such partner-ships may help to identify and use synergies to finance and implement adaptation projects that not only support the public good but also result in economic returns for private investors. An example would be the development of climate-resilient crops through a PPP aiming to combat desertification and help protect the biophysical foundations of agriculture, such as forests, soils and water.

---

[173] Bayer (2010a) *What's up with the Earth: the Mystery of Early Spring,* Bayer, www.climate.bayer.com/en/wuwte-complete.pdfx, accessed 11 August 2013.

Insurance is another area through which private sector companies can become involved in financing adaptation. Investors can purchase insurance to protect their investments from risks such as floods, hurricanes or crop loss – many of which are related to climate change. Insurance companies may protect themselves, in turn, through reinsurance, with companies such as Munich Re. However, the insurance sector faces considerable constraints to operating efficiently in the less-developed world. Owing to the lack of climate change data and information on the damaging effects of climate change, risk analyses cannot always be conducted. In addition, the financial infrastructure in the host country may be poorly developed, or there may not be sufficient money available to cover insurance payments. A Private-Public Partnership, together with a supportive public policy environment, may be a useful mechanism to support development of the insurance sector, for example, for agribusiness.[174]

Another way to involve the private sector is to One option is to use a GHG mitigation component. Through Kyoto Protocol mechanisms such as the CDM or Joint Implementation (JI), an additional revenue source may be identified for projects that not only mitigate GHGs sold on the carbon market, but also contribute to adaptation. Such projects may be implemented outside the United Nations - governed scheme through the voluntary project scheme. While climate change mitigation projects have the option of receiving revenues from the generation and sale of carbon credits, adaptation measures are frequently funded by public money. The combination of these two aspects in one project could motivate the private sector to invest in adaptation as part of a mitigation

[174]Bayer (2010b) Winners of the 19th International Children's Painting Competition, www.unep.bayer.com/en/international-children_s-painting-competition-19.aspx, accessed 11 August 2013.

activity, and the overall funding situation for both mitigation and adaptation projects could be improved. [175]

However, given the diversity of the private sector and of the adaptation challenges facing developing countries, its not be taken for granted that the private sector will succeed in tackling all kind of adaptation challenges. In the past, support to the private sector has often failed to alleviate poverty and livelihood threats in many of the poorest parts of the world. Private investment activity to date has been unevenly distributed amongst countries and economic sectors, and often it appears not to match developing countries' most pressing adaptation needs. It rarely meets the needs the most vulnerable and poor communities and Least Developing Countries (LDCs). These patterns of private sector behaviour have important implications, not least that the discussion on private finance needs to sharpen. It must dissect different kinds of financial flows - from portfolio equity, to direct investment, to commercial bank lending, to bond finance. Each of these implies a different quality of finance for the recipient, with implications for how it might support adaptation efforts. The gaps in delivery of private finance also pose a major challenge for public finance, which must not only leverage new resources specifically for adaptation but also redirect investments to countries and sectors that currently miss out. [176]

Many of the instruments in use, or proposed, that will increase the contribution of the private sector to adaptation are in the early stages of development (e.g. adaptation market mechanism). Others build on the experience of the private sector in development.

---

[175] Ibid.

[176] Cafédirect/GTZ. (2011). AdapCC – *Adaptation to Climate Change For Smallholders Of Coffee And Tea*. Available: http://www.adapcc.org/. Accessed Marcb 20, 2013.

Yet little is known about the specific contribution of each to meeting the adaptation needs of countries with varying levels of development, nor the needs of vulnerable communities within developing countries. More research is required, based on a bottom-up approach from specific needs to specific tools and instruments. It is important to explore how different tools relate to and complement one another in order to make intelligent policy decisions near term. It is essential to develop a common methodology to record and track private finance, including adaptation finance. Without such a system, it will not be possible to ensure an equitable distribution of the scarce climate finance available. Nor will it be possible to hold developed countries to account for their commitments and historic responsibility in climate change. [177]

Safeguards of public organisations that support the role of the private sector in adaptation need to be strengthened. Public organisations must in addition improve implementation oversight to ensure projects comply with such safeguards. There is therefore a role for the private sector in climate adaptation, but it may not be best placed to meet the needs of the most vulnerable and poorest communities hence there may be a few specific areas and sectors where it could focus.

Many of the instruments used or proposed to increase the contribution of the private sector to adaptation are in the early stages of development (e.g. adaptation market mechanisms) while others build on the experience of the private sector in development, but little is known about their specific contribution to meeting the adaptation needs of countries with different levels of development, as well as the specific needs of vulnerable

---

[177] J. Brown, J. and Jacobs, M. (2011). *Background Note: Leveraging Private Investment: The Role Of Public Sector In Climate Finance. Overseas Development Institute*. Available: http://www.odi.org.uk/resources/docs/7082. pdf. Accessed March 5, 2013.

communities within developing countries. The different stages of development of a number of initiatives also call for better policy planning and the elaboration of a more ambitious international research and deployment agenda. Although crucial to reduce vulnerability, some of the indirect instruments such as internalising adaptation costs of encouraging technology transfer and development seem more appropriate, at least in their current form, for countries with large public resources.[178] This is not the case of most developing countries, which would require significant external support in order in order to keep pace with developed countries and prevent widening of the adaptation gap. In general, more research based on a bottom-up approach – starting from the specific needs and moving up to specific tools and instruments – is required. It is also important to start exploring how different tools relate to and complement one another in order to make the right policy decision in the near future. A number of broader or framework issues also need to be addressed as soon as possible. It is crucial to develop a common methodology to record and track private finance, including adaptation finance. Without such a system, it is not possible to guarantee an equitable distribution of the scarce climate finance available, nor hold developed countries to account for their commitments and historic responsibility in climate change.[179] The safeguards of public organisations supporting the role of the private sector in adaptation need to be strengthened. In addition, public organisations need to improve implementation in order to ensure projects comply with safeguards. This is particularly important in the case of climate funds. Without effective

---

[178] BMZ. 2011. Funds. Available: http://www.developpp.de/en/funds.html. Accessed June 20, 2013

[179] AdapCC.(2010). AdapCC Final Report – Results & Lessons Learnt. Available: http://www.adapcc.org/download/Final-report_Adapcc_17032010.pdf. Accessed August 20, 2013

safeguards in place it is difficult to steer private finance, maximise its contribution to the fight against climate change and ensure accountability.

