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Independent Study Report

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**Climate Change Adaptation and Mitigation in Zambia: An Examination of Policy and
Institutional Response to Environmental and Human Security**

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ABSTRACT

Changing climatic conditions have had devastating effects on Zambia with impacts to physical and biological systems already being felt. The Climate induced changes are exerting considerable stress on the Zambia's already vulnerable sectors mostly the agriculture and food security others being the human health, water, energy, wildlife, and forestry. It is significantly affecting the economic, social and environmental dimensions of national development. With a potential of making the current agricultural practices used to be unsustainable in the face of the limitations imposed by climate change, and a situation calling for an urgent need for adaptation to avoid worsened food insecurity, malnutrition diseases and worsening poverty situation. Despite the tremendous impacts of climate change, the government response seems to fall short of seeing the various scales to which these impacts occur, as well as of identifying the gaps that may help generate well-informed decisions and policies. At the heart of this malfunctioning are the public policies and key institutions involved in adaptation and mitigation of the impact of changing climate. Through this case study, which employed a qualitative approach, the attempt was to answer the question of whether national policies addressing adaptation and mitigation measures have been responsive to the environmental and human insecurity caused by climate change in Zambia. The research findings conclude that government policies and priorities have been largely ineffective at addressing agricultural difficulties, especially linking them to climate change adaptation and mitigation, including the proposed programmes under National Adaptation Programme Action. The failures are largely due to the fragmented and disparate policy community concerned with environmental change. The study proposes a policy and institutional framework for a response that promotes people's access to much needed natural resources to support their livelihood and adaptability to climate change and climate variability.

ملخص

لقد أحدثت الظروف المناخية المتغيرة أثراً مدمراً في زامبيا. فقد أحدثت الفيضانات والأمطار المتكررة التي شهدتها زامبيا في الآونة الأخيرة أضراراً جسيمة في المحاصيل والبنى التحتية وما ترتب عليها من آثار مباشرة وغير مباشرة على الأمن البشري والبيئي. الآثار الناجمة عن تغير المناخ أدت بالفعل إلى تغيرات محسوسة في النظم الفيزيائية والبيولوجية مما أحدث ضغطاً كبيراً على القطاعات الضعيفة في البلاد شملت الزراعة والأمن الغذائي، والحياة البرية والغابات والمياه والطاقة والصحة البشرية وهي بهذا تؤثر بشكل كبير على الأبعاد الاقتصادية والاجتماعية والبيئية للتنمية الوطنية. الممارسات الزراعية الحالية لا تتبنى نهج التنمية المستدامة في مواجهة العقبات التي يفرضها تغير المناخ، وهو وضع يدعو بالحاح للتكيف مع شروط انعدام الأمن الغذائي، وأمراض سوء التغذية وتعمق حالة الفقر. تأثيرات تغير المناخ في زامبيا تتجلى عموماً في صحة الإنسان والقطاع الزراعي وفي تفاقم مستويات الفقر الحالية.

على الرغم من التأثيرات الهائلة لتغير المناخ، إلا أن الحكومة الزامبية تبدو عاجزة عن تبين الأسباب المختلفة التي تحدث هذه التأثيرات المناخية، وكذلك التعرف على الثغرات التي قد تساعد على تبني قرارات وسياسات مبنية على معلومات سليمة. كل ذلك يشير إلى خلل في صميم السياسات العامة والمؤسسات الرئيسية العاملة في التكيف والتخفيف من أثر تغير المناخ. توظف هذه الدراسة منهجاً نوعياً وذلك في محاولتها الإجابة على السؤال ما إذا كانت السياسات الوطنية التي تتناول تدابير التكيف والتخفيف من آثار التغير المناخي في زامبيا قد شملت الإستجابة لمسائل إنعدام الأمن البيئي والبشري المرتبطة بهذا التغير.

تخلص هذه الدراسة إلى أن سياسة الحكومة وأولوياتها كانت غير فعالة إلى حد كبير في معالجة الصعوبات الزراعية، لا سيما ربطها بالتكيف مع تغير المناخ والتخفيف من آثاره بما في ذلك البرامج المقترحة في إطار برامج العمل الوطنية. هذا الفشل يرجع إلى حد كبير إلى السياسات المرتبطة بالتغير البيئي ظلت مجتزأة ومتباينة. هذه الدراسة تقترح وضع السياسات والإطار المؤسسي الذي يسمح باستجابة تعزز من وصول الناس إلى الموارد الطبيعية اللازمة التي تدعم الكثير من سبل عيشهم بالإضافة إلى دعم قدرتهم على التكيف مع تغير البيئة وتقلبات المناخ.

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TABLE OF CONTENTS

ABSTRACT	1
ACKNOWLEDGEMENT	3
TABLE OF CONTENTS	4
ACRONYMS AND ABBREVIATIONS	6
1.0 CHAPTER ONE - INTRODUCTION	7
1.1 Introduction	7
1.2. Need for the Study	9
1.3. Problem Statement	9
1.4. The Purpose Statement	10
1.5. Research Question	10
1.5.1 Sub Questions	10
1.6. Hypothesis Statement	11
1.7. Methodology	11
1.7.1. Research Obstacles	12
1.7.2. Timeframe	12
1.8. Key terms used in this study	12
2.0 CHAPTER TWO – LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK	13
2.1. Literature Review	13
2.2. Theoretical and Conceptual Framework	17
2.2.1 Climate Hazards as Natural Phenomena: Biophysical Vulnerability of Systems	17
2.2.1a Climate Change Adaptation	18
2.2.1b Disaster Risk Reduction (DRR)	19
2.2.1c Environmental Management	20
2.2.1d Poverty Alleviation	20
2.2.2 Environmental Impact Theories as a Climate Change Analytical Framework	21
2.2.2a Human Ecology Perspective	21
2.2.2b The Modernization Perspective	22
2.2.2c The Political Economy Perspective	22
2.2.2d Democracy and the State	23
2.2.3 The Political Ecology of Climate Change: Social Vulnerability	24
3.0 CHAPTER THREE- THE STUDY	31

3.1 Significance of the Study	32
3.2. Climate change and the Agriculture sector in Zambia	32
3.3. Climatic Factors	35
3.3.1 Temperature	35
3.3.2. Rainfall Pattern	35
3.4. Effect of the Changing Weather Patterns on Zambia's Agriculture Sector	36
3.5. Policy and Institutional Linkage to Climate Change and Agriculture Sector	37
3.5.1. Ministry for Agriculture and Cooperatives (MACO)	39
3.5.2. The Environmental Council of Zambia.	40
3.5.3. Disaster Management and Mitigation Unit	41
3.5.4. The Ministry for Energy and Water Development	42
3.5.5. The Zambia Meteorological Department (ZMD)	42
3.6 Public Policy shift on climate change	43
4.0 CHAPTER FOUR- FINDINGS	44
4.1. Findings	44
4.3. ANALYSIS	46
4.3.1. Fragmentation in Policy Response to Climate Change and Vulnerabilities	50
4.3.2. Political Will	53
4.3.3. Public Participation	54
4.3.4. Adaptive Capacity for government institutions supporting Climate Change	54
4.3.5. Resources Constraint	56
4.3.6. Integration and coordination of climate change programmes	59
4.3.7. Availability of usable data for informed climate change policy	60
4.3.8. Donor Interference	61
5.0 CHAPTER FIVE- RECOMMENDATION AND CONCLUSION	61
5.1. Recommendation	61
5.1.1. Policy	62
5.1.2. Institutional	63
5.2. Conclusion	64
BIBLIOGRAPHY	67
APPENDIX 1	75

ACRONYMS AND ABBREVIATIONS

AER	Agro-Ecological Regions
CCFU	Climate Change Facilitation Unit
CDM	Clean Development Mechanism
COP	Conference of Parties
DMMU	Disaster Management and Mitigation Unit
ECZ	Environmental Council of Zambia
FNDP	Fifth National Development Plan of Zambia
FRA	Food Reserve Agency
GHG	Green House Gases
IPCC	Intergovernmental Panel on Climate Change
IPCC AR4	Intergovernmental Panel on Climate Change Fourth Assessment Report
IWRM	Integrated Water Resources Management
LDC	Least Developed Countries
MDG	Millennium Development Goals
NAPA	Zambia National Adaptation Programme Action on Climate Change
NAMA	Zambia National Mitigation Programme Action on Climate
NCCRS	National Climate Change Response Strategy for Zambia
NPE	National Policy on Environment
PES	Payments for Environmental Services
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programmes
SNDP	Sixth National Development Plan of Zambia
WRAP	Water Resources Action Programme
ZMD	Zambia Meteorological Department

1.0 CHAPTER ONE – INTRODUCTION

1.1 Introduction

Climate change has emerged as a major challenge of the time, threatening human survival and development globally. The scientific evidence stresses that climate change will increasingly affect human and natural systems with potentially disastrous effects on local, regional and global economies. Climate-induced changes to physical and biological systems are already being felt and exerting considerable stress on the country's vulnerable sectors, among others agriculture and food security (NAPA, 2007). Adapting and mitigating the impacts of climate change will depend on how effectively countries respond to the challenge. But the greatest challenge under the United Nations Framework Convention on Climate Change (UNFCCC) is finding solutions to combat the threat from the impacts of climate change. Similarly, national governments are pre-occupied with finding solutions to existing and unprecedented impacts at national and local levels.

Zambia is one of the countries concerned with the effects of climate change because of its already observed devastating effects on the environment and human aspects. The country has witnessed frequent floods and droughts, which have resulted in serious damage to crops and infrastructure. At the national level, the sector most likely to be hit hardest by the effects is the agriculture sector, with the potential of adversely increasing the vulnerability of the 60 percent of the Zambian people dependant on agriculture for their livelihood, mainly through the production of maize, the main staple food. This could also significantly affect human development and reverse progress that has been made towards poverty reduction and the attainment of the Millennium Development Goals (MDGs).

The challenge here is having one supportive, well informed policy framework for climate change adaptation and mitigation, with concise information on the magnitude of the impact, and equally to help define a response strategy to the lived experience of resource-dependent communities in Zambia, while at the same time addressing climate variability and observed climate change impact at local and national levels. Secondly, the integration of the adaptation and mitigation strategies of climate change national economic and social development plans, harmonized at policy and practical levels with other environmental management activities, especially in the areas of land and water management, health, conservation of biodiversity, protection and development.

In addressing anticipated impacts of climate change, the policy should be able to respond not just to vulnerability but also to the security of individuals and societies. Community resilience is determined not only by the likely responses of the resources on which individuals depend, but by the availability of resources and the access of individuals and groups to these resources.

Climate change continues to undermine the state capacity to provide opportunities and services that help the people to sustain their livelihood, consequently increasing human insecurity. Therefore, this study is aimed at contributing to providing information on the effectiveness of policies in responding to climate change threats in Zambia, with special reference to the agriculture sector outside the Zambia National Adaptation Programme Action on climate change (NAPA). Secondly, this study serves as a way to contribute to the on-going assessments of what is being proposed in the NAPA and how environmental and human security challenges were being addressed from a theoretical approach.

1.2. Need for the Study

The study helps generate information for understanding and informing Zambia's response to changing climate and the effectiveness of policy response within national and global frameworks that threaten environmental and human security using the Zambian case.

1.3. Problem Statement

Changing climatic conditions have had devastating effects on Zambia. The witnessed frequent floods and late rains that resulted in serious damage to crops and infrastructures have direct and indirect effects on environmental and human security. Experts are concerned that the agriculture sector in Zambia is quite sensitive to future climate change, and any increase in climate variability. Further agronomic studies suggest that yields could fall dramatically in the absence of costly adaptation measures (Mendelsohn, Dinar & Dalfelt, 2000).

