

UNIVERSITY OF NAIROBI

INSTITUTE OF DIPLOMACY AND INTERNATIONAL STUDIES

**GENDER RESILIENCE TO CLIMATE CHANGE ADAPTATION IN AFRICA: A CASE
STUDY OF WOMEN IN EASTERN KENYA**

BY

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Arts in International Studies**

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DECLARATION

I declare that this research project is my original work and has not been presented to any other university or learning institution for the purpose of an examination award

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This research proposal has been submitted for review with my approval as the university supervisor

Signed.....Date.....

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DEDICATION

I dedicate this work to my dad, Mr. David Oyosi and mum, Mary Oyosi for the financial and moral support, my brothers, Victor Oyosi and Vincent Oyosi and sister, Charity Oyosi for their relentless support, prayers and encouragement and to my son, Nathan Baraka who I love and thank God for and for the Purpose he has given me and made me work tirelessly for his future's sake.

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LIST OF ABBREVIATIONS

AEZs: Agricultural Ecological Zones

ASALs: Arid and Semi-arid Lands

CEDAW: Convention for Elimination of all forms of Discrimination Against Women

FGD: Focus Group Discussions

GoK: Government of Kenya

IPCC: Inter-governmental Panel on Climate Change

NEMA: National Environmental Management Authority

NGOs: Non Governmental Organizations

RECs: Regional Economic Communities

SDGs: Sustainable Development Goals (of the United Nations)

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ABSTRACT

In an African continent experiencing ever growing effects of Climate Change more so in Sub-Saharan Africa's Arid and Semi-Arid Lands (ASALs), how have African citizens managed to cope. What role has gender played in this adaptation and how have women in Africa built resilience to climate change adaptation. What role does gender play in Climate Change resilience and what strategies and policies have African governments put in place to help women adapt to climate change? These are the major questions that guided this study which sought to examine '*Gender resilience to climate change adaptation in Africa: A case study of women in Eastern Kenya*'

Through an analysis of primary and secondary data, the study found out that climate change has had far reaching effects in Kenya resulting in rising temperatures, new tropical diseases and pests, flash floods and drought among others negatively affecting human, livestock and agricultural performance as well. The study also found that women are the most affected gender when it comes to bearing the effects of climate change. This was due to various reasons like their biological composition, the socially assigned roles that women perform in the society and the economic activities they women perform. The study found that both national and county governments have made some effort to tackle the effects of climate change with little being done to aid women in adapting to climate change yet they are the most affected gender. Government efforts include, building dams, providing drought resistant seeds to farmers, carrying out civic education and seeking the support of development partners in coming up with solutions to mention but a few. The study reached the conclusion that the African continent has not adequately involved women in coming up with solutions to gender resilience and adaptation of climate change and ended by recommending a number of measures to address the situation including; calling on African governments to carry out evidence based research on the role of gender in climate change politics, come up with gendered policies/strategies on climate change and calling on donors and development partners to include the gender component in their engagement with African governments on climate change issues.

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Introduction

Climate change has in the recent past emerged as one the most important issues facing the globe. Vastly attributed to one of the most influential revolutions -the industrial revolution- climate change has literally changed the face of the earth. It has reshaped ice caps, sea levels and polar ice. With emerging global threats ranging from storms, floods to droughts, which are experienced due to climate change, millions of people are affected across the world with the underprivileged and poor being most affected.¹

Due to the adverse consequences associated with climate change, modern life has been re-shaped. Economically, it has negatively affected the livelihoods of subsistence farmers in the developing world; Africa in this regard has had its fair share of tribulations. Politically, it has divided the west, Europe on one side and its pro climate change policies and America on the other side with its abysmal appetite for fossil fuel consumption.

Response to climate change has been directly linked to the level of development. The more developed a country is, the better it deals with the punishing effects and consequences of climate change and vice versa. During the previous decade, climate change has caused inevitable disasters and is expected to intensify its magnitude and frequency.²The interconnectedness of the modern world means that effects of climate change in one part of the globe will inevitably be felt by the rest of the world. According to a report by the World Bank (2015)³, if climate change is

¹ The World Bank, Climate Change Overview www.worldbank.org accessed on 17/03/2016

² Djalante, Riyanti. "Building resilience to disasters and climate change: pathways for adaptive and integrated disaster resilience in Indonesia." (2014).

³ Fay, Marianne, Stephane Hallegatte, Mook Bangalore, Tamaro Kane, Julie Rozenberg, Vogt-Schilb Adrien, and Ulf Narloch. *Shock Waves: Managing the impacts of climate change on Poverty*. World Bank Publications, 2015.

not immediately addressed, it will in the next fifteen years, drive more than 100 million people back into poverty.

It is equally interesting to note that even in one community, under the same environment; climate change will have different effects on s men and women. The gender perspective in climate change and the adaptation it elicits may be defined in terms of the various ways in which men and women play a part in climate change, the distinct effects that climate change has on men and women, the divergent ways men and women use to respond and cope with the punishing effects of climate change, and the different ways in how they are able to change from short term coping to resilience. Women should not just be termed as victims of the effects of climate change but dynamic agents of change. Women posses unique knowledge and skills that should be recognized and tapped into to build up resilience to climate change adaptation.

1.2 Statement of the Problem

Climate Change has become an issue of great concern and has taken a centre stage in international debates in the last few decades. The central issue shaping this debate is the variability of the effects of climate change which differ in the Northern and Southern hemispheres. Climate Change has diverse effects on developing countries (largely because of their inability to cope with its effects) as compared to developed countries and this has shaped the international debate around this subject.

Another dimension of Climate Change is that various factors determine the severity of its effects in a given region as well as the ability of a given region/people to adapt and these include;

geographical positioning, gender, social status e.t.c among others. Among these factors, the gender aspect of Climate Change is of central interest to this paper.

Kenya has also being experiencing the adverse effects of climate change. Arid and Semi-arid Lands (ASALs) of Kenya (where a great part of Eastern Kenya lies) have been the hardest hit by its effects. Poor social and economic development and the high number of people living below the poverty level in Eastern Kenya have made the region most vulnerable to the effects of climate change. Women in the region are more often than not hard hit by climate change due to the fact that they are poorer than the men and due to the societal roles that have been placed on them. This makes them more exposed and vulnerable to climate change and its effects.