Given the urgent need to support developing countries' adaptation efforts, it is essential to begin to fill the knowledge, evidence and policy gaps as soon as possible. It is therefore recommended of that: the need to increase and focus international research efforts on the private sector and adaptation; need to fund research using a bottom-up approach, because current research relies to a great extent on existing tools and examples. Given the problems of existing tools when reaching poor and vulnerable communities and SMEs, it is important to explore the interface between vulnerable communities and the private sector on the ground in order to develop new approaches. there is also need to examine how the private sector can take on projects for the public good (usually non-bankable), including through PPP, other risk-sharing facilities or by creating new classes of assets that can be monetised and help make public-good projects bankable; also, the need to explore how different tools relate to and complement one another in order to develop comprehensive strategies to address global adaptation needs and, in particular, those of developing countries. [180]This is especially important in the case of instruments usually implemented with government support (technology development and transfer) so that developing countries can also benefit from those efforts. Potentially, these efforts could be coordinated through the recently created Climate Technology Centre and Network (CTCN). [181]

---

[180] Ibid.

[181] World Bank, "*Linking Agricultural Innovations To Knowledge Sharing In Africa*", IK Notes, (January 2006) No. 88.

4.2.3 Innovations for Climate Change Adaptation and Sustainable Development in the Horn of Africa.

Africa faces daunting sustainable development challenges in coming decades, but also significant opportunities. The period since the beginning of this new millennium has been one of strong economic performance on the continent. If economic growth can be sustained and the benefits widely shared, Africa can accelerate social progress, including relieving the burden of poverty, hunger and disease on much of its population. African development also has the potential to follow a more sustainable path than has been the case in many other parts of the world, where development often resulted in severe environmental problems before governments and other actors began to get to grips with pollution and resource degradation. Following a more sustainable course will by no means be easy. This definitely calls for innovative thinking and innovative practice.

The new millennium has brought progress in many African countries. A pro-longed international commodity boom has boosted exports of both oil-exporting countries and other commodity-exporting countries. A number of African governments have significantly improved their macroeconomic management and political governance, though on both scores further progress could be made depending on the country. Member States of the United Nations have reiterated their willingness to support African countries through international cooperation. Large development projects have been launched with support from bilateral and multilateral institutions, particularly for the improvement and expansion of energy and transport infrastructures. As a result, many African countries have been enjoying some of the highest growth rates in their histories.

However, Africa still lags behind in its pace of innovation apart from South Africa which experiences innovation rates comparable to the rates observed in developed countries[182], most sub-Saharan African countries remain relatively slow to adopt innovations. The inadequacy of imported innovations to the context of least developed economies explains part of the difficulty to find solutions for Africa's problems. The small size of most local markets, the lack of resources allocated to research and development activities, and the high rates of out-migration of educated Africans are also important constraints to technological innovation and diffusion. Besides, African indigenous innovators are generally overlooked in the search for solutions to endemic problems. Two main reasons[183] can be given for this: (i) innovations and discoveries they produce are mostly incremental, with modest prospect of income gains; and (ii) there is little knowledge sharing due to the application of innovations in isolation, lack of written or electronic records and inadequate communications infrastructure for knowledge sharing. The build-up of a critical mass of indigenous capacity in sciences, including material sciences, biotechnology, engineering, medicine, and ICT remains essential. The elimination of institutional barriers, such as excessive regulation of innovative markets like telecommunications, is another core issue for the dissemination of innovations. At the local level, low levels of literacy and numeracy of prospective technology adopters, many of whom are poor, can also hinder diffusion.

---

[182] W. Blankley "*Preliminary Results Of The South African Innovation Survey, 2005*", South African Journal of Science, May/June 2007:103(3/4), pp. 190-192.

[183] World Bank, "*Linking Agricultural Innovations To Knowledge Sharing In Africa*", IK Notes, January 2006:No. 88.

There are several innovations which have been made towards climate change adaptation and sustainable development in the Horn of Africa. Kenya, like many other developing countries in the Horn of Africa, is grappling with energy challenges. There is poor grid energy access and traditional biomass based fuels for cooking and heating are the most important sources of primary energy. Wood fuel accounts for 68.3 percent of the total energy consumption leading to alarming depletion of forests. Biogas is considered affordable compared to other sources of energy including kerosene, liquid petroleum gas and electricity. The polybiogas initiative is collaboration between Cypro EA and Polytanks Ltd, with support from the CIC. The technology is already creating a lot of interest, especially after displaying it at 2013 Nakuru Agricultural Show, Kenya. Biogas is produced by the breakdown of organic matter in the absence of oxygen (anaerobic digestion). The Polybiogas Model uses a variety of bio-degradable materials such as food waste, livestock dung, poultry droppings, waste from agricultural processing, e.g. coffee pulp, molasses, fruit pulp but also crop materials such as water hyacinth, weed, grass, rice straw, maize stalks and others. The gas that is produced from this process can be used for cooking, heating, lighting, and even running engines to replace diesel fuel, and is a safe and renewable source of energy.

Key challenges facing the economies of East and Horn of Africa region include the recurrent droughts (linked to climate change) which have had negative impacts on the region's power sector. Drought induced reduction in hydropower generation has become a persistent feature in the region's power sector. The adverse impacts of what is thought to be "climate change-related" power crises have had far reaching and devastating impacts on both the power sectors and the economies of the countries within the East and

Horn of Africa region. These impacts are expected to become even stronger in the next years; hence their consequences are likely to become ever more serious as well.

As a result, during power crises, the most common response option from governments in the East and Horn of Africa region has been to procure very high cost emergency thermal electricity to meet the shortfall in power supply. As was witnessed in Uganda between 2004 and 2006, the reduction in water levels at Lake Victoria resulted in reduction in hydro-power generation by 50 MW and this led to the adjustment of the GDP growth rate from 6.2% to 4.9%[184]. The country had to turn to costly thermal generators to ease the supply deficit. During this period, electricity supply was more intermittent than usual, and the price of electricity increased. In Kenya, Tanzania and Ethiopia, drought-related power shortages and their impacts were similar to Uganda.