Despite the tremendous impacts of climate change in Zambia, the government response seems to fall short of seeing the various scales to which these impacts occur, as well as of identifying the gaps that may help generate well-informed decisions and policies. At the heart of this malfunctioning are the public policies and key institutions involved in the adaptation to and mitigation of the impacts of changing climate. Mitigating the impacts of climate change will depend on how effectively Zambia responds to the challenges at local and national levels. The critical view toward the national response strategies is key in assessing the effectiveness of the responses to the sustainability of the national framework of achieving the Millennium Development Goals (MDGs). Identifying the gaps that may stimulate opportunities for research, policy guidance and for development of appropriate technologies is the driving factor in this research.

1.4. The Purpose Statement

The purpose of this case study is to review selected public policies and key institutions involved in the adaptation and mitigation of the impacts of changing climate, which has caused the variability in weather patterns in Zambia. Secondly, this work assesses the extent to which national policies on adaptation and mitigation measures are responsive to the environmental and human insecurity caused by the variability in weather patterns, which is in turn caused by climate change in Zambia within national and global frameworks. The study will further examine the effectiveness of the responses, if any, with environmental and human security in mind. The public institutions chosen are those involved in the National Climate Change Response Strategy formulation coordinated by the Climate Change Facilitation Unit (CCFU) in the Ministry of Tourism, Environment and Natural Resources. The institutions under the CCFU are Disaster Management and Mitigation Unit, Ministry for Energy and Water Development, Ministry for Finance and National Planning, Ministry for Agriculture and Cooperatives and the Environmental Council of Zambia.

1.5. Research Question

How are the adaptation and mitigation measures used by Zambia responsive to the environmental and human insecurity caused by climate change?

1.5.1 Sub Questions

- I. How is the changing climate affecting Zambia in addressing environmental and human security?
- II. How are climate change issues being addressed by public institutions and other actors?

What initiatives are being implemented with government involvement on:

- a) Adaptation? b) Mitigation?

- III. Which instruments and policies are addressing issues of environmental and human insecurity caused by the changing climate in Zambia?
- IV. Which climatic factors have the potential to cause, or have caused, environmental and human insecurity due to the changing climate in Zambia?

1.6. Hypothesis Statement

Environmental and human insecurity affecting Zambia is caused by the absence of an effective integrated national policy response to climate change due to the fragmented national policy development approach.

1.7. Methodology

This research is a desk study employing a qualitative approach, namely using the case study tradition. Through this methodological approach, the research attempts to answer the question of whether national policies on adaptation and mitigation measures have been responsive to the environmental and human insecurity caused by the variability in weather patterns caused by climate change in Zambia. The study applies a combination of tools for the purpose of data collection.

- a. **Methods of Data Collection** - Data was acquired mainly from available literature (archival review of policy documents) by reviewing policies, programmes and activities' documents from the selected institutions and organizations linked to adaptation and mitigation of climate and disaster risk reduction. The data provided information on the existing policies and institutional response. This method was appropriate in collecting the secondary data for understanding the situation in this type of study.

Methods of Data Analysis - Direct interpretation was used based on the collected and tabulated data. The analysis focused on categorical aggregation.

1.7.1. Research Obstacles

- a. Limited access to policies, institutions, organisations and responsible officers.
- b. Not all targeted officers were accessed via email to triangulate the information
- c. Acquiring contact details was a challenge.

1.7.2. Timeframe

The study was conducted within four months. Appendix 1 shows the timetable breakdown of the two months of data collection and analysis, along with two months of report preparation and submission.

1.8. Key terms used in this study

Climate change refers to the change in average climatic conditions in a specific region, which is in addition to the natural climate variability. This arises due to the warming of our planet (Global Warming) that takes place as a result of the excessive accumulation of the heat trapping gases (notably carbon dioxide, methane and nitrous oxide) - the so-called Greenhouse Gases (GHGs) – in the atmosphere. Combustion of fossil fuels (oil, coal and gas), deforestation and forest degradation, and some agricultural practices are among the human activities that lead to the emissions of the GHGs (CCFU, 2009).

Adaptation refers to mechanisms to address the impact of climate change for adapting to a warmer world, while *Mitigation* implies additional strategies to reduce Green House Gases (GHG) and for emissions to decrease (Hiramatsu et al., 2008).

Environmental Security as defined in UNDP's Human Security definition has two main elements: 1) Safety from chronic threats, such as hunger, disease and repression; and 2) Protection from sudden hurtful disruption in daily life, whether in homes, jobs, or communities (UNDP, 1994, as cited in Paris, 2001). UNDP's human security definition is broad and comprehensive; one of the seven elements constituted in the definition is *Environmental Security*, offering examples including protection from such dangers as environmental pollution, degradation and depletion. The Millennium Project defines *Environmental security* as a the relative public safety from environmental dangers caused by natural or human processes due to ignorance, accident, mismanagement or design and originating within or across national borders. Even though *environmental security* is one among seven elements in the concept of *human security* in this study I will use both; however, by using a narrower definition of the latter.

Human Security focuses on the security of an individual rather than of the state, and according to UNDP, "safety from such chronic threats as hunger, diseases and repression" and also "protection from hurtful disruption in the daily life" (UNDP, 1994).

2.0 CHAPTER TWO – LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1. Literature Review

There is wide agreement that changes now underway in the Earth's climate system have no precedent in the history of human civilization (IPCC, 2007; Stein, 2007 as cited in Barnet, 2007). Climate change is a macro-driver of many kinds of environmental changes, such as coastal erosion, declining precipitation and soil moisture, increased storm intensity, and species migration. Climate change poses risks to human security (McCarthy, Canziana, Learny, Dokkey

& White, 2001, as cited in Barnet, 2007). Global attention is focused on finding solutions to this challenge. Addressing climate change is now considered a top priority by the international community and individual countries. It has become a defining issue of this era as it is a serious threat to sustainable development and to addressing human security. Barnet (2007) critically reflects on the risks posed by climate change. He asserts that it is increasingly becoming a 'security' problem and that there are speculations that climate change increases the risk of violent conflicts. His argument is that climate change undermines human security and will continue to do so. This prediction is further likely to also undermine state capacity to provide opportunities and services that help people sustain their livelihood. Because of this fact, climate change may stimulate violent conflicts.

The 2006 World Bank Report indicates increasing temperature at the rate of 0.6°C per decade, and rates the Zambian experience ten times higher than global levels or Southern Africa, which can be considered alarming (Ngoma, 2008). In terms of rainfall, the IPCC-WGII (1998-2001) has concluded that Southern Africa will get drier if climate change occurs, and that the region will find it difficult to cope with climate hazards given the present level of preparedness. According to simulated studies, Southern Africa's precipitation will decrease by 5-20percent in all major river basins of the region, except the Congo, where precipitation is expected to increase by 10 percent. Mearns et al. (1996) and IPCC, (2007) argue that these changes in variability could have a significant effect on agriculture and water resources (Claussen et al., 2001).

Hiramatsu, Mimosa and Akimasa (2008) have provided explanations on actions required for adaptation and mitigation measures within the developed framework for global warming research based on the relationship between nature and human security. The framework developed utilises the information from the Intergovernmental Panel on Climate Change Fourth Assessment Report(IPCC AR4). The developed mapping framework has seven phases of natural sequence. The phases are very important in the understanding of climate change processes and

the type of responses required at every level, including adaptation and mitigation. Dessler, Dessler-Andrew, Deward, and Parsson (2010) raise important questions concerning mitigation and adaptation as responses to climate change. They argue that climate change requires projecting not just temperature but also other characteristics of climate, especially precipitation. It requires not changes in annual average values, but also changes in seasonal cycle, variability and extremes. Thus, introducing uncertainty, projecting climate impacts requires also estimating the responses of climate sensitive ecosystems, which add further uncertainty to projections. Moreover, in vulnerable areas, such as agriculture and commercial forests, human management dominates the ecosystems; climate change impact requires a considerable human response (Dessler et al., 2010, p. 108).

Although there is a general agreement that adaptation and mitigation strategies are the two possible ways to respond to the anticipated effects of the changing climate on humans and the environment, some arguments advanced raises questions as to whether policy responses as presented in the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol can effectively respond to the challenges. The uncertainties that surround the type of impacts raise some doubts as to whether or not adaptation is really the right way to go. Adaptation involves so many actors at international, national and local levels, all bringing complexities and dynamism. One reason behind the failure of the convention process is the lack of adequate financing for adaptation - a major concern for developing countries. This issue was evident at the Conference of Parties (COP) 15 and more recently, COP 16 in Cancun, at which African leaders continued to express concern, calling for workable funding mechanisms, which the developed countries should never consider as aid but as their responsibility towards addressing the challenges of global climate change (Zakieldeen, 2010). For example, the acceptability is beyond just excellent policies that national governments are proposing in the National Adaptation Plan Actions (NAPAs). The implementation of most NAPAs largely

depends on donor assistance; Zambia is a good case where NAPA is internationally driven, and the willingness of the donor communities to mobilise resources will determine the extent to which they will succeed. The same is true for other countries with less capacity. Technological understanding and national capacities cannot be underscored in examining the challenges posed to climate modelling and projection. The example above highlights the uncertainties surrounding policy design and implementation mechanisms for climate change response. There is need to recognize the determining factors, such as the social capital of society, the flexibility and motivation in the institutions of government and the private sector to grasp the opportunity associated with climate change. The effectiveness depends on the acceptability of options on adaptations and institutional constraint on adaptation, compounded by economic factors of globalization (Adger, 2003, p.187)

Another compounding problem in adaptation and mitigation strategies is the question of when the impact is likely to happen. Andrew et al. (2010) have argued that the current exaggeration that technological options already available would allow mitigation at zero or negative costs is not realistic. I position myself with their argument that the current uncertainties and technological progress present wild exaggerations into future realities and a possibility that may render some strategies redundant.

I also concur with Locatell et al. (2008) that adaptation is gaining importance in the climate change policy area, as actors realize that climate change cannot be totally avoided. They assert that mitigation policies will take time before being effective. The above assertion from Locatell et al. (2008) indicates that there are observed gaps in policy implementation, hence, the need to examine their effectiveness. Therefore, this study focuses on the Zambian policies and institutional response to climate change, particularly in relation to environmental and human security.

2.2. Theoretical and Conceptual Framework

There is almost a consensus that human activities are the major causes of global warming and climate change (IPCC, 2007). The impact of climate change has been understood to be unprecedented, and agriculture will be adversely affected because of its sensitivity to variability. This is especially true in Zambia, where a strong relationship between agriculture and sustaining environmental and human security are so interlinked. The change in weather patterns significantly affects agriculture production and impact adversely on the environment and human well-being. National governments within the UN Convention Framework on Climate Change (UNFCCC, 1998) have developed national strategies in response to the national threats caused by the impact of climate change. The global response to the existing impacts of climate change is reflected in the UNFCCC and Kyoto Protocol. The latter commits governments, including Zambia, to adopt policies that facilitate and promote mitigation and adaptation, and to deploy adaptive technologies to address climate change impacts. The UNFCCC and Kyoto Protocol contextualize the climate change response in a political system, a significant shift from previous conceptualizations of climate change and its impact. In this connection, it is important to shed some light on the perspectives on climate change that have prevailed before the UNFCCC and the Kyoto Protocol, among others, giving emphasis to socio-political factors as explanatory factors and as part of an evolving climate regime.

2.2.1 Climate Hazards as Natural Phenomena: Biophysical Vulnerability of Systems

Four perspectives can be identified in this section, which, most of the time, have emphasized the biophysical nature of environmental changes, with climate change being one and continued for some time to provide the framework of orientation for policymakers. The challenge at the policy level for reducing socio-economic vulnerability to climate and weather-related hazards remains high. The four independently distinct research and policy communities

focusing on reducing social-economic vulnerabilities to extreme environmental conditions are presented in the proceeding paragraphs. Each attempts to provide a policy framework for addressing vulnerabilities mostly caused by hazardous conditions attributed to hydro-meteorological effects with increasingly large economic losses to the people.