This paper therefore seeks to study the effects of climate change in Eastern Kenya, the vulnerability and adaptive mechanisms to climate change that have been adopted by the women in Eastern Kenya. The paper will also look at the efficacy of existing government-led climate change measures addressing climate change adaptation of women in Eastern Kenya policies and strategies in place aimed at addressing resilience to climate change adaptation by women in Eastern Kenya.

1.3 Objectives of the Study

The general objective of the study is examining climate change adaptation in Africa with a special focus on women.

1.3.1 Specific Objectives

1. To study the effects of climate change in Eastern Kenya.
2. To determine the vulnerability and adaptive mechanisms of women in Eastern Kenya to Climate Change.

3. To assess the efficacy of existing government-led climate change measures in addressing adaptation of women to climate change in Eastern Kenya.

1.3.2 Research Questions

1. What are the effects of climate change in Eastern Kenya?
2. What is the vulnerability and adaptive capacity of women in Eastern Kenya to Climate Change?
3. How effective are existing government-led climate change measures in addressing adaptation of women to climate change in Eastern Kenya?

1.4 Hypotheses

This study will be guided by the following hypotheses:

1. Climate change has had adverse effects in Africa especially among African women.
2. Women in Eastern Kenya have developed special adaptive mechanisms that boost their resilience to effects of Climate change.
3. The existing climate change policies in Africa are very ineffective and lack capacity to address the phenomenon.

1.5 Justification of the Study

Past studies on climate change have mainly focused various issues of concern in relation to the subject including: global warming reduction of carbon emissions and green house gases, the decline of the ozone layer, the effects of climate change on the environment, climate change mitigation among others. This study seeks to shift the focus and look at the gender perspective on climate change focusing on the adaptation of women to climate change in Africa. Through this study the author seeks to look at the effects climate change has had on women in Africa. Women in Africa take up more societal roles and climate change adaptation is one that is currently being included to their endless list of roles. This research hopes to bring out the various

strategies that women have put in place in order to cope with the hard felt effects of climate change.

The finding of this study will augment the existing knowledge on the role of women and climate change adaptation by expanding available literature on this important issue. The study will also act as a stepping stone and an entry point to future researchers who may have an interest in the role that women play in climate change adaptation. The findings of the study will inevitably open new areas of research into women and resilience to climate change adaptation particularly in Africa which is under grave threat from global warming and climate change.

The study will be important to the Kenyan government to enable the government come up with policies and strategies that will help in supporting women in the adaptation of Climate Change. The findings of this study could also be used by policy makers in government to formulate policies that support community based climate change adaptation strategies. The government will also be motivated through the findings and recommendations of this study to initiate gender sensitive strategies as well as emulate best practices in climate change adaptation of the Eastern region women. Equally important, the study's findings could be used by key decision makers and top management of NGOs involved in climate change adaptation to initiate and sustain projects that promote sustainable projects in their areas of operation.

The study's main focus will be the women in Machakos County and Isiolo Counties in Eastern Kenya, this will be beneficial to the Kenyan public as it will enable them understand how women are affected by climate change and how they have managed to adapt and be resilient

while at it. This study will also simplify and demystify climate change and its effects on the Kenyan public who have very little knowledge about it.

1.6 Literature Review

This section will interrogate existing literature on gender resilience and climate change. While this study will focus on Africa and particularly on the Eastern region of Kenya, it will also draw from literature from other regions of the world. This will offers a true picture of the study's topic but will also give a comparative analysis of the subject matter.

Literature review in this study will be divided into three sub sections (i) Effects of climate change, (ii) Climate change, adaptation and gender resilience, (iii) Climate Change, Gender and Vulnerability and (iv) Climate Change Policies in Kenya.

1.6.1 Effects of Climate Change

Climate Change has demonstrated its far reaching consequences that affect the social, political, economic and cultural facets of society. Research over the years has depicted the devastating effects of climate change on humanity globally. These effects range from societies undergoing extreme shocks and stress caused by economic meltdowns, natural disasters, floods and droughts among others. According to the latest projection by the United Nations Intergovernmental Panel on Climate Change (IPCC), if no action is taken to reduce greenhouse gases as soon as possible, the air surface temperatures could increase to levels that will drastically alter

ecosystems.⁴ The IPCC and other forecasters predict that such global warming could result in the following changes:

1. A rise in sea levels and this will expose many communities to severe flooding;
2. Water shortages that will lead to lack of water for billions of people;
3. Disruptive seasonal rain patterns that will cause droughts and floods, severely reducing crop yields and escalating food insecurity in many of the developing world;
4. An Increase in frequency and intensity of extreme weather events that will lead to loss of life, injury, mass population displacement, and economic instability in poor countries;
5. Decline in human health as people's resistance to disease is weakened by heat stress, water shortages and malnutrition. There will be widespread increase in infectious diseases, waterborne illnesses and higher levels of pollution will lead to respiratory illnesses.⁵

As in the war economy, Climate Change though a life threatening phenomena, will end up benefitting a small minority that is, elites in society. Today, communal forests are being converted to privatized tree farms owned by the few elite members of the society and in turn the owners of such land can collect carbon credits⁶, a phenomenon that is being experienced globally. Companies (mostly Multinational Corporations) in developed countries are making billions of shillings in profit by selling some protection schemes against Climate Change to

⁴ Intergovernmental Panel on Climate Change 2014 Synthesis Report: Summary for Policymakers

⁵ Houghton, J., Y. Ding, D. J. Griggs, M. Noguer, P. J. van der Linden, X. Dai, K. Maskell, and C. A. Johnson. "IPCC 2001: Climate Change 2001." *The Climate change Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change* 159 (2001).

⁶ Klein, Naomi. *This changes everything: Capitalism vs. the climate*. Simon and Schuster, 2015.

developing countries that have nothing (and if any, minimal contribution) to the effects of Climate Change that are being experienced now.⁷

With the changing needs of the consumer, experts argue, there will be new and expanded business opportunities in response to climate change. Such opportunities include privatized disaster response services that will be as a result of security issues which will arise due to droughts, floods, and storms. As much as droughts and floods create all kinds of business opportunities, they also contribute to the economy of war.⁸ The foregoing arguments therefore prove that the effects of Climate Change are to a large degree, global and thus inescapable i.e no one is immune to the overall effects.