An important renewable that has contributed to the resilience and adaptation of Kenya's energy sector to drought induced power generation shortfalls is geothermal energy. Just over 10% of the Kenya's electricity generation is from geothermal energy. During the recent droughts in the country, geothermal energy played a critical role as it continued to operate at nearly 100% availability when many of the hydropower stations in the country were crippled by the dry spell. Renewable energy options are ideal candidates that can be developed to complement large scale hydropower generation. Options such as geothermal, small hydro, biomass cogeneration and wind are attractive since the resources are widely available in the region. These renewable energy options are not only environmentally friendly but they possess additional benefits including being

[184] J. Baanabe. (2008) *Large Scale Hydropower, Renewable Energy Adaptation & Climate Change &Energy Security in East &Horn of Africa*: A paper presented at HBF Regional Workshop on 21st November, 2008.

suitable options as adaptation responses to the adverse impacts of drought (which could be climate change related) to the power sector.[185]

All the countries in the East and Horn of Africa region could reap significant benefits from, and hedge their respective power sectors from the effects of what is believed to be climate change induced drought by investing in the development of geothermal energy sources. The potential of geothermal energy in East and Horn of African countries is shown in the table below. It is estimated that a portion of the geothermal potential, would be sufficient to hedge against drought related power crises in East and Horn of Africa.[186]

4.2.4 The Issue of Funding for Climate Change

There are two fundamental avenues of financing for climate change adaptation: public financing and private financing. The key difference between public and private adaptation financing is the investor's motivation. The primary motivation for suppliers of private finance is to maximise return on their investment (directly or indirectly). Public sector financing, on the other hand, does not necessarily need to be 'profitable' but is generally motivated by a desire to maximise 'impact' per invested dollar so as to demonstrate to their 'owners' (the tax payers) that funding is being spent wisely in the most vulnerable regions and making a positive difference to as many vulnerable people

[185] Ibid.
[186] Ibid.

as possible. Most likely, many climate change adaptation projects will be financed by a mix of public and private funds. [187]

Developing countries can take steps to improve their ability to secure these funds. There are a number of common principles for securing public and private climate change adaptation financing that include focusing on the return on investment, making use of collaborative action, communicating the rationale for adaptation action, and building local capacity. Improving the enabling environment for investment by providing the appropriate administrative framework and developing the capacity to absorb resources can improve a country's ability to attract finance and its ability to use that investment effectively. Both public and private funders will be attracted by investment climates that promise stability and good governance.

Adaptation projects will often be financed through collaboration between private sources of capital, public donors, non-governmental organisations (NGOs), and local institutions (both public and private). Similarly, the financing for these projects will likely include a mix of private, public, and philanthropic funds.[188] One of the key strategies for seeking funding for adaptation projects is to structure projects to take advantage of both of these sources of funding. Often public and philanthropic funding can serve a catalyst for the investment of private capital. Developing countries can use public funding to reduce the investment risk of a project thereby encouraging private

---

[187] A. Atteridge. Will private finance support climate change adaptation in developing countries? Stockhom Environment Institute. Working paper 2011. Available: http://www.sei-international.org/mediamanager/documents/Publications/SEI-WorkingPaper-Atteridge-WillPrivateFinanceSupportClimate.ChangeAdaptationInDevelopingCountries-2011.pdf. Accessed May 22, 2013.

[188] UNDP (2011a) Publication Catalyzing Climate Finance UNDP.

investors to contribute. Public private partnerships are a particularly effective model for accessing financing and implementing adaptation measures. Public funds can be used to reduce the risk for private investors. Private investors then can contribute needed capital. In addition, philanthropic funds can be used to build capacity and pilot new adaptation strategies. Public private partnerships also allow the public sector to benefit from specialised skills that may exist only in the private sector.

Sources of climate finance can be public and private. Public sources include domestic budgets contributions, multilateral and bilateral development agencies, and UNFCCC funds. Private sources include domestic and foreign firms and individuals, financial institutions (e.g. banks), capital markets (e.g. stock exchanges), environmental markets and finance (e.g. carbon finance and payments for ecosystem services), pension funds, and philanthropic organisations. The majority of developing countries face financial constraints (public as well as private) and significant additional costs imposed on their development by the impacts of climate change. Therefore bilateral, multilateral, and private financing are all likely to be important sources of funding for adaptation activities. The Cancun Agreements which confirmed the Copenhagen Accord, include a pledge by developed countries to jointly mobilise $100 billion per year by 2020 from "public and private, bilateral, multilateral, and alternative sources of finance" to meet the needs of developing countries.

Adaptation funding currently lags behind mitigation funding both in the public and private arenas. Of an estimated $97 billion in total climate finance available in 2009/2010, $93 billion was used for mitigation measures while adaptation projects received only $4.4 billion. Of the funds devoted to adaptation, over 90% came from

public sources. Bilateral institutions were the largest source of adaptation funding ($3.6 billion), with multilateral institutions ($475 million) and philanthropic organisations ($210 million) contributing smaller shares[189].

Although public funding for climate change adaptation appears to be increasing, this funding is likely to remain well below the estimated need. The World Bank [190] reports that $1.5–1.8 billion has been pledged for adaptation (out of the total current funding of $9 billion for both mitigation and adaptation). The OECD reported $9.3 billion in adaptation related aid by members of the Development Assistance Committee in 2010.[191]

Table 1 shows data from UNEP on the financial instruments used by the public sector to fund climate change mitigation and adaptation projects and their distribution in 2010. It is clear that mitigation projects capture the vast majority of the funding, while in both cases, concessional loans are the most commonly used financial instrument. Concessional loans are typically provided to developing countries and carry lower interest rates and longer repayment periods than market rate (or non-concessional) loans. When considering financing options from public institutions, developing countries often pursue these financial instruments.

Table 1 . Public sector financial instruments ($million)

---

[189] B. Buchner et al. (2011). *The Landscape of Climate Finance. Climate Policy Initiative*. Available: http://www. climatepolicyinitiative.org/generic_datas/view/publication/117. Accessed December 22, 2011.

[190] World Bank. (2010a). *World Development Report on Climate Change. World Bank*, Washington, DC.

[191] OECD, (2011). *First-Ever Comprehensive Data on Aid for Climate Change Adaptation*. Organisation for Economic Co-operation and Development. Available: http://www.oecd.org/dataoecd/54/43/49187939pdf Accessed March 5, 2013

Instrument	Mitigation	Adaptation	Total
Grants	$857 (6%)	$771 (27%)	$1,628 (10%)
Concessional loans	$8,904 (69%)	$2,030 (71%)	$10,934 (70%)
Non-concessional loans	$3,100 (24%)	$54 (1.9%)	$3,154 (20%)
Other	$4 (<1%)	$0 (0%)	$4 (<1%)
Total	**$12,865**	**$2,855**	**$15,720**

Source: UNEP, 2011

Public and private financing should not be seen as mutually exclusive alternatives. In many cases the two funding sources may be symbiotic. Public-private partnerships represent a particularly effective method in which public sector money can be used to leverage private sector investment, particularly in infrastructure projects. These partnerships can also bring in technical expertise from the private sector that may not be available in the public sector. In addition, private sector engagement can improve the sustainability of an investment, ensuring that the project is funded over time. Private financing is currently a component, along with public funds, of numerous infrastructure projects in the developing world.