The four perspectives are associated with four research communities, including disaster risk reduction, climate change adaptation, environmental management and poverty reduction (IUCN et al., 2003). The following section provides explanations on the four traditions in relation to policy framework for responding to vulnerabilities caused by climate change, and highlighting the main focus. These communities have largely worked independent of each other.

2.2.1a Climate Change Adaptation

This community has largely developed with a strong scientific basis from an environmental science perspective (Thomalla et al., 2006). It was initially constituted by the world's meteorological community but recently expanded to include a wide range of biological, geophysical scientists, social scientists and economists with a focus on management of risk from climatic changes (Thomalla et al., 2006). It is highly interdisciplinary in its approach concerned with current weather variability and extremes, as well as the projected changes in long-term climate. Poverty reduction and sustainable development have been presented with considerable challenges by climate change because of its nature affecting a wide range of social and ecological systems (IUCN et al., 2003). The effects arise from changes in average climatic conditions and climatic variability occurring over a long period. This is also because a wide range of simultaneous environmental and socio-economic processes manifest in vulnerabilities, creating difficulty in perceiving and measuring impact for policy intervention. This community is largely dominated on a global scale with a top-down approach using such forums as IPCC,

Conferences of Parties, national government, formulation of NAPA strategies and the research communities.

2.2.1b Disaster Risk Reduction (DRR)

According to Thomalla et al. (2006), this community has been concerned with risk management caused by extreme events through preparedness, mitigation and prevention. It has its basis from engineering and natural science, but traditionally focused on events, exposure and on technological solutions, including hazard forecasting and immediate relief efforts for major disasters resulting from floods and cyclones (IUCN et al., 2003). There are recently observed shifts from response and recovery to awareness and preparedness on a local scale, within community based approaches, and also from short term to long term. This community is characterised by concentration on short-term single stressor responses through structural measures, such as flood embankments, community shelters and more resistant buildings to provide physical protection with regard to lives, property and critical infrastructure. This community has grown to include specialists in the longer-term strategy of disaster prevention by anticipatory actions. Land-use planning and the establishment and enforcement of higher building codes are some of the strategies adopted. Like in climate change adaptation, natural hazards present considerable challenges for poverty reduction and sustainable development. Thomalla et al. (2006, p.41) contend that many societies today are still ill-prepared to cope with extreme events, which threaten to undermine many decades of effort in the spheres of development assistance, poverty reduction and disaster risk management, as their impacts remain considerable. Detailed information on the magnitude of the impact is available from International Disaster Database (EM-DAT) online.

2.2.1c Environmental Management

The community involves a wide range of people and institutions working with overall environmental issues but concerned with specific aspects of environmental management, such as water resources and conservation of forests. IUCN (2003) identifies some of the characterized features of this community as being extremely fragmented and mostly working in isolation of each other. This is so because of the contrasting agenda of the institutions involved, surprising even those within institutions that represent the central governments. For example, in Zambia, the Environmental Council is concerned with general pollution control as a focus for environmental management, while water resources are managed within the Ministry of Energy and Water, with forestry issues being addressed by the Ministry of Tourism, Environment and Natural Resources with an informal platform for information sharing and channelling of integrative crosscutting issues.

2.2.1d Poverty Alleviation

IUCN et al. (2003) asserts that this community is concerned primarily with a framework for policy definition that attempts to address the needs and vulnerabilities of the poor. It is largely dominated by economic agencies that influence policies for poverty reduction. In the last two decades, for the case of Zambia, this community has been very pronounced, mostly through the production of poverty reduction strategy papers, recently incorporated into the national development agenda. For example, in the National Policy on Environment (NPE), the umbrella policy for addressing climate change is seen as part of the strategies in the national plan for addressing poverty ills. The climate change adaptation and disaster risk reduction communities recognize that poverty reduction is central in the framework of reducing vulnerability to natural

hazards and climate change, because poverty is both a condition and determinant of vulnerability.

2.2.2 Environmental Impact Theories as a Climate Change Analytical Framework

This section explores the three major theoretical perspectives of environmental impact theories: human ecology, modernization, and political economy as analytical theoretical frameworks for understanding policy in relation to climate change and vulnerabilities.

2.2.2a Human Ecology Perspective

According to Freese (1997a; 1997b), human ecologists apply the ecological principle to the understanding of human societies. Human ecologists emphasize an ecological foundation for understanding the driving forces of the anthropogenic environmental impacts, such as climate change. Human ecology incorporates biophysical factors, such as climate and biogeography, as contexts in which social factors drive environmental impacts (Diamond, 1997; Dietz & Rosa 1994; Duncan, 1959; Freese, 1997a, 1997b; Harrison, 1993; Richerson & Boyd, 2000; Rosa & Dietz, 1998). They do not expect social and political variables to overcome fundamental impacts, although they acknowledge social and political aspects to possibly mediate the impacts partially. York, Eugene, Rosa, and Dietz (2003) find political ecologists consistent with a neo-Malthusian perspective in stressing the importance of population size, growth, density, and structure for explaining environmental impacts (Catton 1980; Dietz & Rosa 1994; Duncan, 1959, 1961, 1964; Harrison, 1993). Human ecology suggests that climate may play an important role in influencing patterns of geographic and economic development in ways that are consequential for understanding environmental impacts.

2.2.2b The Modernization Perspective

The Modernization perspective assumes that global environmental problems can be solved by modifying the existing social, political and economic institutions without affecting economic growth, capitalism and globalization (Christoff, 1996; Cohen, 1999; Hajer, 1995; Mol, 1995, 2001; Mol & Sonnenfeld, 2000; Mol & Spaargaren, 1997, 2000; Sonnenfeld, 1998; Spaargaren, et al., 2000). They emphasize modernization and development, which are assumed to alleviate environmental problems. The modernization ecologists acknowledge that the emergence of political rights movements and civil liberties, along with state environmentalism are expected to help curb environmental impacts (York et al., 2003).

2.2.2c The Political Economy Perspective

The key driving factor behind environmental impacts, according to the political economy perspective, is economic growth driven by the structure of market economies, the institutions of modernity, and the relentless commitment to growth inherent in modern, particularly capitalist production systems (O'Connor, 1988; Roberts & Grimes, 2002; Schnaiberg & Gould, 1994; and Schnaiberg, 1980). The political economy perspective focuses on economy-wide impacts, not necessarily on the impacts of any one industry or firm. The only way to prevent further ecological deterioration is to curb economic growth in its traditional form, restructuring societies away from economic expansion and toward ecological sustainability. They do not see technological development and reform-oriented policy as a way to solve the problem of environmental degradation.

2.2.2d Democracy and the State

Governments are also recognized as important actors that influence the emergence of ecological reforms (Goldman, 2001; Mol & Spaargaren, 2000). Ecological modernization theory, like some versions of the environmental Kuznets curve theory, assumes that state environmentalism and subsequent policy efforts can lead to a "greening" of production. They argue that the efforts of Civil Society are key forces to influence governments to address ecological problems (Mol, 1995, 2001; Mol & Sonnenfeld, 2000; Sonnenfeld, 1998; Spaargaren et al., 2000). Therefore, environmental reforms will occur as a result of political freedom and civil liberties because they provide a context in which the public can influence policy and institutional behaviour (York, Eugene, Rosa & Dietz, 2003).

The human ecology, political economy and neo-Malthusian debate on ingenuity and the optimism of "ecological modernization" are missing and failing to address the structural constraints imposed on nation-states by relations of dependency, geopolitical and historical factors. The political ecology perspective addresses these more adequately.

The above perspectives which dominated climate change discourse, have hardly addressed human security. According to O'Brien and Leichenko (2007, p.1)

"the issue of climate change has been widely discussed and debated among scientists and policymakers as an environmental issue, rather than as human security issue. Current discourses on climate change draw attention to growing bodies of research on biophysical changes to the earth system, as well as on the economics and politics of climate change management. Although the climate change vulnerability literature has emphasized differential exposure, sensitivities, and adaptive capacities, as well as the concept of social vulnerability, there has been relatively little attention to the implications of differential outcomes and changing vulnerabilities for human security".

This study argues that the overlooking of the differential outcomes and changing vulnerabilities noted in the above extract can have serious implications to groups and individuals; especially that it overlooks the social causes of vulnerability. Therefore, a framework that may give better

orientation to policy makers in responding to climate change challenges is one that pay greater attention to the political, economic, and social causes of vulnerability, including those embedded in the response to climate impacts. In the next section, I will briefly discuss the three perspectives, i.e. “human ecology”, “modernization”, and “political economy” before I move on to discuss in more details the “political ecology” perspective. The latter, which will guide this study, provides more adequate framework for viewing how state responses to climate change impact can have serious implications to environmental and human security

2.2.3 The Political Ecology of Climate Change: Social Vulnerability

As of recently, and especially in connection to the UNFCCC and the Kyoto Protocol, a significant shift in the debate took place, placing more emphasis on the political context and therefore, on the socio-political factors that may influence climate change and responses to climate change (Smitter & Skinner, 1997). Smit & Skinner (2002) acknowledge the political nature of climate change response and argue that while adaptation is often considered as a government policy response in agriculture, it involves decision making of industries in the agriculture sector and farmers. They equally argue that the many agriculture adaptation options that have been suggested represent measures or practice that might be adopted to alleviate the expected adverse impacts. There are a wide range of forms (technologies, financial, managerial), scale (global, regional, local) and participants (governments, industries and farmers).

Jänicke and Jacob (2004) provide the support that climate change response is situated in a global political framework, and that in order to protect the global environment, the main addressees should be the nation states, because it is they who provide and lead markets for technological, as well as for policy innovations. However, Buttel (2000) cautiously points out that a focus on the establishment or diffusion of institutional forms of environmental protection may actually have little to say about the extent to which such measures or forms "have, or are

likely to have, any definite connections with actual environmental protection outcomes"(Buttel, 2000a, p.118).

The strategies for climate change to address adverse climate change impacts can be situated within political ecology theory. Therefore, analysing the effectiveness of the policy response to climate change should be placed within the framework of political ecology. I argue that climate change requires a political response due to its gravity of felt and expected impacts on the national and society levels. Adger et al. (2001) articulate that global discourses are often based on shared myths and blueprints of the world; the political prescription generated at global levels often may not be appropriate for local realities. For example, the UNFCCC's strategy on climate change response, which attempts to standardise ideas and ways of constructing reality, has been observed both within the policy domain and in the role of the state (Scott, 1998). Because of this fact, the political ecology framework of exploring multiple connections between global and local phenomena, not only in environmental functions but also in decision making and hierarchies of power, becomes appropriate in understanding policy response effectiveness. Therefore, the political ecology framework should be considered adequate for explaining climate change response inadequacy in Zambia, because it attempts to analyse the connections at multiple levels through actions and practices of government agents, individuals, and civil society.

Biermann and Dingwerth (2004) show the link to the nation state's responsibility for global environmental challenges. They argue that environmental challenges increase the demand for mitigation and adaptation action, placing additional stress to protect and promote the welfare of the citizens, consequently in a bid to avoid environmental insecurity. The concept of security in reference to environmental threats is influenced by and usually based on various arguments presented at different levels, from conceptual, theoretical and political perspectives. The conceptual perspective suggests that serious threats to human well-being, not just from the

military, but those that include economic, resources, food, or environmental realms, become security problems (Soroos, 1994). States will require additional capacities to address the additional change from such threats as climate change. Even with all the increasing interest in non-state actors, states still remain the main actors of global environmental governance, also for their importance in initiating environmental policy (Jänicke & Jacob, 2004). Homer-Dixon's explanation of the role of knowledge and ideas, or lack thereof, is important for a society's ability to adapt smoothly to environmental scarcity. This is what he refers to as "ingenuity," and argues that "a society must be able to supply enough ingenuity at the right places and times" to cope successfully with scarcity (Dessler, 1999, p. 107). Ingenuity includes technical aspects, such as technologies that help in compensating environmental loss at the agriculture level. Homer-Dixon (1999) implicitly acknowledge the need for appropriate institutions and policies to respond to the "ingenuity gap" in many societies, which leaves them vulnerable to the most pernicious effects of climate change and degradation. He calls for a general model that addresses a variety of social impacts and analyses complex systems of climate change and the interaction to human perturbations (Dessler, 1999). For example, the proponents of ecological modernization expect an "unproblematic use of science and technology in controlling environmental problems" (Mol & Spaargaren, 1993, p. 454; see also Buttel, 2000b, 2000c; Christoff, 1996; Cohen, 2000; Fisher & Freudenburg, 2001; Tatenhove 2000, 2000a, 2000b; Mol & Sonnenfeld, 2000).