The effects will however be disproportionate with the lives of the poor women in developing countries being the most affected as poverty increases women's vulnerability to the harmful effects of climate change.⁹ Women living in poverty in densely populated areas, in temporary settlements which are more often than not build on land that is unsuitable, will be at risks of flooding and landslides. The poor women who depend on subsistence farming for survival will experience crop failure and lack of economic sustenance.¹⁰

1.6.2 Climate Change, Adaptation and Gender Resilience

According to Intergovernmental Panel on Climate Change (IPCC) "Climate Change" refers to the change in the state of a climate system that can be identified by changes in the mean climate and for the variability of its properties and that persist for an extended period typically

⁷ ibid

⁸ ibid

⁹ Gender, Development, and Climate Change edited by Rachel Masika

¹⁰ ibid

decades or longer.¹¹ It connotes the statistical description in terms of mean and variability of relevant variables over a period of time, ranging from months to thousands or millions of years.

Adaptation in this context can be defined as a way in which humans adjust to their natural habitat and the actions they take to respond to the effects of climate change which if not addressed are harmful to human existence. Adaptation has also been defined as the adjustment in natural and human systems in response to actual or expected climate stimuli or effect, which moderates harm or exploits beneficial opportunities.¹² Adaptation also denotes the ability of the human systems to adapt to and cope with change. There are however certain factors that determine how a system will be able to adapt to such changes and they include: wealth, technology, education, information, skills, infrastructure, access to resources and management capabilities.¹³ The capacity of men and women to adapt is based on how they can use the above factors to deal with the effects of climate change.

The concept of resilience has been understood as the idea of strength in the face of adversity. Resilience-based approaches in humanitarian and development work are aimed at supporting the people in the affected areas to not only survive and recover from a current crisis, but also help in strengthening their coping mechanisms in the face of future threats. According to Smyth & Sweetman, resilience-building involves boosting well-being, realizing rights, and investing in resources, activities and social relationships which reduce risk.¹⁴

¹¹ IPCC, AR. "Intergovernmental panel on climate change." *Climate change 2007: Synthesis report* (2007)

¹² Houghton, J., Y. Ding, D. J. Griggs, M. Noguera, P. J. van der Linden, X. Dai, K. Maskell, and C. A. Johnson. "IPCC 2001: Climate Change 2001." *The Climate Change Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change* 159 (2001).

¹³ IPCC 2001

¹⁴ Smyth, Ines, and Caroline Sweetman. "Introduction: Gender and Resilience." *Gender & Development* 23, no. 3 (2015): 405-414.

Gender is generally understood as the manifestation of the dynamic and context-specific relationships between women and men. Often gender is understood as the cultural difference of women and men, based on the biological differences between male and female.¹⁵

1.6.3 Climate Change, Gender and Vulnerability

Climate Change is the most expansive and serious global environmental problem facing humanity today. As such, climate change is a theoretically and empirically interesting case for examining gender dynamics.¹⁶ Climate change though a global phenomena has affected some countries more than others. Research has shown that the disastrous effects of climate change affect developing countries more than it does the developed world. According to the United Nations Framework Convention on Climate Change (UNFCCC), the next decades will see billions of people from developing countries experience drastic shortages in food, water and deterioration of health and quality of life owing to climate change.¹⁷

The distribution of vulnerability to climatic stresses, hazards and environmental degradation are not equal across the globe. Due to the fact that Africa still largely depends on agricultural and extractive resources to date, climate change is thus expected to pose serious challenges. Crop failure could result due to increase in temperatures that alter growing seasons of certain foods.¹⁸ With women making up a significant proportion of subsistent farmers in Africa, it has been predicted that women, by virtue of their gender will incur heavier effects than men due to global warming and climate change.

¹⁵ Dankelman, Irene. *Gender and climate change: An introduction*. Routledge, 2010

¹⁶ McCright, Aaron M. "The effects of gender on climate change knowledge and concern in the American public." *Population and Environment* 32, no. 1 (2010): 66-87.

¹⁷ UNFCCC climate change impacts, vulnerabilities and adaptation in developing countries. P 6

Even though the climate debate has been a phenomenon that has existed for more than a decade, it still elicits numerous debates. Activists and Organizations spear heading the climate change debate have had to deal with the fact that capitalism and the underlying market forces are very important issues as far as climate change is concern. Climate change is likely to further widen the existing gap between the developed world and the developing world. It is generally accepted that women in developing countries are the most vulnerable in that they constitute the poorest and most disadvantaged groups in society. With the current trend, various human activities will cause the issue of environmental degradation to become worse this will in turn lead to an increase in the build-up of greenhouse emissions in the atmosphere.

The contribution of women in society to help in the mitigation of such factors is of paramount importance. Research has shown that women in rural areas are key players in environmental conservation and resource management. Women play an active role in agriculture and that makes them effective at environmental improvement and management. There is also need to seek for alternative sources of energy and fuel for households to use as a means of adaptation to climate change.¹⁹

In General the phenomena of climate change is a threat to human security. It is therefore important for key policy makers and stakeholders to understand and address the different types of vulnerabilities that are faced by men and women and their gendered implications.²⁰ These gender implications encompass the various ways in which men and women contribute to climate change, the various effects that climate change has on either gender, the various ways that each

¹⁹ Denton, Fatma. "Climate change vulnerability, impacts, and adaptation: Why does gender matter?." *Gender & Development* 10, no. 2 (2002): 10-20.

²⁰ *ibid*

gender responds to and are able to cope with climate change, and the differences in how they are able to shift from short term coping mechanisms to resilience.²¹

Research and growing evidence reveals the different ways in which women, men, children, older members of society, persons with disabilities and ethnic minorities are vulnerable to environmental shocks and stresses. There is also research²² that reveals how the vulnerable communities build resilience and adapt to the various environmental shocks and stresses. In doing so, adopting a gender lense will enable a deeper understanding of the various experiences faced by men and women in the different groups. This will be important in the creation of awareness with regards to social equality in addressing climate change issues.

Existing literature²³ has been written acknowledging and recognizing the inventiveness of women and men living in poverty, and their vigor and capacity to overcome hardships. It is however important to note that, the effects of environmental pandemics and disasters are differently felt for elites and people living in poverty. The difference is also felt in the various scopes of gender and age among other aspects. It is important to adopt a gendered view on resilience so as to challenge gender inequality and promote women's rights. The gendered view recognizes the difference in the inequalities between men and women in the different stratas of society. There is acknowledgment that women, girls, boys and men of diverse ages and socio-economic caliber have different vulnerabilities, and this ultimately shapes the different ways in which the experience and recover from a catastrophe.²⁴

²¹ Smyth, Ines, and Caroline Sweetman. "Introduction: Gender and Resilience." *Gender & Development* 23, no. 3 (2015): 405-414.