The Horn of Africa Risk Transfer for Adaptation (HARITA) project began as a joint effort by Oxfam America, Swiss Re, and others to develop a risk management package for farmers in Ethiopia[192]. The project includes a mix of risk reduction,

[192] Oxfam America. (2009). Horn of Africa Risk Transfer for Adaptation. Policy Brief. Available: http://portal.

insurance, and credit products to reduce vulnerability to weather and climate risks. The project is designed to encourage communities to practice improved natural resources management in order to reduce food insecurity. Farmers are provided with access to microcredit and insurance coverage against crop loss. They are also encouraged to increase their savings rate. Farmers pay their insurance premiums through labor on community projects in an insurance-for-work program[193].

The International Research Institute for Climate and Society, Swiss Re, Nyala Insurance Co., and Dedebit Credit & Savings Institution cooperated to develop affordable drought insurance based on a weather index insurance model.[194]The project was started in one village, Adi Ha, in Ethiopia in 2009, and involved 200 households. In 2010, the project was expanded to 1,308 households[195]. In 2010, insurance take-up rates in all villages served, a measure of the percentage of households participating, ranged from 6 to 36%, with an average of 19%[196]. The program was expanded again in 2011 to 13,195 households in 43 villages[197]. In each year, the actual take-up rate for the program

---

iri.columbia.edu/portal/server.pt/gateway/PTARGS_0_2_5494_0_0_18/HARITA%20Update%20August%2011%202009%20short.pdf. Accessed September 5, 2012 t

193 IISD. (2011). WFP-Led Public-Private Partnership Expands Rural Resilience Initiative to Senegal. International Institute for Sustainable Development. Available: http://africasd.iisd.org/news/wfp-led-public-private- partnership-expands-rural-resilience-initiative-to-senegal/. Accessed June 28 2013

194 Ibid

195 Oxfam America. (2011a). Horn of Africa Risk Transfer for Adaptation. HARITA Quarterly Report: January2011-March 2011. Available: http://www.oxfamamerica.org/files/harita-quarterly-repor-jan-mar-2011.pdf. Accessed September 5, 2012.

196 Ibid

197 Oxfam America. (2011b). Horn of Africa Risk Transfer for Adaptation. HARITA Quarterly Report: July 2011- September 2011. Available: http://www.oxfamamerica.org/files/harita-quarterly-report-july-sept-2011.pdf. Accessed December 21, 2012.

exceeded the annual goal. This expansion allowed the program to directly affect approximately 75,000 people in 2011[198].

The program allows farmers to pay their insurance premiums with labour as part of an insurance-for-work program[199]. They contribute labour to efforts to reduce the impact of climate change on their communities, such as irrigation or forestry projects. Farmers that have the means can pay their premiums with cash and as farmers become more prosperous they can graduate from paying with labor to paying with cash. The insurance-for-work program builds on the Ethiopian government's food- and cash-for-work program. This Productive Safety Net Program serves eight million food-insecure households in Ethiopia. Weather index insurance is available for short-cycle crops (e.g. teff and beans) and long-cycle crops (e.g. maize, wheat, barley, and sorghum) and is delivered by the Africa Insurance Company and Nyala Insurance Share Company, both based in Ethiopia[200].

Private financing sources for adaptation technology projects automatically drop when rainfall drops below a pre-determined level. The weather data collection and analysis underlying the weather index insurance was supported by the Ethiopian National Meteorological Agency. Local microfinance institutions also allow farmers the option to bundle credit and savings services with the insurance program. Risk reduction activities undertaken as part of the program include financial literacy training and a number of

---

[198]UNFCCC. (2011). Rural Resilience Initiative (R4). Available: http://unfccc.int/files/secretariat/momentum_ for_change/application/pdf/5_micro-insurance_for_famers.pdf. Accessed December 21, 2012.

[199]UNDP, (2011d). Technological Cooperation and Climate Change: Issues and Perspectives. Available: http:// www.undp.org/content/undp/en/home/librarypage/environment energy/climate_change/mitigation/ technological_cooperationandclimatechange.html. Accessed March 5, 2012

[200] Ibid.

natural resource management activities[201]. In 2010, 15,000 trees were planted and 2,000 meters of erosion prevention trenches were constructed. In the third quarter of 2011, approximately 6,200 farmers received financial literacy training. In addition, extension agents and 86 village leaders were trained in compost making, 2,875 compost-making pits were constructed in 43 villages, and 2,875 female-headed households prepared vegetable gardens. To improve water management, 24 run-off diversion structures were developed, irrigating 930 hectares of land and benefiting 1,884 farmers. In 2011 the HARITA program made its first payouts to small-scale farmers. In response to drought conditions in seven villages, 1,800 farmers received a total of $17,392 in insurance payments[202].

In 2011, the World Food Programme (WFP) and Oxfam America announced that they would expand the initiative from Ethiopia to Senegal and two other countries. Swiss Re agreed to invest $1.25 million in the expansion in return for being the exclusive insurance sector partner [203]. USAID is also contributing $8 million through the WFP to support the expansion. The collaboration involves no co-mingling of funds. WFP is sponsored by USAID and Oxfam America is sponsored by Swiss Re. The expanded program is known as the R4 Rural Resilience Initiative[204].

---

[201] Ibid.

[202] Oxfam America. (2011c). Pilot Microinsurance Program Has A Successful Payout To Over 1,800 Ethiopian Farmers After Drought.Available:http://www.oxfamamerica.org/press/pressreleases/pilot-microinsurance-program-has-a-successful-payout-to-over-1-800-ethiopian-farmers-after-drought. Accessed December 21, 2012

[203] IISD. (2011). WFP-Led Public-Private Partnership Expands Rural Resilience Initiative to Senegal. International Institute for Sustainable Development. Available: http://africasd.iisd.org/news/wfp-led-public-private- partnership-expands-rural-resilience-initiative-to-senegal/. Accessed June 28 2013

[204] Oxfam (2011c) and Oxfam 2011d Op cit,.