The political ecology framework demonstrates the multiple linkages between local resource use strategies and wider institutional arrangements that emphasize heterogeneity instead of homogeneity when referring to human dimensions of climate change (Brosius, 1999; Slotte, 2002). Additionally, political ecology attempts to provide critiques as well as alternatives in the interplay of the environment and political, economic and social factors. Political ecologist

analyses have shown the complexity of addressing environmental challenges that involve communities consisting of multiple actors with diverse ways of using natural resources and with differentiated access to control and power (Agrawal & Gibson, 1999; Nygren, 2005). Bryant (1992, p.12) describes political ecology as a theoretical inquiry into developing “an integrated understanding of how environmental and political forces interact to mediate social and environmental change.” Meanwhile, Blaikie and Brookfield (1987, p.17) define political ecology as an approach that “combines the concerns of ecology with a broadly defined political economy.”

The two definitions present the strategic connection of political and ecological processes in the analysis of environmental change. Blaikie and Brookfield (1987, p.168) identified key analytical approaches in political ecology, including a focus on environmental actions of the land managers, shaped by economical, ecological and political marginalization pressure of production on resources and flawed environmental data and policies that can be understood through a ‘chain of explanations’. There is consensus that it is not enough in political ecology to focus on local cultural dynamics and interactions excluding relations, but the past and present relationships between policy, politics or political economy in general and the environment need to be explicitly addressed. An adequate response to a chaotic environment may well require broad social or even international initiatives (Park, 1992). “More attention to political influences on human / environmental interaction and on the environmental changes is no doubt a good thing” (Vaydra & Walters, 1999, p.168).

The challenge with key stakeholders remains with decision making based on the available information in response to the future uncertainties posed by climate change. Uncertainties represent a new challenge that necessitates a new framework to explain, understand, and take the necessary relevant decisions. This framework has evolved quite robustly in recent years,

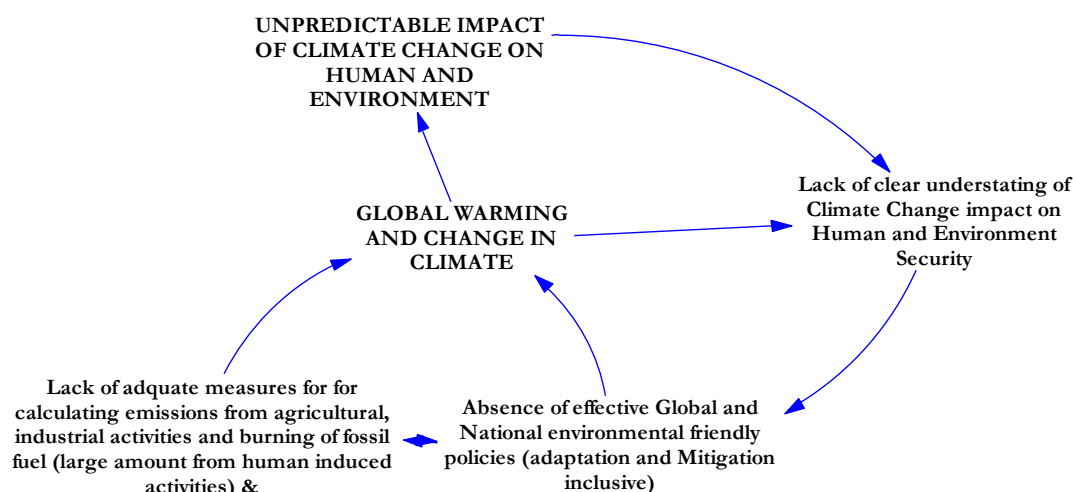
especially in connection to the writings of the German sociologist, Ulrich Beck, namely his thesis about risk society. William (2008) along the same lines as Beck (1992) contends that the focus of risk society is a preoccupation within the question of how the risks and hazards systematically produced as part of modernisations can be prevented, dramatised or channelled. The crux of the argument lies in decision, because risks are about choices – choices in the present based on a future scenario. Mitigation of Green House Gases (GHGs) and adaptation to climate change are two possible ways to address damages that are likely to be caused by global warming. So far, mitigation has been the political activity, while adaptation is a global public good (Machealowa, 2001).

Several factors attributed to influencing policy ineffectiveness include difficulty to capture the perception of vulnerability to climate change at the local level. Such factors might include access to resources, land tenure, health and education, and the wider enabling environment created by strong and accountable local and wider governance systems. There is consensus in climate change research that local communities should increase participation in responding to risks posed by climate change impacts, such as adaptive capacity.

Nygren and Rikoon (2008) claim that in much of political ecology literature the term “political ecology” has been used to refer to the politics of environmental change, with limited attention being paid to ecological dynamics. Political ecology attempts to offer critiques within its framework as an analytical approach for explaining the alternatives in the interplay of the environment and political, economic and social factors. Robbins (2004, p.12) asserts that the discipline has a “normative understanding that there are very likely better, less coercive, less exploitative and more sustainable ways of doing things”. The assumptions drawn from political ecology can be used at various levels for the following objectives: firstly, for informing public policymakers and institutions of the complexities surrounding environment and development;

hence, to contribute to better environmental governance; secondly, to help understand the decisions that communities make about the natural environment in the context of their political environment, economic pressure, and societal regulations; And thirdly, showing how unequal relations in and among societies affect the natural environment, especially in the context of government policy. Forsyth (2003) supports Robbins' assertion that it is further concerned with a development of political thinking of environmental science that integrates social and political aspects into formulating explanations of the environmental problems and solutions. Considering the nature of the climate change impact on the Zambian society and its agriculture sector, I find this theoretical approach adequate as an analytical framework for understanding policy response.

Diagram 1: Causality Level of Climate Change



Source: *Author*

Diagram 1 explains my personal conceptual understanding of the relationships between causalities and effects of climate change on the policy framework response of governments. The changes in climate cause unpredictable impacts on human responses to the anticipated effects. Unclear understating of the impact on humans and the environment limits the capabilities for

effective policy response. This factor negatively impacts policy response to adaptation and mitigation measures in agriculture and other industries that benefit from the reduction of emissions and, on the other hand, contribute to warming the planet. The limited capacity to respond effectively in *itself* contributes to global warming by failing to remove maladaptive policies that address the causes and responses at local, national and international levels. The relationship between climate change and policy on adaptation and mitigation is seen as non linear and complex, but interlinked.

The capacity to adapt to climate change impacts, according to Ayers (2011) is determined by the underlying social and economic weaknesses that also determine vulnerability to climate change impacts. The measures must be implemented in anticipation of climate change, because they would be ineffective if implemented as a reaction to climate change (Smith & Lenhart, 1996, p.193). LEG (2002, p.69) supports the notion of early engagement of people at the grassroots level. IUCN et al. (2003) call for a critique to the prevalent policy approach for addressing adaptation, especially the artificial distinction between climate change and climate variability, and the assumption that adaptation needs to focus on global rather than local processes. In order to effectively analyse adaptation and mitigation responses to climate change, the framework should be robust enough for analysing the integrative aspect of the climate change response into national economic and social development, as well as how they are harmonized at policy and practical levels with other environmental management activities, especially in the areas of land and water management, health, conservation of biodiversity, protection and development. The political ecology theoretical approach is being adopted for this research.

The climate change policy response in Zambia has been severely constrained by several factors, some of which are state interdependency arising from commitments under global conventions, such as the UNFCCC, Montreal Protocol on Substances that Deplete the Ozone Layer, Convention on Biological Diversity and Convention to Combat Desertification. The

geopolitics of the ‘North’ and ‘South’, the commitment under the Kyoto Protocol, UNFCCC financial mechanism and originality of the knowledge sources used in designing the global response to climate change largely influence Zambia’s climate change response. The influence of the global development discourse, which led to programmes such as the Structural Adjustment Programme (SAP) continues to negatively impact most of the state’s institutional capacity to provide the expected policy implementation support. Even the donor support for policy implementations is largely influenced by different donor agendas reflected either in bilateral or multilateral agreements with the government. Zambia’s ability to initiate its own climate change programmes has been undermined by its weak political, economical and financial position. This is the aspect that explains the dependency on foreign support, even for policy implementation with corresponding effects on the policy development approach at the national level. These factors are discussed in chapter four in relation to climate change policy response. All of the above factors contribute to the fragmentation in the policy approach to climate change at the national level.

3.0 CHAPTER THREE- THE STUDY

This chapter portrays the general picture of Zambia’s response to climate change, which will be critically assessed in chapter 4. To do so, this chapter is divided into two sections. The first section provides an overview of the climate change situation in agriculture and Zambia in general. The second part explores the linkage of each of the key policies identified by the CCFU to climate change. It starts with outlining the significance of the study.

3.1 Significance of the Study

The study is expected to contribute to understanding whether the fragmentation in the policy approach to climate change largely accounts for the absence of an effective policy response to climate change. This is done through examining the necessary policy and legislative instruments outside the Zambia National Adaptation Programme Action on Climate Change (NAPA). The study further contributes to the various assessments for defining a comprehensive policy approach that addresses the threats and vulnerabilities caused by climate change. The information should further create an opportunity for moving away from a compartmentalised policy development tradition.

3.2. Climate change and the Agriculture sector in Zambia

The 2006 World Bank Report (as cited in Ngoma, 2008) indicates that Zambia's increasing temperature at the rate of 0.6°C per decade is unprecedented, ten times higher than the Global or Southern Africa rate in 2006. If this trend continues, the implication of higher temperatures for rainfall will be even more difficult to predict. It is already emerging as a major challenge of the time, threatening human survival and development in Zambia. Drought and floods have increased in frequency, intensity and magnitude over the last two decades. Frequent floods and late rains have resulted in serious damage to crops and infrastructure. Meanwhile, on the other hand, drought periods have often been accompanied by reduced precipitation; high temperatures and evapotranspiration with adverse consequences for staple food production (NAPA, 2007).