²² Le Masson, Virginie, Andrew Norton, and Emily Wilkinson. *Gender and Resilience*. Working Paper, BRACED Knowledge Manager, 2015.

²³ Blaikie, Piers, Terry Cannon, Ian Davis, and Ben Wisner. *At risk: natural hazards, people's vulnerability and disasters*. Routledge, 2014.

²⁴ Supra note 1

In a complex way, poverty is a result of exclusion and marginalization. Poverty contributes to poor women and men not being able to make choices that will enable the improvement of their socio-economic conditions and enable the protection of natural resources. This results to a situation where it becomes difficult to reduce the poverty levels. The reduction of poverty is about ensuring that the poor have an access to reproductive health resources, access to fertile land, ample access to information, access to technologies, relevant skills, proper sanitation, good irrigation strategies, and access to clean water.²⁵

A lot of research that has been done focuses on resilience with regards to rural livelihoods and climate change adaptation. Research done on communities threatened by climate change, environmental hazard or degradation, shows that ‘outsiders’ bring resources, experience, and leverage which are very useful in supporting local-level resilience building.²⁶

Women living in poverty face various challenges that make them resilient to stresses and shocks which threaten their wellbeing and their dependants. Such resilience needs to be recognized and valued. Such resilience is significantly improved by policies and programmes which deliberately encourage their equal rights, active participation and leadership in livelihoods, social protection, conflict resolution and disaster management. According to Denton²⁷ this will be made possible if individual women partnerships are formed, feminist movements and women’s organizations take part in the transformation of the terms that enable women to respond and engage in the process of change. She also argues that, it is the essential

²⁵ Fatma Denton (2002) Climate change vulnerability, impacts, and adaptation: Why does gender matter?, *Gender & Development*, 10:2, 10-20, DOI: 10.1080/13552070215903

²⁶ *ibid*

²⁷ Fatma Denton (2002) Climate change vulnerability, impacts, and adaptation: Why does gender matter?, *Gender & Development*, 10:2, 10-20, DOI: 10.1080/13552070215903

role of women's organisations and movements in building resilience of women as a collectively marginalized group in society. This is, in the feminist typology of power, building on a sense of 'power-within' and the energy and agency of taking action, or 'power-to', to scale up by acting with others – 'power with'.

Gender inequality in the developing world is a phenomenon that is prevalent and cannot be ignored. Even though women account for 80 percent of the agricultural sector in Africa they still remain plunged in poverty and in a vulnerable position in the society.

Climate Change has been viewed by UNDP as one of the biggest challenge facing the globe at the moment. The effects of climate change will aggravate the existing economic, political and humanitarian pressures and this will affect human development all over the world. It is of paramount importance that the world all over recognizes the need to have a gender based approach where women rights are recognized, a gender approach to climate change will include: sustainable development pathways; inclusive and effective democratic governance; and resilience-building.²⁸

The various incidents that are as a result of climate change affect whole communities and ought to affect men and women equally. Furthermore, extreme climate events and the effects they have on the various ecosystems are not limited to regional boundaries. Earth as a planet is a global concern that incorporates a number of ecosystems, peoples and various cultures. It therefore requires collective and global input in its management, protection and its sustainability. This is however not the case with climate negotiations which could be used as an illustration of

²⁸ Sophia Huyer, Gender and Climate Change in Macedonia, Applying a Gender Lens to the Third National Communication on Climate Change.

the unequal world economy that currently exists. The said scenario envisages a situation where men and the developed nations are the ones that get to define the policies that contribute to the reduction of environmental problems such as climate change, while women and smaller and poor developing countries are left out with no power to influence any decisions.²⁹

Women are evidently absent in the climate change decision-making process, and consequently, the climate change debate has not found a way to address the issue of women marginalization and their need to be included in generating solutions to existing environmental problems. Extreme events such as floods and drought have not succeeded in convincing decision makers on the need of making women the core players in sustainable development. Denton³⁰ argues that there's therefore need to increase women participation in UNFCCC bodies and the Kyoto Protocol in order to promote gender equity. There is need to have a more equitable representation of women within the organizational structures of climate change institutions. However, ensuring women's contribution and participation in these debates will not guarantee that the various issues faced by women in poverty will be addressed.³¹

1.6.4 Climate Change Policies in Kenya

Kenya has come up with various climate change adaptation policies; National Climate Change Response Strategy (NCCSR 2010), National Climate Change Action Plan (NCCAP 2013) and National Adaptation Plan (NAP). The purpose of the NCCSR is to implement measures that are needed to address challenges that are emerging from Climate Change. It looks at the history of

²⁹ Fatma Denton (2002) Climate change vulnerability, impacts, and adaptation: Why does gender matter?, *Gender & Development*, 10:2, 10-20, DOI: 10.1080/13552070215903

³¹ *ibid*

climate change, challenges and international efforts to combat climate change. It gives a detailed analysis of the impacts of Climate Change, adaptation and mitigation strategies e.t.c.

The NCCAP looks at coming up with a low-carbon climate resilient development pathway for Kenya as it goes through the process of mitigating and adapting to Climate Change. The Plan also looks into issues relating to policy and legislation, financial implications, capacity building, monitoring and reporting, technological requirements.

The above policies are a stepping stone to a resilient Kenya that has mitigated and adapted to Climate Change, they are however yet to be implemented though efforts seem to be underway.

1.7 Theoretical Framework

This research will use a single theory in explaining the topic and concepts under study and the relationship amongst various variables. The feminist theory and specifically its branch, Ecofeminism theory will be used to explain different concepts in the topic of study.

1.7.1 Tenets of Feminism Theory

Feminism theory holds that the challenges facing women today are the result of a male dominated value system that governs everyday social realities. Feminism conceives gender as socially generated and perpetuated by culture. Generally, the theory holds that there should be equality between men and women politically, socially and economically.