The ‘R4’ initiative represents a strategy to strengthen food and income security by improving natural resource management - risk reduction, providing access to microcredit-risk taking, promoting insurance coverage - risk transfer, and increasing savings-risk reserves[205].

The case study presented above indicates the importance of a collaborative approach to developing and financing adaptation projects. In each case, private sector actors partnered with public donors, NGOs, local institutions, and host country agencies to develop an integrated program. This collaborative approach leverages the capacities and resources of multiple stakeholders and creates both social and private benefit. One lesson for nations seeking funding for adaptation projects is that projects must be carefully constructed to take advantage of all the resources, both internal and external, that will be needed to make the project a success.

Investing in climate change adaptation is something new. However, many investments in adaptation are justifiable even under current climate conditions. Incremental additions to infrastructure can essentially be justified as prudent investments. Making infrastructure and other investments less vulnerable to more heat, flooding, drought, and sea level rise provides an extra margin of safety. This can help ensure that investments will continue to function and provide revenues well into the future, particularly if climate change happens more quickly than thought or climate variability increases, as could already be the case.

---

[205] Ibid

4.3 Conclusion

The analysis shows that there has been a step change in progress in adaptation activities across OECD member countries over the last decade. More than three quarters of OECD countries have published or are currently developing a national strategy for adaptation, and many of these countries have also published detailed plans for implementing adaptation measures. National governments have commonly established policies to mainstream adaptation into government operations and regulatory systems, and established co-ordination mechanisms to ensure action across government. While the implementation of strategies and plans is still at an early stage, the analysis reveals three key challenges faced by countries: overcoming climate information shortcomings and associated capacity constraints; engagement of the private sector; securing adequate financing and measuring the success of adaptation interventions. Action to address these constraints will be vital to ensuring that progress in planning translates into improvements in outcomes.

CHAPTER FIVE

SUMMARY, KEY FINDINGS AND RECOMMENDATIONS

5.1 Summary

There is growing consensus that environmental degradation can, and does, trigger, amplify or cause conflict and instability, and a growing concern that environmentally-induced conflict might increase. Today, security institutions are being called upon to protect access to environmental resources in other countries as well as in the global commons, and to provide support for humanitarian operations, many of which have significant environmental roots. In the future, force may be used in response to transboundary pollution, or to enforce international environmental law. But security specialists recognise that conflict can be a constructive force, signalling the need for institutional change or capacity building.[206] The pressures placed on institutions by environmental degradation and resource scarcity might be just such a signal. And, in an era of highly destructive weaponry, most would prefer that force be used as a last resort, and that all possible efforts be made to bolster and adapt institutions so that they are able to manage conflict effectively, before it escalates to widespread violence and war. In many cases, reducing poverty, strengthening the state and civil society, and promoting human rights will do more to enhance security and help countries adapt to changing environmental conditions than applying force will achieve.

---

206 Ibid

This study has been able to establish and highlight the need to integrate Climate Change into Development and Security policies given the continent's susceptibility to climate change effects as well as the role that development plays in climate change and vice versa. The gap has however been in the practise of the policies. One of the major challenges has been institutional capacity and the perceived cost of climate change adaptability. Focus has been on more immediate challenges such as poverty and inadequate infrastructure, which has left Governments and donor agencies few incentives to divert resources to investments that are seen as not paying off until climate change impacts are full-blown.

5.2 Key findings

The consequences of climate change on communities and nations present humanity with an unprecedented challenge. The numbers of storms, droughts and floods have increased threefold over the last 30 years with devastating effects on vulnerable communities, particularly in the developing world. In 2008, 20 million persons have been displaced by extreme weather events, compared to 4.6 million internally displaced by conflict and violence over the same period. How many people will be affected by climate change by 2050? Forecasts vary from 25 million to 1 billion people with a figure of 200 million being the most widely cited estimate. Extreme environmental events such as cyclones, hurricanes, tsunamis and tornadoes tend to capture the media headlines, but it is gradual changes in the environment that are likely to have a much greater impact on the movement people in the future. For example, over the last 30 years, twice as many people

have been affected by droughts as by storms (1.6 billion compared with approximately 718 million). It is important, however, not to view climate change effects as simply the failure of communities to adapt to climate change, or nations' failure to mitigate. [207]

The causes of conflict and insecurity are multiple, complex, and well integrated. Therefore, it is extremely difficult to isolate the role of environmental degradation and resource depletion as contributors to, or causes of, conflict and insecurity. [208]Evidence suggests that the environment plays a relatively minor role as a direct cause of violent conflict. However, some evidence also indicates that environmental variables may make an indirect, underlying contribution to conflict through their negative impact on other factors that may more directly cause violent conflict. It is increasingly apparent that environmental degradation and resource depletion play an important role in creating, or exacerbating, human insecurities. This environmental contribution appears especially relevant as the terms of reference shift from the national level down to the community level or up to the international level.

Undertaking research on the role that environmental degradation plays in contributing to insecurity also assists in clarifying what other factors may be important contributors to insecurity and conflict. For example, research on environment and security often strengthens the conclusion that poverty is a key factor in causing tension, unrest and, eventually, conflict. The most severe challenges for individual well-being in

---

[207] Ebrahim Shabbir Deen (2012) "Climate Change and Conflict: Is the International Community Doing Enough?" Journal of Sustainable Society, Vol. 1, No. 1, pp. 2-30.

[208] C. Hendrix and I. Salehyan (2011) 'The Brewing Storm? ClimateChange, Rainfall, and Social Conflict in Africa', Available at:<http://ccaps.strausscenter.org/system/research_items/pdfs/43/original.pdf?>1299598361 Accessed on: 26 March 2011.

many parts of the world may well not be external to the country of residence, but internal, although internal problems are likely to be affected in some way by external forces. Domestic rather than international factors may pose the greatest threat to individual well-being, although domestic difficulties may arise from external factor.

Environmental degradation and resource depletion provide opportunities for co-operation. For example, the transboundary nature of these issues forces states to co-operate to resolve environmental concerns, and may act as a deterrent against violent conflict. Research on environment and security, while limited, has brought attention to the growing salience of non-conventional security threats. It has also stimulated discussion on issues of environment and human security. It appears that this latter discussion may provide a useful framework within which to address development issues, particularly since it recognises that environmental problems must be analysed from a broad perspective that encompasses economic, political, cultural and demographic systems. It, thus, emphasises the extent to which understanding context is crucial to successful development and security strategies. General models can help orient thinking, but carefully researched case studies prepared by, or in collaboration with, local stakeholders are of vital importance.