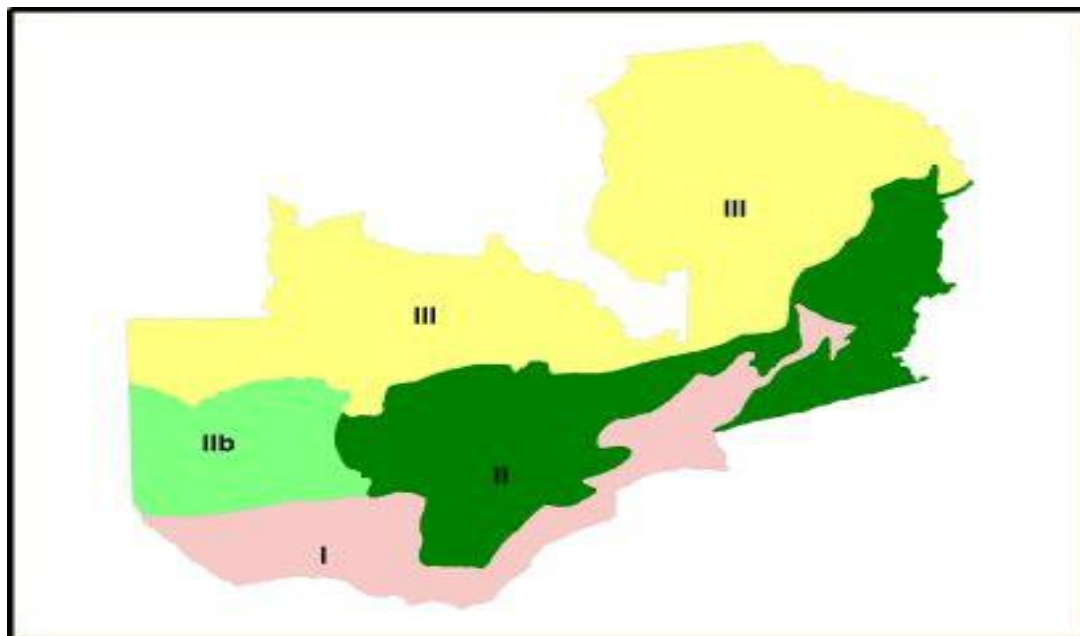
This situation is expected to alter food security sources for more than 60 percent of Zambians who depend on rain-fed agriculture for their livelihoods, with maize, sorghum and cassava as predominant staple crops, as indicated in the 2007 Zambia National Adaptation Programme Action on Climate Change (NAPA). Cash crops include wheat, cotton, oilseeds, coffee and horticultural produce. Zambia's food security situation remains precarious despite

occasional surpluses during good seasons. The current agricultural practices in use will no longer be sustainable in the face of the limitations imposed by climate change, a situation calling for an urgent need for adaptation to avoid food insecurity and malnutrition diseases, worsening among people living with HIV/AIDS. The impacts of climate change in Zambia are generally manifested in human health and the agricultural sector, worsening the existing levels of poverty and undermining all development efforts at the national level (ILRI, 2006).

Water stress is another likely impact. Wolf (2002) as cited in Gleditsch, (2007) asserts that one billion people lack access to safe freshwater, almost three billion do not have access to adequate sanitation facilities, and more than five million people die every year from water-related diseases or inadequate sanitation. The Fifth National Development Plan of Zambia (2006-2010) estimates that 37 percent and 4 percent of urban and rural populations respectively have access to safe water supplies and sanitation, while 70 percent of the national population were not food secure. Poverty in Zambia is wide spread, with 73 percent of the population living below the poverty datum line. A majority of Zambians live in rural areas heavily dependent on subsistence rain-fed agriculture, and relying on a single maize harvest for their livelihoods. This situation makes them very vulnerable to climate related natural calamities and disasters, such as floods and droughts, which directly affect agricultural productivity.

The NAPA document highlights the areas suitable for staple crops since the 1980s, such as maize production. These regions are likely to shrink by more than 80 percent. Assessments undertaken as part of the NAPA preparation process indicated that climate change will increase vulnerability, especially in arid regions, which typically correspond to Agro-Ecological Regions (AER) I and II in Zambia. Refer to figure 1 below.

Figure 1: Agro-ecological zones of Zambia



Source: CEEPA (2006).

Region I: The Luangwa-Zambezi rift valley receives less than 800 mm annual rainfall, mostly in the southern part of the country. Region I is mainly sub-tropical.

Region II: Receives less than 1,000 mm but more than Region I. This is mostly in the central part of the country. Region II is divided into IIa with sandy soils and IIb with clay soils. Region II is mainly sub-tropical.

Region III: Receives more than 1,000 mm and up to 1,400 mm of annual rainfall. This is in the northern part of the country. Region III is mainly tropical (NCCR, 2010)

This is a scenario suggesting frequent shortages of grain and severe yield decrease for specific crops, such as maize, at the national level. Other impacts under climate change vulnerability assessment on the economic costs of climate change on agriculture in Zambia undertaken by the World Bank, with support from FAO and the University of Pretoria, indicated that the same regions will exhibit severe deficits at critical periods of the cropping calendars (NAPA, 2010).

3.3. Climatic Factors

3.3.1 Temperature

The global mean temperature has increased by 0.3 to 0.6 degrees Celsius since the late 19th century, and 0.2°C to 0.3°C over the last 40 years, though the warming is not uniform globally (Climate Ark, 2007) . According to the Inter-governmental Panel on Climate Change (IPCC) the Earth has warmed by about 0.7 degrees centigrade in the past century and human activities are very likely the cause of it. Similarly, the mean annual temperature in Zambia has increased by 1.3° since 1960, a rate of change that is confidently projected to continue. This has the effect of increasing the frequency of days and nights that are particularly warm, a trend that constrains crop yields in tropical latitudes. A second important impact of rising temperatures is the higher altitude at which the risk of malaria transmission becomes significant. This is important in Zambia, a country where a third of the population experiences the illness each year, but which also has many settlements located at marginal altitudes.

3.3.2. Rainfall Pattern

In terms of rainfall, the IPCC-WGII (1998-2001) has concluded that Southern Africa would get drier if climate change occurs, and that the region will find it difficult to cope with climate hazards given the present level of preparedness. According to simulated studies, Southern

Africa's precipitation will decrease by 5-20 percent in all major river basins of the region except the Congo, where precipitation is expected to increase by 10 percent.

3.4. Effect of the Changing Weather Patterns on Zambia's Agriculture Sector

Climate change impact in Zambia is observed through the varying weather patterns, inducing floods and increased rainfall intensity, which are affecting the agricultural sector in various ways. The floods have devastated a number of districts in the recent years. In some areas, rivers were flooded from heavy or severe rainfall and floods associated with some hailstorms, which destroyed crops and buildings. The frequency of their occurrence and magnitude has unfortunately been increasing. According to the Disaster Management and Mitigation Unit (DMMU), the drought-induced crop failure experienced between 1986 and 1996 occurred in six out of ten farming seasons: "In terms of profile, the country has had 11 hazards most being droughts and floods (DMMU, 2009).

The low crop productivity in Zambia is due to a number of factors, among which are adverse environmental conditions and drought being the highest contributors (Lewanika, 1995). For example, excessive rainfall in 2001 and dry spells during the 2001/02 growing season led to a major shortfall in maize production, adversely affecting food security, a decrease of 42 percent compared with the average yearly production. The agricultural infrastructure was washed away and destroyed (roads and bridges). Access to the markets was also affected. The farming communities were further affected by the slow response of the government departments in rehabilitating agricultural infrastructure. In some cases they waited until the rainy season was over. The flood hazards in Chavuma left a total of 157 houses collapsed, several roads destroyed, bridges washed away and some classrooms damaged (DMMU, 2009). The agricultural extension services to the farmers were severely affected. Croplands were degraded due to soil erosion and,

in the long run, might have an adverse impact on the productive grassing areas for those involved in pastoral farming communities.

The 2009/2010 farming season had the best harvest for the Zambian farmers countrywide, even though the rainfall received was above normal. Crop yield for the 2009/2010 farming season had exceeded the government expectation. Food Reserve Agency (FRA), a state agency under the Ministry of Agriculture and Cooperatives mandated to buy farm products for national food security failed to create a market for the maize estimated at 2.7 million metric tonnes. The FRA statement indicated 643,000 metric tonnes were purchased out of the 2.7 million metric tonnes maize harvest by August 2010. This reflected negatively on the preparedness, both at the level of storage facilities and financial resources mobilization for purchasing the produce from the farmers.

The effects of the changing weather pattern on Zambian agriculture are mixed, comparing the effect between the 2001/2002 and 2009/2010 season. The 2001/2002 partially drought-affected season accounted for low crop production, which was reduced by 42 percent, while the 2009/2010 season exceeded the expectation of the government. The 1991/2 season was the worst, in which Zambia experienced nationwide drought, which devastated the agriculture sector, almost paralyzing the economy of the country.

3.5. Policy and Institutional Linkage to Climate Change and Agriculture Sector

This section focuses on the key policy linkages to climate change and the agriculture sector, with a view of establishing the connection to climate change adaptation and mitigation. The key institutional policies for climate change were analyzed.

The Fifth National Development Plan (FNDP) 2006 - 2010

FNDP is one of the main strategic national development framework documents, which identifies the National Policy on Environment (NPE) and the National Environmental Action Plan as the key to its planning and implementation. The goal of the two key policies as indicated in the FNDP were to reverse environmental damage, maintenance of essential environmental biological processes, and the sustainable use of the natural resources for the benefit of present and future generations. It places much emphasis on sustainable management of the environment.

The review of the national budgetary allocation from 2006 to 2009 on environmental protection showed a lack of total commitment to environmental protection in financial terms. The highest resource allocation was in 2006, when the budget for environmental protection grew by 0.3 percent in 2007. Between 2007 and 2009 the environmental protection budget declined by 0.2 percent. Equally, the review of the national budget speeches by the Minister(s) of Finance and National Planning between 2005 and 2009 show that the government's investment in environmental protection initiatives was very minimal; in fact, the speeches did not even make reference to climate change. While the Sixth National Development Plan 2010-2015 (SNDP) presents five programmes which runs up to 2015, the following were observed:

- none of them take into account how farmers were to adapt to the adverse external circumstances;
- no concrete programmes specifically addressing the threats presented by climate change to the agriculture sector;
- the programmes suggested appear vague with a possibility of presenting difficulties at the level of implementation.

Climate Change Facilitation Unit (CCFU)

The CCFU is a government initiative coordinated by the Ministry of Tourism, Environment and Natural Resources aimed at formulating a comprehensive National Climate Change Response Strategy. The CCFU was established in 2009 with an expected outcome of helping the government determine whether there was need for a policy or legal framework on climate change, as well as to provide a framework for a comprehensive and strategic approach on aspects of adaptation, mitigation, technology, and financing, including education and public awareness. Since the CCFU is yet to conclude its work, I focus on the institutions coordinated under its mandate. The following are the participating public institutions, and policies are reviewed in relation to the issues of climate change, and more importantly, to the adaptation and mitigation response to the impacts in agriculture and in general. These institutions were identified by the Ministry of Tourism, Environment and Natural Resources as part of the Climate Change Facilitation Unit (CCFU), which means that each of them has a linkage to issues of climate change.

3.5.1. Ministry for Agriculture and Cooperatives (MACO)

At the agriculture level, The FNDP identifies priority areas in irrigation development and support for agricultural infrastructural development and land development, services and technological development. The public budget for the agriculture declined from 26 percent in 1991 to 4.4 percent in 1999 and has not exceeded 6 percent according to the studies (Govereh, 2006). The decreased resource allocation coupled with agricultural policy currently emphasizing public partnership and liberal marketing policies has a corresponding effect on ministry involvement in extension services, which remain the main source of field accurate information required for research, adaptation and mitigation. It also has the mandate to create a market for agriculture produce and contribute to the national strategic food reserve through the Food

Reserve Agency (FRA). The ministry policy encourages research in its centres, such as Mount Makulu in seed and livestock variation and improvement in response to changing climate. However, biotechnology remains the challenge due to lack of adequate research facilities and trained personnel.

Similarly, the National Policy on Environment (NPE), despite being the parent policy document that addresses the framework for addressing environmental issues, does not support the aspect of climate change adaptation as a key developmental priority, which is expected to be a must for Zambia like any other developing nation, while it addresses some aspects of mitigation. The NPE acknowledges government policy and priorities to have largely been ineffective at addressing agricultural difficulties. The NPE highlights some of the policy failures in the agriculture sector as:

- for industrial support for environment, inappropriate use of chemical agents and agriculture practice;
- agricultural and livestock extension services having inadequate concern for environmental issues;
- farm expansions in response to low production on existing land;
- inadequate land use planning and suitability analyses;
- deficient small-scale damming and irrigation schemes;
- lack of attention to an integrated water resource management policy in agricultural policy and developments.