Ecofeminism on the other hand holds that ecological devastation is the result of human actions that are shaped by a society's culture and traditions, as such; culture becomes both the problem and the solution. The theory traces the history of ancient civilizations of such diverse places as the Middle East, China, Greece, and South Americas as having conceived the Earth as

feminine; Ecofeminism thus sees a link between Earth's oppression (through environmental degradation) and women's oppression as having arisen with the ascendancy of religion and culture based on patriarchy some six to seven millennia ago.³²

Ecofeminism espouses the view that human beings are inheritors of traditions which fashions reality in accordance to power hierarchies, the prototype being male power over female power.³³ This view finds support in all major traditions including Confucianism, Vedic, Biblical and Koranic teachings which portray male values, perspectives, experiences and symbols as norms/standard for all human beings. These dominant traditions as a consequence associate this stated 'humanness' with legitimate preponderance of humankind over nature resulting in the silencing, ignoring and reinterpretation of the woman's and nature's 'voices'. Ecofeminism advances the view that men have purposed to deny their dependence and vulnerability feelings vis-a-vis nature and women and consequently have endeavored to dominate both.³⁴

1.7.2 Application of the theory to the study topic

The Feminism theory is suitable to the topic of study as it focuses on the plight of women in climate change which it blames on the male dominated systems. For a long time the UN climate change regimes as well as other climate change regimes worldwide have formed male dominated systems that have ignored the voice of the biggest victims of climate change-women. Experts argue if women were actively involved in finding solutions to the issues of climate

³² Spretnak, Charlene. "Ecofeminism: Our roots and flowering." *Reweaving the world: The emergence of ecofeminism* (1990): 3-14.

³³ *ibid*

³⁴ Kheel, Marti. "Ecofeminism and deep ecology: Reflections on identity and difference." *Trumpeter* 8, no. 2 (1991).

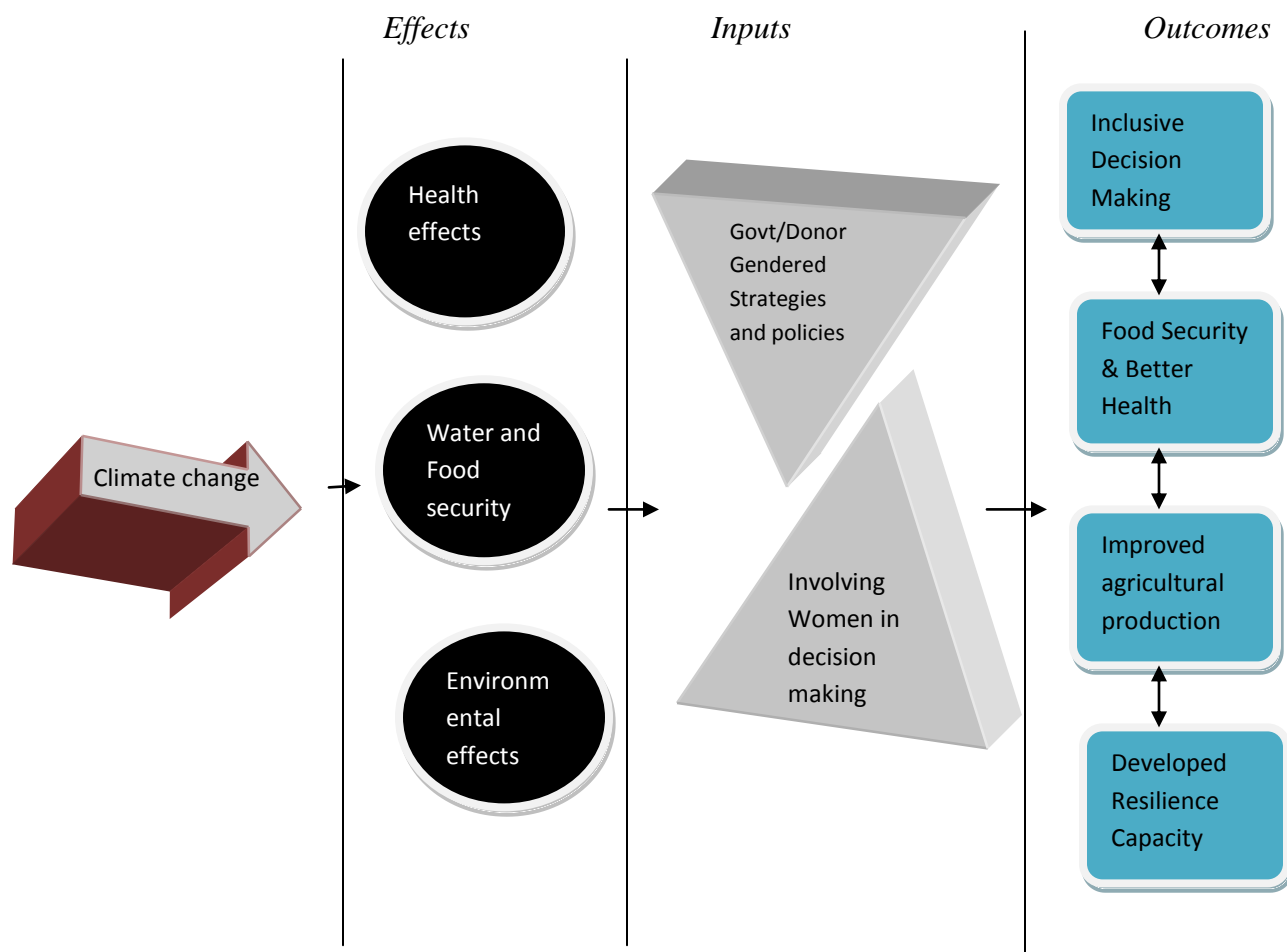
change, then it would be easier coming up with gender sensitive solutions which will have a deeper effect as they will be based on experiences of the most affected group-women.

Ecofeminism on the other hands focuses on the role of gender in climate change resilience and adaptation. Like its mother theory (Feminism), Ecofeminism sees the main cause of climate change as 'androcentrism' or male centeredness. This theory therefore gives strength to the assumptions of its mother theory and supports the long term aims of the study topic which are to initiate a debate for structural shift and power relations of climate regimes which perpetuate male dominance over women and nature. The theory supports the view of the researcher that these regimes must first be decimated to give way to power structures that include women and nature 'voices'. Women play a central role in nature's preservation as women not only understand but are also in harmony with nature and the Earth a fact Ecofeminism acknowledges.