In short, linking environmental change to a broad concept of security is a useful and insightful approach to many contemporary problems. It is an approach relevant to the activities of the DAC and the OECD, and further work aimed at identifying environment and security guidelines for development co-operation agencies would likely be productive for many reasons. In particular, awareness of this linkage could be instrumental in designing development co-operation that contributes to security at

different levels of social organisation, or that, at least, does not contribute to violent conflict and instability. Development assistance that simultaneously helped to alleviate poverty, enhance the quality of life, and reduce insecurity could be defended to a much broader community than is currently the case.

Finally, further work on this approach and its utility for the community of development co-operation agencies ought to be undertaken in close collaboration with experts from developing and transition economies. To date, the lion's share of research and policy activity has been undertaken in the developed world; the insights, sensibilities and knowledge of those outside this region are critical for fully appreciating this set of linkages and integrating this understanding into strategic and operational activities.

5.3 Recommendations

The following recommendations will help integrate policies and programs on communities and climate change the context of sustainable development. One is to integrate policies and programs to address climate change and mainstream it across development sectors. This should include setting up strong coordination and governance systems. Oversight is needed to make sure various sectors work together to avoid duplicating efforts and wasting resources. Moreover it is necessary to prioritize population in national climate change and development plans, with adequate resources for effective implementation of programs. In particular, climate change plans and programs should include expanding access to family planning. This will boost resilience to climate change.

The prioritization of meeting women and their partners' needs for family planning as it will yield a 'triple win' in the U.N. sustainable development framework. Universal access to family planning would reduce fertility rates and slow population growth, which would help: (1) reduce poverty by improving and expanding health, schooling and economic opportunities; (2) protect and manage natural resources for economic and social development; and (3) reduce inequality and create greater opportunities for all through social development. Another important advice is to further improve technical capacity in program design, research and application of research to decision-making processes. Decision makers engaged in climate change policy, planning, and implementation at all levels should have access to research on population trends, climate change and development. It is important to strengthen technical capacity of local experts to design and carry out integrated programs, and to monitor and evaluate these programs. This includes supporting efforts to improve training of local climate change experts.

The incorporation of population, reproductive health and family planning into global and regional institutions and frameworks for sustainable development is also key. Such institutions include the African Union and the UN Economic Commission for Africa. The frameworks include the post-2015 MDG, the International Conference on Population and Development (ICPD), and the post-Rio +20 agendas. The African political leadership should securitize the issue of climate change by prioritizing a revisioning of security which sees individual security (human security) as the ultimate referent object in any attempt to understand the theory and practice of security. National security should be viewed increasingly as an environmental issue, with multiple, complex

connections among population growth, environmental quality, and security, including human migrations, war, disease, social disruption, political fragmentation, competition for scarce resources, and eco-terrorism. In framing a bold, new perspective on national security, it must be realized that the environment has a profound impact on African national interest in two ways. First, environmental forces transcend borders and oceans to threaten directly the health, prosperity and jobs of African citizens. Since the fight against climate change is fundamentally a question about the future of energy, to transform the global energy systems in ways which could prevent irreversible effects of climate change within the next 10 to 15 years which is the benchmark given by a formidable body of scientists, there is need to move nations from predominantly a fossil fuel nations the clean energy nations. In this regards, Iceland, is an inspiration, as an example of how to battle climate change through comprehensive transformation of energy systems by a conscious strategic commitment to development of domestic geothermal energy resources. Now 100% of Iceland's electricity is produced from clean energy resources, and over 75% of its total energy needs, including cars and shipping, are met by either hydro or geothermal power. Global warming could clearly be slowed down, or even averted completely, if, the Icelandic model were to be followed on a global scale, by utilizing the variety of clean energy resources which are available to every country in the world. One involves the transformation of African energy systems, our lifestyles, our societies, our economies, in order to minimize, and preferably prevent, climate change. The second course of action consists of preparing for the disastrous consequences of the global warming which is already on the horizon, to engage in a comprehensive and profound dialogue on the new security challenges facing us, on how to map out the global

and the regional institutions, and how they could tackle the task ahead. Thus, contrary to the consensus that the problem and solutions of climate change lies in transnational management framework, rather, a national self-help reactive-proactive approach to reducing or coping with climate risks should be a complementary elements of a comprehensive international effort. This is the only to balance the mitigation and adaptation side of the climate change response equation.

As defined by the 1989 Brundtland Report, sustainable development involves the satisfaction of basic human needs and the opportunity for everyone to aspire to a better life. It must therefore meet the needs of today without compromising the ability of future generations to meet their own needs. This involves avoiding certain types of debt capable of foreclosing the prospects of future generations. Such 'debts' can take several forms, including: social debts, incurred by failure to invest in human development; and ecological debts, resulting from the overexploitation of natural resources or pollution of the soil, water, and atmosphere. These 'bad debts' should be avoided at all costs. The concept of sustainable development argues in favour of greater integration of both economic and environmental policies at the national level and that of ecological zones, irrespective of political boundaries. It is important, in dealing with regional aspects of the environmental challenge in Africa, to argue for the incorporation of environmental issues in current efforts at African integration and cooperation. There is need to factor adaptation into development assistance through measures such as mandatory climate risk assessments for projects financed by multilateral and bilateral lenders.

Also, funds should be committed to support climate relief. Such a climate 'insurance' can serve to promote proactive climate risk management. In traditional

property insurance, risky behaviour is discouraged by requiring the insured to retain some risk in the form of a deductible. Finally, the security consequences of climate change should be fully integrated in the national security and national development plans of African nation-states so as to provide for proactive measures for responding to climate shocks that may come from within or outside Africa's territorial borders.

BIBLIOGRAPHY

AdapCC. 2010. AdapCC Final Report – Results & Lessons Learnt. Available: http://www.adapcc.org/download/Final-reportAdapcc17032010.pdf. Accessed August 20, 2013

AMCEN Session Final Document (2009): Nairobi Declaration on the African Process for Combating Climate Change, Nairobi, Available at http://www.unep.org/roa/Amcen/Amcen_Events/3rd_ss/Docs/nairobi-Declaration-200.p df. Accessed 29 May 2013

Arnell, N.W. (2006),"Global impacts of abrupt climate change: an initial assessment." Working Paper 99

Atteridge, A. Will private finance support climate change adaptation in developing countries? Stockhom Environment Institute. Working paper 2011. Available: http://www.sei-international.org/mediamanager/documents/Publications/SEI-WorkingPa per-Atteridge-WillPrivateFinanceSupportClimateChangeAdaptationInDevelopingCountri es-2011.pdf Accessed May 22,2013.