3.5.2. The Environmental Council of Zambia.

The period between 1992 and 2010 is significant for a number of policies passed in relation to the conventions, notably the Environmental Council of Zambia (ECZ), established in

1992 after Zambia signed the United Nations Framework Convention on Climate Change on the 11th of June 1992 and ratified it on the 28th of May 1993. The Convention entered into force on the 21st of March 1994. It was preceded by the 1990 Environmental Protection and Pollution Act Number 12, amended in 1999 and approved as principal law relating to environmental issues and the national action plan (GRZ, 1990; 1999). It is mandated to protect the environment and control pollution so as to provide for the health and welfare of persons and the environment. The ECZ advises the Government on the formulation of policies relating to good management of natural resources and the environment. The 2005 draft National Policy on Environment (NPE) recognizes the failures of: the historical sectoral approach to legislation was apart from forestry and wildlife; local communities were not included in the implementation; lack of intra/inter sectoral institutional arrangement; and few coordination mechanisms for effectiveness. The NPE cites the ECZ as not having been able to collaborate nationwide on environmental and natural resources management, largely due to lack of resources (NPE, 2009)

3.5.3. Disaster Management and Mitigation Unit

The Disaster Management and Mitigation Unit (DMMU) was established after observing operational failures in disaster response in the absence of a coordinating agency. The observed challenges prior to its formation in 1994 included overlapping functions, waste of resources, bureaucratic delays and isolation based on different and individual ministerial approaches. DMMU, in its establishment and development of national policy on disaster management, recognizes biological diversify and combating desertification in drought conditions. Its focus is on protection of the citizenry and their assets and the environment against disasters through a pro-active, community-based, developmental and multi-sectoral approach that combines disaster preparedness, prevention and mitigation and integrates disaster management into national development. It is guided by the two strategic documents, the *Zambian National Disaster*

Management Operational Manual 2005 and the Zambia National Contingent for Floods. The policy document acknowledges the need to integrate DRR and climate change issues. DMMU addresses all forms of disasters not necessarily specific to climate change. According to the National Climate Change Response Strategy (NCCRS) for Climate Change for Zambia (NCCRS, 2010), there was no evidence of specialist knowledge and expertise in climate change present at DMMU. The challenge was to marry the two approaches from different policy perspectives, Disaster Risk Reduction being of a reactive nature while climate change was more anticipatory and adaptive.

3.5.4. The Ministry for Energy and Water Development

The Department of Water Affairs under the Ministry of Energy and Water Development is vested with the sole responsibility for the provision of sufficient and reliable data on water resources availability and demand to allow for effective planning, utilisation and management of the water resources. The increase in the population, the demand for waterpower generation, direct consumption and other uses has increased. This has led to conflicting demands on the resources, leading to observed lack of attention to an integrated water resource management policy in agricultural policy and developments, as noted in the NPE of 2005. There was evidence of inadequate management of water resources and catchment, especially with altered flow regimes through hydro-electric dams and irrigation, and change from perennial to seasonal flow patterns. At least 56 percent of the Zambian population lacked access to safe water supply and less than 10 percent had access to adequate sanitation facilities.

3.5.5. The Zambia Meteorological Department (ZMD)

The ZMD is under the Ministry of Transport and Communications with responsibility to provide meteorological and climatological services. It observes and researches into weather and

climate. Its core business is to provide efficient, quality and effective meteorological and other related services to various weather sensitive users that include other economic settings in order to facilitate planning and development. With the ZMD being the country's scientific authority in climate and climate change issues has historical climate change data. Most of the information available on climate change is inclined to support the science of climate, limiting the usability of data at the policy level for ministries such as the Ministry of Agriculture, whose services are affected by climate sensitivity.

3.6 Public Policy shift on climate change

There has been a public policy shift in relation to climate change response as observed in Zambia with a view to overcoming malfunction in policy response to climate change over the last two decades. Neubert (2011) suggests that lack of political will and generalisation of suggestions that could be classified as too abstract and non-context specific have contributed to failures in policy implementation. The recent public policy shift reflected in the Republican President Rupiah Banda's speech in 2009 offers political insight. He stated that the nation was expected to face serious effects of climate change, and that therefore, adaptation to the current and anticipated effects was a government priority. The government was most concerned with the poor, who suffer disproportionately from the effects of climate change, compounded by the current rate of deforestation, which exacerbates flooding and drought threatening livelihoods (Times of Zambia, 2009). Some of the possible reasons for the recent public shift in policy towards climate change in Zambia are:

- 1) The general consensus on the scientific findings that climate change will increasingly affect human and natural systems with potentially disastrous effects on local, regional and global economies;

- 2) Increased calls for changes at the policy and institutional levels based on the past assessments of national capability to deal with changing weather patterns and how it is impacting food production;
- 3) The obligation under the Kyoto Protocol and the UNFCCC.

However, what has been missing is a theoretical approach that serves as an analytical framework for policy development and response for climate change resulting in heavy reliance on global initiatives, such as the NAPA and UN REDD+. The fragmentation and disparate nature of the Zambia policy community in responding to climate change is evident from the absence of a coordinated climate change response at the national level. This aspect largely accounts for the lack of adequate mechanisms for addressing the threats, vulnerabilities, adaptation and mitigation.

4.0 CHAPTER FOUR- FINDINGS

This chapter critically assesses the responses to climate change policy in Zambia within the political ecology analytical framework. The first part presents the findings, with the second part offering an analysis on the results in relation to climate change impacts on the agriculture sector.

4.1. Findings

There is a general recognition that climate change poses threats to human and environmental security, and adaptation and mitigation measures were no longer considered optional at policy level. Government policies and priorities have been largely ineffective at addressing agricultural challenges, especially at providing direction for adapting to the anticipated adverse impacts of climate change. Policies of the institutions coordinated under the Climate Change Facilitation Unit (CCFU) in the Ministry of Tourism, Environment and Natural Resources were reviewed,

and their responsiveness to the threats of climate change to the agriculture sector were measured.

The following were the observations:

1. There was an absence of a coherent policy approach to climate change to address the complexities of the challenges, with flexibility to allow adaptation and mitigation for climate change;
2. Absence of comprehensive strategies targeted at addressing the climate change threats and vulnerabilities of communities with multiple levels of engagements. Even activities identified in the NAPA were not sufficient to respond adequately at the national level;
3. While poverty alleviation in the policy development community ranked high as recognised by national development plans and policies, environmental management policy and development approaches among the four policy communities toward climate change were pronounced with a lot of emphasis on environmental protection and regulation, with little focus on the interactions and interplay of the actors from both the state and civil society, including the private sector;
4. Policy responses to climate change were mostly influenced by global conventions and agendas, a case for climate change adaptation through NAPA under UNFCCC, pollution control and protection of biodiversity;
5. There were inadequate resources for general environmental protection and management at the national level, compounded by the absence of the policy on climate change, signifying a missing framework for resource mobilization. Similarly, at the agriculture level, the policy recognized the need for adaptation, but the implementation of the intervention was hampered by reduced resource allocation in the past decade, even when the Sixth National Development Plan recognised that agriculture sector growth could not be achieved due to unfavourable weather conditions in the country, coupled with late distribution of inputs and inadequate budgetary allocation;

6. Strategies in the water sector have been characterised by unclear institutional arrangements, which often conflicted or overlapped with each other. Though the policymakers' reference to its focus on the relationship of water and environmental protection, the efforts were directed to the prime responsibility of management and allocation of water resources. Strategies to deal with climate change issues were not clear;
7. Availability of usable information data to support adaptation and mitigation was a big challenge for the agriculture sector; most information provided by the ZMD were inclined to support science of climate change, making it unusable to the agriculture sector and policy framing;
8. There was evidence of general low adaptive capacity for addressing inter-sectoral issues with ineffective institutional capacity to adapt to climate change and help communities to build resilience. Connected to the above point, this resulted in little resilience built for communities who rely on agriculture for primary livelihoods;
9. There was limited space for a broad range of actors to participate, such as civil society and the private sector ,in advocacy for legislative change and financial investment;
10. Relatively low level of political will was evident for supporting climate change policy response;
11. Significant international and donor influence in drafting strategies and financing of climate change programmes.

4.3. ANALYSIS

The analysis presented in this section attempts to explain whether the policy response in Zambia has been affected by the lack of a comprehensive and robust theoretical analytical

approach, to guide the policy makers in developing effective policy responses to the environmental threats associated with the impacts of climate change with specific reference to the agriculture sector. The agriculture sector is used as proxy indicator to determine human and environmental security. The importance of the agriculture sector in Zambia cannot be overemphasised. Its performance at level of food productive has direct corresponding effects on human and environmental security. The productive capacity and government support at policy to this sector signifies how Zambia responds to both human and environmental security, hence its reference throughout this study. The negative significant effects associated with climate change affecting human and environmental security impact at individuals and communities levels, are linked at two level, 1) they undermine the individual and community capacity to be able to adapt to the climate changes. Weakening the social safety nets that support community resilience in securing food and water that forms the key aspects of means of production. Climate change also present new environmental conditions that could present difficulties for communities to cope with new diseases arising from weather variability, currently malaria is already main contributor to child mortality with rising temperature there is a possibilities of increase in reported incidents and loss of life. Second level, impacts of climate change affect other economics scales, policies from other sectors including those emanating from global level are likely to put strain on resources with potential of weaken public institutional capacity to support communities to adapt to climate changes.

The threats posed are likely to include of loss of life and property due to the extreme climatic conditions, loss of agricultural productivity with increased water stress and damage to infrastructure. Also due to climate variability and climate hazards from climate change extreme weather, it will affect the rate of deforestation, limit access to water resources severely affect people's livelihood who are direct dependant on the natural resources.

In Zambia signs of climate change are already being felt, the above aspects should provide incentives for the state intervention at policy level in order to prevent human loss and

minimize the social and environmental impact with direct effect on food productivity. The stress on the environment in Zambia is likely to further impact the benefits of ecological services such prevention of soil fertility, water and air quality. Also many people who directly depend on the natural resources such as small scale farmers who are the majority of the population are already affected. The 60 percent rural population of Zambia directly depending on rain fed are the backbone of the national food security. Any change in the weather variability is sensitive to the rural community productive capacity with huge consequence on national food security. The threat to food security in Zambia directly impact on political stability as observed from the past, in 1991 shortages of main staple food (maize) led to national wide riots and forced change of government.

Analyzing the policy response to climate change in Zambia, contextual factors should be examined broadly to understand the climate change causes of the insecurities. The insecurities caused by the threats of climate change can generate locally or globally. Including Social and economic policies which can undermine the institutional and community capacity to adapt. The vulnerable sectors mostly affected are agriculture and food security others being the human health, water, energy wildlife, and forestry. The impacts are further significantly affecting the economic, social and environmental dimensions of national development. With a potential of making the current agricultural practices used to be unsustainable in the face of the limitations imposed by climate change.

Political ecology theory, which offers critiques for explaining the alternatives in the interplay of the environment with political, economic and social factors is broad enough to offer a lens for analysis in this study. I argue that the absence of a comprehensive and robust theoretical analytical approach for policy development in Zambia accounts for the ineffective response in addressing human and environmental threats and vulnerabilities presented by climate

change. The dominance of thinking from the environment management perspective has also contributed to limiting the policy development sphere, leading to a compartmentalised approach to addressing climate change threats in a more fragmented fashion, which is presented in the table below.