Ecofeminism argues that the devastation of the environment is attributed to human activities that are shaped by a society's culture and traditions. Over the years, human activity has evolved from charcoal burning in stone age period to clearing of forests and setting up of factories that emit dangerous gases. With little or no vegetation left to absorb these gases, humanity has become the casualty and thus human activity perpetuated by culture has contributed grossly to environmental degradation and climate change.

The study has found through literature review that the existing male dominated regimes have become unable to come up with adequate solutions due to the disconnect with what Ecofeminism calls 'Mother Earth' which women understand better.

1.7.3 Conceptual Framework



Source: Modified from CARE International Climate Change Brief: Adaptation, gender and women's empowerment available at www.careclimatechange.org/adaptation

1.8 Research Methodology

This section reviewed the research methods used in conducting the study. It looked at the research design, sampling, the research site, data collection methods and tools and data analysis and presentation.

1.8.1 Research Design:

This study used the Case Study Research Design. Case Study according to Yin seeks to answer the “how & why” questions and is especially useful where the researcher has minimal or no control over events in question and studies current phenomenon in real life setting.³⁵ This study was descriptive in nature. The researcher got facts from the field and described them as they were in terms of observations, opinions and facts.

1.8.2 Research Method

The study employed Mixed Research Method. Mixed research method has emerged as the third most dominant research paradigm alongside Qualitative and Quantitative research.³⁶ Mixed Research Method has gained this acceptance as it is generally accepted that both Qualitative and Quantitative approaches have weaknesses while used on their own and triangulation overcomes these weaknesses by emphasizing on strengths of both approaches.³⁷ According to Jones, while Qualitative methods like observation and unstructured interviews may allow researcher to develop the overall picture of phenomena, Quantitative approach may prove more apt for

³⁵ Yin, Robert K. *Case study research: Design and methods*. Sage publications, 2013.

³⁶ Johnson, R. Burke, Anthony J. Onwuegbuzie, and Lisa A. Turner. "Toward a definition of mixed methods research." *Journal of mixed methods research* 1, no. 2 (2007): 112-133.

³⁷ Nau, Douglas S. "Mixing methodologies: can bimodal research be a viable post-positivist tool?." *The Qualitative Report* 2, no. 3 (1995): 1-6.

behavioral and descriptive assessment.³⁸ Therefore mixed research that carries aspects of both qualitative and quantitative brings out the best results.

1.8.3 Research site

The study required data from the Eastern Kenya region an area of approximately 140,698.68 km sq and a population of 5.66 million people (according to the 2009 census). Under the new constitution, Eastern Kenya today is a region composed of eight counties: Embu, Isiolo, Kitui, Machakos, Makueni, Tharaka Nithi, Meru and Marsabit which fall into three different agro-ecological zones (AEZs). Meru, Tharaka Nithi and Embu fall under Zone II (which is for agriculturally productive areas); Makueni, Kitui and Machakos are classified semi-arid while Marsabit and Isiolo have been classified as arid³⁹.

Due to expansive nature of the target study area (Eastern Kenya as a whole) and the limited time frame available for the study, data collection was carried out from two counties- Machakos and Isiolo counties-which fall under two different AEZs. Machakos is classified under semi-arid zone while Isiolo is Arid. These two counties were chosen due to their accessibility, (both had averagely developed transport infrastructures and hence movement within the counties was easy) and they were also in close proximity to Nairobi (where the researcher is based). This therefore reduced the financial burden for the researcher to travel to these areas for field study.

³⁸ Jones, Ian. "Mixing qualitative and quantitative methods in sports fan research." *The Qualitative Report* 3, no. 4 (1997): 1-8.

³⁹ Pratt, C. (2012). *Traditional Early Warning Systems and Coping Strategies for Drought among Pastoralist Communities of North and Eastern Province, Kenya*

Figure 1.0: Map of study site (Machakos County, Kenya)



Source: Google Maps

Figure 2.0: Map of study site (Isiolo County, Kenya)



Source: Google Maps

1.8.4 Target Population and sample size

This study required data from Eastern Kenya, a region composing of 8 counties belonging to different AEZs. Due to the expansiveness of the region, the limited time frame within which the research was to be completed (two semesters) and the limited finances available to the researcher, two counties-Machakos and Isiolo were taken as samples. Machakos is classified under semi-arid zone while Isiolo is Arid. These two counties were chosen due to their accessibility, (both had averagely developed transport infrastructures and hence movement within the counties was easy) and they were also in close proximity to Nairobi (where the researcher is based). This therefore reduced the financial burden for the researcher to travel to these areas for field study.

Machakos County has a population of approximately 1,098,584 while Isiolo has 143,294 (according to the 2009, housing and population census) Due to the inability to collect data from the entire population of these two counties, a sample size was collected from both counties. Probability sampling, the simple random sampling method was used to select 70 respondents, 35 respondents from Machakos County and 35 from Isiolo County (at least 75% of them were women). Non-Probability Sampling, purposive sampling was used to select 30 respondents from among key policy makers under the National Environmental Management Authority (NEMA), Ministries of Environment Natural resources and the Ministry of Water and Irrigation in regards to the policy measures and strategies being implemented on the ground by the government. 10 questionnaires were given to women focus groups in both Machakos and Isiolo Counties.

1.8.4 Data Collection Tools

Questionnaires: These were used to collect quantitative and qualitative data from various respondents. Enough space was provided for respondents to fill in the information required.

Interviews: These targeted women focus groups in the two counties (Machakos and Isiolo), taking into account that a good number of these women were illiterate or have acquired primary school level of education.

Observation: The research was done at the research sites, the researcher observed the situation on the ground capturing any additional information that the respondents may have forgotten to mention as well as confirming the validity of the data given.

1.8.6 Data Analysis and Presentation

Quantitative data was acquired from the respondents and was broken down using SPSS and interpreted to create meaning. Data from interviews was transcribed and organized into sub-themes which was then joined and presented inform of themes. Both Qualitative and Quantitative data complemented each other.

The data was then interpreted and presented inform of themes, figures, charts, graphs and pie-charts. Conclusions were then drawn and used to come up with recommendations.

1.9 Conceptualization of Terms

Climate Change: The term will be used in this study to refer to regional climate pattern changes especially since the mid 20th century to date largely due to rise of carbon dioxide in the atmosphere.