Baland, J.M., and J.P. Platteau, (2006) Halting Degradation of Natural Resources: Is there a Role for Local Communities? Oxford University Press, Oxford.

Bayer (2010a) what's up with the Earth: The mystery of early spring, Bayer, Available at: www.climate.bayer.com/en/wuwte-complete.pdfx, Accessed 11 August 2013.

Bayer (2010b) Winners of the 19th International Children's Painting Competition, Available at www.unep.bayer.com/en/international-children_s-painting-competition-19.aspx, Accessed 11 August 2013.

Beck, U. (1992). Risk Society: Towards a New Modernity. London: Sage pg 40.

BMZ. 2011. Funds. Available: http://www.developpp.de/en/funds.html. Accessed June 20, 2013J.

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

Botkin, Daniel and Edward Keller. (2000).Environmental Science: Earth as a Living Planet. Danvers, MA. John Wiley & Sons, Inc.

Brian W. (2010), After Copenhagen, Getting Business into Green Tech. Time Magazine

Brown, J. and Jacobs, M. (2011). Background Note: Leveraging Private Investment: The Role of Public Sector Climate Finance. Overseas Development Institute. Available:

Brown, O. and Crawford A. (2008), Assessing the Security Implications of Climate Change for West Africa: Country Case Studies of Ghana and Burkina Faso. Available at http://www.iisd.org/pdf/2008/security_implications_west_africa.pdf. Accessed July 2013

Buchner, B. et al. 2011. The Landscape of Climate Finance. Climate Policy Initiative. Available: http://www.climatepolicyinitiative.org/generic_datas/view/publication/117. Accessed December 22, 2011.

Butterfield, R. (2009) Extreme rainfall seasons in East Africa. Available at: http://www.weadapt.org/wiki/Extreme_rainfall_seasons_in_East_Africa May 3rd 2013

Buzan, B. (2003) Regions and Powers: The Structures of International Security. Cambridge: Cambridge University.

Cafédirect/GTZ. 2011. AdapCC – Adaptation To Climate Change For Smallholders Of Coffee And Tea. Available: http://www.adapcc.org/. Accessed July 20, 2013

CEWARN (2005) 'CEWARN Alert: Rising Tension and Series of Violent Incidents Subsequent to Marsabit Massacre of July 12th 2005', CEWARN [website], <http:// cewarn.org/reports/Alerts/rising%20tension%20in%20Marsabit.pdf>, Accessed 20 May 2013.

Christy, J.R. W.B. Norris, and R.T. McNider. (2009) Surface Temperature Variations in East Africa and Possible Causes. J. Climate, in press.

ECA and OECD (2011), Interim Mutual Review of Development Effectiveness in Africa (MRDE), available at http://www.uneca.org/gpad/main110524mrde2011.html Accessed 23 July 2013

Ekenedirichukwu, G. E. And Ohiaegbu C. UN/ISDR. (2003). Living With Risk: A Global Review Of Disaster Reduction Initiatives. Geneva: United Nations Inter-Agency Secretariat Of The International Strategy For Disaster Reduction (UN/ISDR). Available from http://www.unisdr.org/eng/about_isdr/basic_docs/LwR2003/lwr-03-ch2-2-eng.htm#1 Accessed 23 July 2013

Havalrd Buhaug, N. P, (2008). Climate Change, The Environment and Armed Conflict. San Fransisco: International Studies Association Convention.

Healy, S. (2008) Lost Opportunities in the Horn of Africa: How Conflicts Connect and Peace Agreements Unravel. Published by Chatham House - Royal Institute of International Affairs, London, United Kingdom,

Helme, N. and Davis S., (2011): Nationally Appropriate Mitigation Actions (Namas) And The Clean Development Mechanism (CDM); Washington, Centre for Clean Air Policy, http://tinyurl.com/3h4l7vu Accessed 5 July 2013

Hendrix, C. and Salehyan, I. (2011) The Brewing Storm? Climate Change, Rainfall, and Social Conflict in Africa, Available at: <http://ccaps.strausscenter.org/system/research_items/pdfs/43/ original.pdf>129959836 Accessed on: 2 August 2013

Homer-Dixon, T, (1991) 'On the Threshold. Environmental Changes as Causes of Acute Conflict', International Security 16 (pg2).

Homer-Dixon, T. F. (1999). Environment, Scarcity, and Violence. Chichester: Princeton UP.

Hoste, J., J., (2010): Where was United Africa in the Climate Change Negotiations? Africa Policy Brief No.2.EGMONT Royal Institute for International Relations. Available at http://www.open.ac.uk/socialsciences/bisa-africa/files/africanagency-seminar1-hoste.pdf Accessed on: 2 August 2013

http://www.hmtreasury.gov.uk/independent_reviews/stern_review_economics_climatechange/sternreview_index.cfm. Accessed on August, 2013.

http://www.odi.org.uk/resources/docs/7082.pdf. Accessed March 5, 2013.

IFPRI, (2011) Climate Change in Africa: Key Facts and Findings. IFPRI: International Food Policy Research Institute. Available at http://www.ifpri.org/publication/climate-change-africa-key-facts-and-findings> Accessed 21 June 2013

IISD. (2011). WFP-Led Public-Private Partnership Expands Rural Resilience Initiative to Senegal. International Institute for Sustainable Development. Available: http://africasd.iisd.org/news/wfp-led-public-private-partnership-expands-rural-resilience-initiative-to-senegal/ . Accessed June 28 2013

IPCC, (2007) Climate Change Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press,

Ivan Campbell, S. D, (2009).Climate Change and Conflict. Lessons from community conservancies in northern Kenya. Nairobi: The Conservation Development Centre (CDC).

Jacobs, M.J. and C.A. Schloeder, (2001). Impacts of Conflict on Biodiversity and Protected Areas in Ethiopia. Washington, D.C.: Biodiversity Support Program. January 15). Available at http://www.time.com/time/business/article/0,8599,1954019,00.htm

Khadiagala, G. L, (2008) Eastern Africa: Security and the Legacy of Fragility. New York: International Peace Institute

Kiarie C, Ibrahim F, and Durrito P, (2013) Environmental Conflicts, Natural Resources and Diplomacy in the East and Horn of Africa. Horn of Africa Bulletin ,pg 2.