Table 1. Institution Policy Focus on Environmental Change

Policy / Institutions	Policy and Institutional focus	Research Community / Policy Approach	Policy connection to Climate Change Response
National Policy on Environment (NPE)	Reversing of environmental damage and protection	Environmental management	Mitigation, no clear adaptation measures identified
Environmental Council of Zambia	Environmental protection and pollution control	Environmental management	Control on GHGs through pollution control and regulations
Disaster Management and Mitigation Unit (DMMU)	Disaster management , prevention and preparedness	Disaster Risk Reduction	No clearly established linkages to climate change
Ministry of Energy and Water Development- Water Department	Water management and distribution	Economics	No clear linkages without institutional arrangement supporting climate change

Zambia Meteorological Department (ZMD)	Forecasting and collection of meteorological data	Climate change	Provision of climatic data mostly supporting climate change science
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The table above clearly shows the fragmentation and disparate nature of Zambia's policy community addressing climate change in the absence of a coherent analytical approach to environmental change, with the observed disparate nature of the policy community presented in Table 1. I contend that the Climate Change Facilitation Unit in its current form of representation risks providing a policy framework limited to environmental sectoral issues guided by an environmental management perspective. I further advance that besides the missing coherent analytical theoretical approach, there are other compounding factors, which are discussed in subsequent paragraphs of this analysis.

4.3.1. Fragmentation in Policy Response to Climate Change and Vulnerabilities

The findings reveal a low level of policy integration on the issues of climate change in the agriculture sector. The findings suggest fragmentation in the policy approach to climate change as one of the attributing factors to the general poor performance at the policy implementation level in response to climate change threats. In fact, most of the institutions coordinated by CCFU have operated in isolation of each other with diverse and disparate interests for environment management. The climate change policy response in Zambia cannot be discussed in isolation from factors that have constrained state capacity to provide a comprehensive policy framework. The study identifies state interdependency arising from commitments under global conventions, such as the UNFCCC, Montreal Protocol on Substances that Deplete the Ozone Layer, Convention on Biological Diversity and Convention to Combat Desertification. Policies in

Zambia addressing environmental impacts and vulnerabilities have largely been adopted from the international conventions, which are mainly focused on addressing very specific environmental threats. For example, the Environmental Council of Zambia can be linked to the Montreal Protocols focusing on issues addressing matters threatening the ozone layer; the National Policy on Environment does address the aspects identified in the Convention of Biological Diversity and the Convention to Combat Desertification, while climate change falls within the global climate change response, especially its current strategy on the national adaptation programme and mitigation in areas such as carbon markets and carbon taxation. The global suggestion on the climate change response is linked to global markets, which makes Zambia dependent on those with more global market influence. This introduces the geopolitics of the ‘North’ and ‘South’. Tolo (2009, p. 3) argued that the ineffectiveness of the climate response presents at least two polarised political realities. He draws evidence from the run up to UNFCCC – COP4:

- “1) One was the fundamentally “Northern View”, which postulated that the next steps in protecting the climate required two things:
 - a) the first was a means of ensuring developing countries participation in reducing GHG emissions;
 - b) the second was the development or refinement of the mechanisms that would begin to slow incremental reductions of those gases without causing undue hardship to those developed countries making the cuts.
- 2) The other position can be characterized as the “Southern View”, which stipulates that the current state of negotiations continues to deny the developing world its right to benefit equally from the protection of what is a common global resource belonging to the entire global population: the atmosphere”. (Tolo, 2009, p. 3)

Until recently, the concentration of funding focused on mitigation efforts targeted at the developed world. Adaptation, which is the main concern in developing countries where the impacts are anticipated to be enormous, remains with unclear processes in the UNFCCC. Apart from the unclear mechanisms for funding climate change adaptation, developed countries committed under the Kyoto Protocol to provide financial assistance to developing countries view this mechanism as a way for channelling donor aid, which all African leaders are against. The lack of political willingness within the UNFCCC to mobilise the resources is very evident. With unclear funding mechanism for climate change, funds will continue to undermine Zambia's response to climate change, especially the integration aspect into all the social and economic policies and practices.

The global development discourse, mainly for developing countries, manifested in programmes such as the Structural Adjustment Programme (SAP) have continued to negatively impact most of the state's institutional capacity to provide the expected policy implementation support. In Zambia, SAP was both a political and economic process. Its failure continues to be felt at the policy level; SAP's failure left most public institution without or with little capacity to support policy implementation. It weakened the human resource base and the expertise in these institutions was compromised through retrenchment. It also disoriented public support, as the agenda was foreign driven. The reduced capacity allowed greater influence from the donors as most programmes supported under SAP were externally financed. Zambia's ability to initiate its own climate change programmes has been undermined by its weak political, economic and financial position, in addition to donor influence on the development agenda in Zambia. The political and economic weakness has historical, social and economic explanations with connections to global politics and markets. The aspect explains the dependency on foreign support even for policy implementation with corresponding effects on the policy development approach at the national level.

Support for policy reforms, development and implementation in general has mostly been supported by the donor community who determined to what extent it succeeded, and climate change policy has not been exceptional.

4.3.2. Political Will

The failure to achieve meaningful results in adaptation, especially in addressing the concerns of community vulnerability caused by climate change, is demonstrated in low political will. This key factor has been missing at the political leadership level in mobilizing resources and citizen participation in adaptation initiatives. The indication of this low level of political will is reflected in the manner in which resources are mobilized and allocated for programmes targeted at climate change adaptation and mitigation. At the national level, these activities are mostly included in programmes for environmental protection, obscuring their importance. Many scholars in climate change policy argue that political will is seen in the institution hosting the coordinating function. The coordinating function (CCFU) is located in the Ministry of Tourism, Environment and Natural Resources with relatively low influence when compared to other ministries with economic influence, such as Agriculture, Finance and National Planning. Unlike DMMU handling issues of disaster risk reduction is situated in the office of the Vice President. The Ministry of Tourism, Environment and Natural Resources is not adequately situated currently to draw up programmes that address adaptation in the agriculture sector, inclusive of other sectoral issues, because of its inclination to strong environmental protectionism. Certainly, its low influence has an adverse impact on its convening powers over other ministries with relative economic power and influence, including at the level of drafting policies with a multi-sectoral approach.

4.3.3. Public Participation

The high domination of state actors in the policy development for climate change response in Zambia has limited civil society and local communities' role in policy formulation and strategies. This situation has led to inadequate reflection of the public needs and interests in policies responding to the threats of climate change. All the participating institutions under the CCFU are quasi or government institutions representing mostly the environmental sector. The exclusion of the civil society and private sector participation in the climate change policy arena has contributed to creating an information gap, consequently leading to the lack of better public understanding of the political context in which the climate change response strategy is developed and issues addressed. Policy development processes in Zambia are still traditionally considered among the public as the domain or responsibility of the government. This mentality traces back to the first republic era, when participation and access to public information were exclusive to government employees. That is why there are fewer incentives provided by the government for citizen participation in key processes, such as policy development in climate change. This historical factor in Zambia's policy development is evident by clearly missing a platform where government can engage the public, articulate goals on climate change and guide the public on the means for achieving adaptation or mitigation. As a result, policies developed responding to climate change threats are confined to limited thinking, mostly representing the government's view.

4.3.4. Adaptive Capacity for government institutions supporting Climate Change

There is an apparent low adaptive capacity for responsible institutions under the CCFU examined; this is an undeniable factor to account for the failure of policies addressing climate change challenges. The non-integration of crosscutting impacts of climate change limit decision makers' understanding of the climate change impacts and their implication for national

economies. For example, the agriculture policy revealed has a bias towards macro-economic interests. Capital interest has led to displacement of local people in rural communities to make way for large scale commercial agriculture, mining and tourism, marginalizing them in accessing nature resources and leaving them exposed further to vulnerabilities of climate change impacts.

This has undermined the political importance of prioritization and resource mobilization for creating institutions with adaptive capacity to climate change. The absence of appropriate policy and legislative frameworks in the implementation of adaptation responses has had corresponding effects at the level of resource mobilization for building institutions with resilience to support communities to respond to their vulnerabilities. Without a defined framework, it has been difficult to mobilize the public and political support needed for allocating public resources towards strengthening institutional capacity for climate change, especially with limited space provided by the government for public participation in public policy engagement for climate change.

The inadequate institutional support and the missing legislative framework have constrained communities' ability to adapt to vulnerabilities. For communities to adapt, Zambia needs resilient and adaptive institutions with a leading role in creating an enabling environment for adaptation to climate change. The adaptive capacity is dependent on policies and strategies to respond to the needs and support the resilience of the most vulnerable systems and groups in society. Even though communities have been highly adaptive to different variations in weather patterns from time immemorial, the suggested changes may be unprecedented and prove beyond their capacity to adapt to the anticipated changes. The situation is worsened when challenges present themselves in a context without a robust theoretical analytical framework to provide a policy direction or for implementation.

The capacity development necessary to help communities anticipate the magnitude and build resilience way in advance is mostly missing where it has been done on an *ad hoc* basis. The adaptive capacity at national, provincial and community levels is too low to provide services that enable the communities to similarly develop their capacities to cope with climatic change. The responsibility for this low adaptive capacity lies in the public institutions for not being able to manage and design programmes with flexibility for a changing environment and responsiveness to the immediate and anticipated changes.

The lack of decentralization of most institutions under CCFU has made government institutions inadequate in supporting access to much-needed natural resources by communities dependent on such resources for both survival and adaptation to climate variability. Therefore, climate change adaptation must be integrated into the planning frameworks of decentralized governance structures and adaptive capacities built at that level. Decentralization of adaptation responses need to be strengthened by empowering local governments by building their capacity for adaptation. However, the major challenge is employment of skilled manpower at the local government level, which is undermined by government's low financial capacity necessary for retaining technically qualified people.

4.3.5. Resources Constraint

Zambia as a Least Developed Country is constrained financially; currently, it is not able to finance the annual budget from domestic resources. A review of the institutions involved in climate change shows no tangible mechanism in place for mobilising the resources necessary for the implementation of climate change responses. Even the resources allocated for each of the proposed projects in the NAPA document appear inadequate if the benefits are analysed and contextualized at the national level. The ability of the central government in mobilizing the required resources poses a huge challenge, especially when matched with competing interests of

achieving the United Nations Millennium Development Goals (MDGs) and poverty reduction programmes, where the bulk of development assistance is channelled. Climate change programmes do not attract the same importance as the latter. The alternative to funding the adaptation is through the United Nations Framework Convention on Climate Change (UNFCCC). Unfortunately, the last Conference Of Parties (COP) 16 in Cancun did not address the mechanism for adaptation funding, compared to mitigation, which appears elaborate enough (Madzwamuse, 2010). African leaders, Zambia inclusive, are pushing for a concrete financing mechanism. They outlined demands for adaptation, mitigation, and technology transfer cooperation even when the resources to be mobilized are yet to be known, and the questions yet to be answered are: how much adaptation and mitigation funds are needed? How will these resources, once mobilized, be administered; and what sort of institutional arrangements will be required? Issues of access to the funds and its availability still remain unclear. The hope is in the next Conference of Parties (COP) 17 in South Africa to provide clear guidance on adaptation funding mechanisms; until then, projects identified in the NAPA should be resourced through nationally mobilized resources or other bilateral agreements outside the UNFCCC. Even when COP 17 addresses the funding for adaptation programmes, there are indications that current NAPA documents will need revisions to provide more comprehensive programmes with more tangible results for adaptation at the country level. Zambia's NAPA document requires a comprehensive review if funding under the UNFCCC mechanism is to be accessed. Judging from the on-going negotiations for adaptation funding mechanisms, considerable time is required to reach concrete solutions due to the following reasons, among others:

- I. Concluding negotiations under UNFCCC is time consuming;
- II. Countries in Annex 1 of the Kyoto Protocol require time to mobilize the resources from the time concrete mechanisms are agreed upon and to meet their commitments. These countries are committed through the Protocol, except the United States of America, to

raise funds and assist the Least Developed Countries (LDCs) to invest in programmes for climate change mitigation and adaptation.

- III. Even among the countries classified as Least Developed Countries (LDCs), including Zambia, it will take time to have a common agreement on which countries should access the funds first. This will further be complicated by the priorities of each of the LDCs and the perceived urgency for interventions.