Resilience: The term will be used in this study to refer to the ability of human beings to adapt to the negative effects of climate change

Adaptation: The term will for the purpose of this study be used to mean the different mechanisms and changes that people living in zones affected by climate change use to cope with its effects.

Mitigation: Will be used to refer to the activities, strategies and policies employed by different stakeholders to eliminate or reduce effects of climate change.

Gender: The term will refer to the maleness and femaleness of the female species based on their social, cultural differences rather than their biological ones.

1.10 Chapter Outline

This study will be structured as follows:

Chapter One: Introduction: The chapter introduces the topic of study and gives the background. It then brings out the problem under study in the Problem statement, states the research questions and the significance of the study. It then analyzes supportive literature review and looks at the research methods to be used in the study.

Chapter Two: The second chapter will comprehensively evaluate the effects that climate change has had in Eastern Kenya (also in respect to the gender aspect).

Chapter Three: The third chapter will study the vulnerability of women in Eastern Kenya to climate change and find out how they have managed to adapt to the phenomenon.

Chapter Four: This chapter will assess the effectiveness of government-led the climate change adaptation strategies and policies in Kenya with a view to determine if they have contributed (or not) to the resilience of women to effects of climate change.

Chapter Five: The last chapter will draw summary conclusions from the study data that has been analyzed and from it give recommendations. It will also suggest further areas of research.

CHAPTER TWO: EFFECTS OF CLIMATE CHANGE IN EASTERN KENYA

2.1 Introduction

This chapter is aimed at addressing the research question ‘what are the effects of climate change in Eastern Kenya?’ For us to understand the Eastern Kenya region which is the main focus of the topic, it is imperative to first understand the effects of climate change on Kenya as a whole. This will present a wider perspective to the region under study.

2.2 Background of climate change in Kenya

A report by Hijmans et al.⁴⁰ contends that Kenya’s climatic conditions have been varying in the last two decades. This has seen a humid tropical climate across the coastal areas while the inland areas have been largely arid. Temperatures on the other hand vary with elevation of land from sea level rising. The most remarkable feature about Kenya’s climate is that it varies with precipitation. It experiences bimodal pattern of seasons and this is due to its astride position across the equator.

In Kenya, the long rains are experienced between March and June while the short rains come in September through to December. The amount of rainfall experienced in different parts of the country depends largely on the topography of each region with a high of 2300 mm of rainfall per year on plateaus while lowlands experience as low as 320 mm per year. On average, Kenya receives 500 mm of rainfall per year largely affected by low rainfall in the Eastern and Northern parts of the country.⁴¹

⁴⁰ Hijmans, R., Cameron, S., Parra, J., Jones, P. and Jarvis, A. (2005). *Very high resolution interpolated climate surfaces for global land areas.*

⁴¹ Osbahr, H. and Viner, D. (2006). *Linking Climate Change Adaptation and Disaster Risk Management for Sustainable Poverty Reduction. Kenya Country Study*

A study by Anyah and Semazzi⁴² found that during rainy seasons, the country often experiences floods and at times experience high amounts of rain resulting into El Nino. Regions that normally experience floods include; the Lake Victoria basin, the coastal regions as well as the Tana River basin. Anyah and Semazzi have linked El Nino floods in the country to climate change and they argue that high amounts of rainfall can be attributed to effects of El Nino and say it may be indirectly linked to the long periods of droughts normally experienced after the long rains.

When it comes to droughts, the Kenya Red Cross⁴³ report found that the country experiences a major drought at least once every decade and a minor drought at least once every four years. The report notes that the country experienced critical droughts in 1984, 1995, 2000 and 2006 while the 2009 drought was the worst in recent times as it affected all areas of the country resulting in starvation and hunger of about 10 million people.

UNEP/GoK survey⁴⁴ established that droughts in Kenya have caused devastating effects largely due to the fact that this is a developing country and hence its ability to cope and manage any disaster is generally weak and low. The effects of climate change have been worsened by an ever growing population which has encroached on forest land as well as carried out agricultural activities on water catchment areas

2.3 Effects of Climate Change in Kenya

Climate change has been experienced in Kenya just as the rest of the world for many decades now and its effect have been deeply felt especially during floods and droughts. The loss

⁴² Anyah, R. and Semazzi, F. (2007). *Variability of East African rainfall based on multiyear RegCM3 simulations.*

⁴³ Kenya Red Cross. (2009). *Drought Appeal 2009—Alleviating Human Suffering.*

⁴⁴ UNEP/GoK (United Nations Environment Programme and Government of Kenya). (2000). *Devastating Drought in Kenya. Environmental Impacts and Responses.*

of lives, crops and livestock has forced the government to at times declare droughts or floods a national disaster in Kenya.

The fact that Kenya relies on rain-fed agriculture, the inequitable land distribution, large scale poverty, less coping mechanisms and recurrent rains and floods have all combined to increase Kenya's vulnerability to climate change according to the IPCC⁴⁵ report . The report found that climate change and variability pose an enormous threat to Kenya's growth and listed the following sectors as likely to be the most affected; food security, water, ecosystems, economy, health, population distribution and settlement

2.3.1 Effects of climate change on Kenya's Food Security

The study will adopt Anderson et al.⁴⁶ definition of food security. The author defines food security as a situation where all people possess (or have access to) sufficient social, physical and economic safe and nutritious food which meets their dietary requirements and promotes a healthy life at all times.

In a study by Kabara and Kabubo-Mariara⁴⁷, they found that short and long rain precipitations produce different results in relation with different crops. They found that maize produces the same yields with short or long rains, while sorghum produces low produce with long rains. In general they found that long rains generally lead to more produce as opposed to short rains. They reached the conclusion that high rainfall is crucial for attainment of high yields while excessive rains were harmful to crop production. This they explained is due to the fact that

⁴⁵ IPCC (Intergovernmental Panel on Climate Change) 2014 Synthesis Report: *Summary for Policymakers IPCC, AR. "Intergovernmental panel on climate change*

⁴⁶ Anderson, S., Gundel, S. & Vanni, M. (2010). *The Impacts of Climate Change on Food Security in Africa: A Synthesis of Policy Issues for Europe*

⁴⁷ Kabara, M., and Kabubo-Mariara. J. (2011). "Global Warming in the 21st Century: The Impact on Agricultural Production in Kenya". In *Global Warming in the 21st Century, edited by J.M. Cossia, Chapter 8*

excessive rains cause water logging, effectively destroying crops in their formative stages of growth, while excessive rains during harvesting time cause rotting in mature crops.