Mallick, O. B, (2005) Development Theory, Rostow's Five Stage Model of Development and its relevance in Globalization. Newcastle: The University of Newcastle.

MORI, Ipsos (2010), Climate Change Adaptation: A Survey of Private, Public and Third Sector Organisations, Available at http://randd.defra.gov.uk/Default.aspxMenu=Menu&Module=More&Location=None&ProjectID=17519&FromSearch=Y&Publisher=1&SearchText=GA0406&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description Accessed 29 July 2013.

Murphy, J. D, (2010) Sustainable Development: From Bruntland to Rio 2012. New York: International Institute for Sustainable Development (IISD).

Nori M., & Davies J, (2007). Change of Wind or Wind of Change? Report on the e-conference on Climate Change, Adaptation and Pastoralism, organised by the World Initiative for Sustainable Pastoralism http://www.iucn.org/wisp/resources/?2339/ Accessed 3 April 2013

O'Loughlin, J. (2012) Climate Variability and Conflict Risk in East Africa measured by Boulder team. University of Colorado, Boulder:, at http://www.colorado.edu/news/releases/2012/10/22/climate-variability-and-conflict-risk- eas-africa-measured-boulder-team-0 Accessed May 12, 2013

OECD, (2006) Putting Climate Change Adaptation in the Development Mainstream. Paris: OECD.

OECD,(2011). First-Ever Comprehensive Data on Aid For Climate Change Adaptation. Organisation For Economic Co-Operation And Development. Available: http://www.oecd.org/dataoecd/54/43/49187939pdf Accessed March 5, 2013

Ohlsson, Leif, (2003) 'The risk of Livelihood Conflicts and the Nature of Policy Measures Required', in Nicholas N. Kittrie et al., eds , Seeds of True Peace: Responding to the Discontents of a Global Community, Washington, DC: Carolina Academic Press.

Omiti J & Irungu P, (2009) Institutional and Policy Issues relevant to pastoral development in Kenya. Discussion Paper No. 031/2002 (Institute of Policy Analysis and Research)

Oxfam America. (2009). Horn of Africa Risk Transfer for Adaptation. Policy Brief. Available: http://portal.iri.columbia.edu/portal/server.pt/gateway/PTARGS_0_2_5494_0_0_18/HARITA%20Update%20August%2011%202009%20short.pdf. Accessed September, 2013

Oxfam America. (2011 b). Horn of Africa Risk Transfer for Adaptation. HARITA Quarterly Report: July 2011- September 2011. Available: http://www.oxfamamerica.org/files/harita-quarterly-report-july-sept-2011.pdf. Accessed August, 2013.

Oxfam America. (2011a). Horn of Africa Risk Transfer for Adaptation. HARITA Quarterly Report: January2011-March 2011. Available: http://www.oxfamamerica.org/files/harita-quarterly-repor-jan-mar-2011.pdf. Accessed September 2013.

Oxfam America. (2011c). Pilot Microinsurance Program Has A Successful Payout To Over 1,800 Ethiopian Farmers After Drought. Available: http://www.oxfamamerica.org/press/pressreleases/pilot-microinsurance-program-has-a-uccessful-payout-to-over-1-800-ethiopian-farmers-after-drought . Accessed August 21, 2013

PAIAID, (2012). Population, Climate Change and Sustainable Development in Africa, Policy Brief. Population Action International and the African Institute for Development.

Ranger, N., et al. (2010) Adaptation in the UK: A Decision-Making Process, www.cccep.ac.uk/Publications/Policy/docs/PB-adaptationUK-ranger.pdf Accessed August1, 2013

Reuveny, R. (2007). 'Climate Change-Induced Migration and Conflict', Political Geography 26(6):

Slingo, J.M., A.J. Challinor, B.J. Hiskins and T.R. Wheeler (2005). Introduction: food crops in a changing climate, Philosophical Transactions of the Royal Society, Series B 360.

Stern Review, (2006), The Economics Of Climate Change. by N Stern London, Treasury. Available at

Todaro, M, Smith, S. (2003). Economic Development, Chapter Four, Essex,Pearson Education Limited

UNDP, (2009) Project: Coping with Drought and Climate Change, (United Nations Development Program,

UNDP, (2011)d. Technological Cooperation and Climate Change: Issues and Perspectives. Available:http://www.undp.org/content/undp/en/home/librarypage/environment-energy/climate_change/mitigation/technological_cooperationandclimatechange.html . Accessed March 2013

UNEP (1999). Schwartz, Daniel and Singh, Ashbindu. Environmental Conditions, Resources and Conflicts: An Introductory Overview and Data Collection, pg 6.

UNFCCC, (2007): Climate Change; Impacts, Vulnerabilities And Adaptation In Developing Countries, Available at unfccc.int/resource/docs/publications/impacts.pdf. Accessed 18 February 2013

UNFCCC, (2007): Climate Change; Impacts, Vulnerabilities And Adaptation In Developing Countries, Available at unfccc.int/resource/docs/publications/impacts.pdf. Accessed 18 February 2013

UNFCCC, (2007): Climate Change; Impacts, Vulnerabilities and Adaptation In Developing Countries, Available at unfccc.int/resource/docs/publications/impacts.pdf. Accessed 18 February 2013

UNFCCC, (2011): Decision 1/CP.16; The Cancun Agreements; Outcome Of The Work Of The Adhoc Working Group On Long-Term Cooperative Action Under The Convention, Document UNFCC. Glossary of Climate Change Acronyms, "Adaptation." Available at http://unfccc.int/essential_bacground/glossary/items/3666.php. Accessed July 2013.

UNFCCC, (2011): Decision 1/CP.16; The Cancun Agreements; Outcome Of The Work Of The Adhoc Working Group On Long-Term Cooperative Action Under The Convention, Document UNFCC. Glossary of Climate Change Acronyms, "Adaptation." Available at http://unfccc.int/essential_bacground/glossary/items/3666.php. Accessed July 2013.

UNFCCC.(2011).Rural Resilience Initiative (R4). Available: http://unfccc.int/files/secretariat/momentum_for_change/application/pdf/5_micro-insurance_for_famers.pdf. Accessed August, 2013.

Van de Giessen, E. (2011) Horn of Africa: Environmental Security Assessment, Available at: <http://www.envirosecurity.org/espa/ PDF/ESA_HOA.pdf> Accessed on: 26 July 2013 World Bank. (2010) a. World Development Report on Climate Change. World Bank, Washington, DC