The delay in defining the adaptation funding mechanism has already been discussed, but emphasis presented here is on the link to the priority of the developed countries' interest. This aspect will continue to severely affect access to food and food security in Zambia, especially given that it may compromise the ability of the less financially capable, majority rural communities who depend on agriculture for their livelihood to respond to the impact. The national institutional capacity to assist vulnerable communities to adapt or mitigate is compromised further, as Zambia is not able to cope with its low level financial capacity for adapting to and mitigating the impacts.

Here are some of the possibilities to be considered for raising the necessary resources:

- a) Integration of climate change activities in all sectoral or ministerial budgets- instead of a budget for climate change, it is possible to mainstream climate change activities across sectors, learning from the mainstreaming of HIV/AIDS programmes.
- b) Bilateral and multilateral partners – Donor assistance either in the form of direct budget support or through co-financing projects within the NAPA or NAMA activities strategically on climate change. However, to be attractive to sufficient donor support, Zambia must demonstrate capacity through well-designed and planned programmes indicating clear defined targets, with objectives contributing to a national vision of addressing both national interest and global agenda. Currently, Zambia is faced with

challenges of adequate institutional arrangements and capacity for implementing the proposed programmes.

- c) Carbon Trading and the Clean Development Mechanism (CDM) - Zambia should utilize the CDM facility under the Kyoto Protocol to raise funds through carbon trading and partnering with countries in Annex 1 of the Kyoto Protocol to develop programmes that are attractive for mitigation of climate change. The funds can be used to fund other programmes with local impact, especially for adaptation.
- d) Payment for Environmental Services (PES) - Zambia already implements a mechanism of raising finance from taxing carbon emissions at the national level from industries and motor vehicles, which can be directed to fund the climate change programmes at the local level. These are activities with a strong emphasis on community participation and community capacity development for adaptation. The idea beyond this is that emitting industries and motor vehicles contribute to funding the activities that are targeted at reducing vulnerability caused by climate change, such as carbon sequestration and livelihood-enhancing activities for vulnerable communities.

4.3.6. Integration and coordination of climate change programmes

The placing of the climate change unit (the CCFU placed under the environment sector) in the Ministry of Tourism, Environment and Natural Resources (MTENR) limits public policymakers' understanding of the climate change impacts and the implication at the national level. This has undermined the political importance in prioritization and resource mobilization for climate change. The MTENR is not adequately situated currently to draw up programmes that address adaptation in the agriculture sector, inclusive of other sectoral issues, because of its inclination to strong environmental protectionism. Its low influence adversely impacts its convening powers over other ministries with relative economic power and influence, including at

the level of drafting policies with a multi-sectoral approach. The review of the 11 projects presented in the NAPA *project profile*, reveal the project's narrow focus, mostly on biophysical vulnerabilities without departing from the environmental sectoral approach tradition, the projects presented do not address the integration of micro level adaptation aspects. Even the policy response is pro biophysical vulnerabilities without addressing the human, social and economic aspects, including the interaction and interplay among the actors.

4.3.7. Availability of usable data for informed climate change policy

The non-availability of usable data to support adaptation programmes accounts further for the non effectiveness of the policy on climate change response. The justification in the NAPA for the need for a centre for the strengthening of Early Warning Systems to improve services for preparedness and adaptation to climate change is supportive enough. Most of the data available offer a northern view or Eurocentric perspective on the country climate change impact. Madzwamuse (2010) asserts that African research capacities are forced to collaborate on disparate, foreign-led research, which responds to external research interests and agendas. This situation applies for Zambia. The locally generated information for informing policy processes continues to be highly constrained by a lack of the financial investment in climate change research by the government. Climate change response is very much reliant on information and data generated at the IPCC level and from foreign entities, including the donor community. This situation has led to a gap in information important for the decision makers to under the context in which the impact of climate change is happening and needs to be addressed. Projected studies for Zambia informing decision makers have been placed in a very generalized context offering scenarios for southern Africa or Africa in general, in some cases branded as countries in the tropics. Even information from donor-commissioned studies has been confined to environment working groups for donor coordination on climate change related matters. The policy

effectiveness is determined by the source information support for policy development; basing policy response on externally generated information may present risks at implementation level.

4.3.8. Donor Interference

Findings showed that donors in Zambia were involved at the drafting stage of documentation related to climate change. Mostly donors were closely involved in the drafting of plans and documents, depending on the level of influence and the funding they were promising. This interference in the implementation stage might be problematic, because sound policies are often not implemented properly if they are imported, rather than the outcome of domestic political processes (Neubert et al., 2011). The interference at the document formulation level creates a problem of ownership and addressing the donor agendas undermining the pressing local priority areas. Donor involvement may render the input of other stakeholders in responding to the needs unimportant. It underscores local influence in determining the agenda for adaptation in Zambia, which must be driven and informed by the realities on the ground and effects on the vulnerabilities to the communities caused by climate change. National and local participation is the basis for forming prioritization in programming and funding, but as already discussed above, the forum for such input is lacking. The active involvement of multiple national and local level stakeholders in shaping and implementing the solution in climate change is too important to be left to donor interference.

5.0 CHAPTER FIVE- RECOMMENDATION AND CONCLUSION

5.1. Recommendation

The research recommends institutional policies that help avoid barriers to adaptation, particularly promoting people's access to natural resources that support their livelihood and adaptability to the climate change and climate variability. Policies that will support people's needs to access the much-needed natural resources without bringing communities into conflict with public institutions and undermining the efforts for adaptation. The recommendations are offered at two levels: policy level and institutional level.

5.1.1. Policy

- In order to improve the policy response effectiveness, the climate change policy response framework under consideration by the Climate Change Facilitation Unit (CCFU) should be flexible enough to address the unforeseen impact of climate change.
- The strategy currently adopted for formulation of NAPA and recommendation of the policy and legislative framework should be broadened to include multiple sectoral issues. The current composition of institutional participation under CCFU is drawn from the environmental sector, which represents mostly the environmental management perspective to environmental change. This restricted participation may prove inadequate in proposing the solutions to complexity that may be presented by climate change impact.
- The CCFU (the future form it may take) should be made independent of the Ministry of Tourism, Environment and Natural Resources budget and be established under the Act of Parliament. This will cut down bureaucratic procedures of the ministry, and more significantly, boost accountability and transparency in its own identity. The public will benefit in that it will be able to mobilize its human and financial resources based on the expertise it needs. Having a clear mandate and mission will improve the effectiveness and efficiency at supporting its mandate at the programming level.

- Apart from establishing the coordinating body under the Act of Parliament, it will require political and financial support as a way of empowerment. Other than the legislative backing to be provided by the Act, it should be made to enjoy the political will.
- The coordinating body will need well elaborated governance and accountability mechanisms to be able to attract the necessary resources and gain the trust of the cooperating partners willing to invest in climate change response.

5.1.2. Institutional

- Coordination is the most challenging part in the field of climate change policy response. Coordination has to be well supported in order to meet the logistical component, human expertise and implementation of plans beyond environmental sectoral issues. In order to be effective, the CCFU (the institution that may take its current form) must be efficient in providing adaptation and mitigation services. It will need to be well resourced, not only in form of finance but human resources as well, including replication of similar structures and services at provincial and district levels with devolved powers to be able to act, monitor and implement adjusted programmes specific to the communities where the effects are felt.
- CCFU should also be transformed into a national platform for broad climate change issues, and for engaging Civil Society Organisations, Private Sector, Community Based Organizations and the International Community. It should be given the responsibility to stimulate national debate around emerging issues of climate change and response, promote activities that incentivize public participation in climate change programme, and motivate the research community for purposes of informing public policy improvements.

- CCFU should provide leadership in defining the climate change policy direction, as is the case now; however, they must be more aggressive in popularizing the programmes with clearly identified targets and means for achieving them.
- CCFU should also mobilize and create a fund to be accessed by communities to be able to implement important programmes that build resilience at community levels. This fund should rely on resources through a public financing mechanism. The creation of a fund should serve as an opportunity for increased public participation in developing programmes and encourage innovation for climate change response.
- CCFU policy focus should be on promoting adaptation programmes that are responsive and adaptive to local impacts. Zambia is more likely to benefit from adaptation especially in the agricultural sector, as opposed to mitigation. Its dependence on the NAPA programmes from external financial sources should be reduced to ensure sustainability.

5.2. Conclusion

Changing climatic conditions have had devastating effects on Zambia with impacts to physical and biological systems already being felt. The Climate induced changes are exerting considerable stress on the Zambia's already vulnerable sectors mostly the agriculture and food security others being the human health, water, energy wildlife, and forestry, . It is significantly affecting the economic, social and environmental dimensions of national development. With a potential of making the current agricultural practices used to be unsustainable in the face of the limitations imposed by climate change, and a situation calling for an urgent need for adaptation to avoid worsened food insecurity, malnutrition diseases and worsening poverty situation. The impacts of climate change in Zambia are generally manifesting themselves in human health and in the agricultural sector, worsening the existing levels of poverty.

The tremendous impacts of climate change have been witnessed through frequent floods and late rains, which have resulted in serious damage to crops and infrastructure with direct and indirect effects on the environmental and human security. The government response seems to fall short of seeing the various scales at which these impacts occur, as well as identifying the gaps that may help generate well-informed decisions and policies. At the heart of this malfunctioning are the public policies and key institutions involved in adaptation to and mitigation of the impacts of changing climate. For example, the National Policy on Environment (NPE) highlights some of the general policy failures, including the agriculture sector. The NPE does not support the aspect of climate change adaptation as a key developmental agenda, which should be a must for Zambia, like any other developing nation. At the agriculture level, the policy recognized the need for adaptation, but the implementation of the intervention was hampered by reduced resource allocation and political support evident in the last decade. Given the absence of policy and legal frameworks for climate response, adaptive capacity remained low for all public institutions linked to climate change issues, with little resilience built for communities who rely on agricultural for primary livelihoods.

The research concludes that government policy and priorities have been largely ineffective at addressing agricultural difficulties, especially on issues relating to climate change adaptation and mitigation, including the proposed programmes under NAPA, largely due to factors pertaining to nation-states by relations of dependency, geopolitical and historical. This confirms the hypothesis that environmental and human insecurity affecting Zambia is caused by the absence of effective national policy response to changing climate due to the fragmented and disparate national policy development approach in informing policy on environmental change.

The recommendation provided in this study is a contribution toward making Zambia's climate change policy response effective; it is realized that field of climate change in Zambia is still at a nascent stage and a lot needs to be done, especially with such a low level of political and

financial support for the programmes. The suggestions are limited by the nature of this study and the documents reviewed; therefore, a detailed study is invited to examine the effectiveness of the NAPA response strategy in answering to the challenges of local impact with the possibility of using indigenous knowledge in designing the response. It is important to examine the robustness of theoretical approaches guiding the policy community in responding to climate change challenges and climate change in general. Secondly, research should contribute to suggesting a theoretical framework representing a confluence of the four distinct relevant communities working on vulnerability reduction through research and policy initiatives on climate change, vulnerable communities and adaptation.

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Appendix 1

Table 1.

Date	Activity / Task	Resources	Output	Outcome
January 30 th	<ul style="list-style-type: none"> Handing Draft proposal Development of simple questionnaire 	Library, books internet and online resources	Draft IS Proposal	Draft IS proposal for discussion with Supervisor submitted
February 1-28	<ul style="list-style-type: none"> Consolidating the draft proposal Data Collection for literature Review/ administering of questionnaire 	Library, books internet and online resources Phone	<ul style="list-style-type: none"> Reviewed Draft proposal Administered questionnaires 	
March 1-30	<ul style="list-style-type: none"> Data Collection from interview and strengthening of literature review 	Library, books internet and online resources Phone questionnaire		

April 1-30	Preparation of draft report	Library, books internet and online resources Phone		
May 10	Submission of the draft report to the supervisor for initial comments	Library, books internet and online resources Phone		
May 25	Submission of the draft report to the supervisor for final draft for further comments	Library, books internet and online resources Phone		