According to the World Bank⁴⁸ Kenya has been ranked position 172 among the poorest countries-based on the Human Development Index (HDI). The World Bank report argues that the country experiences many environmental worrying trends that have worsened the food situation in the country especially the densely populated areas. In highland areas, where most fertile soils are found, the food security situation has been linked to inefficient agricultural practices, rapid population growth and land fragmentation. A CARE International brief⁴⁹ (2011) has summarized the effects of climate change on Kenya’s food security as follows;

Table 1.0: Effects of climate Change on Kenya’s food security

Effect of Climate Change	Consequence on Food Security
Rising Temperatures	<ul style="list-style-type: none"> • More crop pests and diseases • More Evapotranspiration hence low soil moisture • More human diseases reducing available agricultural labor • Increased Livestock diseases • Low Agricultural Yields
Rise of sea levels	<ul style="list-style-type: none"> • Damage to coastal fisheries • Loss of fertile land due to Salinisation of soil • Salinisation in water sources
Shifting Planting seasons	<ul style="list-style-type: none"> • Low quality and quantity of agricultural produce • Excessive/Shortage of water • Need for irrigation
Severity/extreme weather	<ul style="list-style-type: none"> • Loss of livestock • Damage to forests and fish habitations • Land degradation • Destruction of agricultural inputs (e.g seeds)

⁴⁸ World Bank. (2001). *World Development Indicators*

⁴⁹ CARE International (2011). *Adaptation and Food Security*

Source: CARE International 2011

Food is a centerpiece of every culture and community in Kenya. However food production has today been threatened in Kenya by rising global temperatures and hence the diminishing food stock have had an effect on the social bond between families which is strengthened at family congregations at meal times.

Kenyan farmers have also been forced to endure extreme weather and high global temperatures. This has often resulted in diseases and poor health of many farmers especially in the northern and eastern regions of Kenya (which are affected by persistent drought) and the lake region (affected by floods and heavy rains at times). This has made some farmers physically weak, with cases of malnutrition and water borne diseases reducing their input in their farms hence low produce resulting in food insecurity situations⁵⁰.

2.3.2 Effects of climate change on Kenya's Economy

Kenya's economy rests on the backbone of natural resources and agriculture. Other key sectors pushing Kenya's economy include tourism, forest products (timber, charcoal) livestock, fisheries, and horticulture. All these sectors are affected by climate change in various ways.

Some of these include:

⁵⁰ Ibid 10

2.3.2.1 Agriculture and horticulture

Agriculture has been the backbone of Kenya's economy since independence. Agriculture is of immense importance to the livelihoods of people living in rural areas as it's the most common source of livelihood. According to the World Bank⁵¹, agriculture earns Kenya approximately 60% of foreign exchange and about 24% of the Gross Domestic Product (GDP) while providing livelihood to almost 80% of Kenya's population.

The agricultural sector is among the most affected by climate change in Kenya. Droughts cause low soil moisture leading to poor crop performance. Since Kenya's climatic conditions have been largely unpredictable in the last two decades, it has had negative effects on poor subsistence farmers as they rely majorly on rain fed crops which are lost during floods or droughts. The World Bank notes that whenever the agricultural sector performs poorly (due to climate change) the country's food security becomes at risk. The report noted that Kenya has experienced successive crop failure seasons in the recent past attributed to climate change effects (too much rains and long droughts). The report also noted that Kenya's famine cycles have scaled down from an average of 20 years to an average of every 12 years, to 2 years and lately (as of 2001) it has become an annual event. In terms of horticulture, the industry has been growing rapidly with an annual growth of 12%⁵². Horticulture employs approximately 4.5 million people according to the World Bank⁵³ (2001) estimates while another 3 million benefit indirectly. Climate change affects the horticulture industry in Kenya both directly and indirectly. Directly, the industry has been hit by water shortage (available for irrigation purposes) due to

⁵¹ Ibid 9

⁵² Ibid 10

⁵³ Ibid 9

droughts and this has been witnessed in Kieni and Laikipia farms⁵⁴. Indirectly, horticulture returns have been affected by pressure and lessened demand from the European markets due to their stand on carbon emissions associated with the horticulture industry⁵⁵.

2.3.2.2 Tourism

A study by the Wildlife Conservation Society⁵⁶, the tourism sector in Kenya has been performing well over the years seeing an increase from 1.1 million tourists in 2003 to 1.8 million tourists in 2007. This performance however plummeted in 2008 seeing one of the worst performances of the tourism sector and this was linked to the post election violence (PEV) resulting in travel bans issued against Kenya by various western embassies. This saw a decrease of 19% of tourism earnings.

Tourism in Kenya depends largely on wildlife which in turn depends on natural resources (pastures, water etc) which are susceptible to climate change. The Wildlife Conservation Society noted that many rivers serving national parks and game reserves in Kenya have reduced in terms of water volume with others drying up, this led to the death of 37 elephants in 2006 and 28 in 2007. Destruction of the Mau catchment area in Kenya has had an effect on the wildebeest's migration-a spectacular feature that draws in many tourists-resulting to reduced tourist visits to the country.

Some areas like Nairobi's environs have experienced human-wildlife conflict lately with animals escaping the parks to go out and look for water and food and also as a result of human

⁵⁴ Ibid 10

⁵⁵ Stockholm Environmental Institute. (2009). *Economics of Climate Change in Kenya*

⁵⁶ Wildlife Conservation Society. (2008). *The Deadly Dozen*.

encroachment on wildlife habitation. Other tourist attractions in Kenya have not been spared by climate change either. The snow caps around Mount Kenya, the marine ecosystems and coral reef have all been affected by climate change and have diminished due to rise in temperatures⁵⁷.

2.3.2.3 Energy

A comprehensive study by the Ministry of Energy⁵⁸ found that biomass was the most common type of energy used by many households in Kenya. It accounts for 69.5% of the total national primary energy supply. The ministry found that the imbalance between demand and the supply is exerting much pressure on forests and vegetation stock in the country resulting to land degradation. Also use of biomass has become a threat to other land use systems like forestry, agriculture and human habitations.

Climate change has contributed to the drying up and decrease of biomass production in Kenya affecting production of wood and fuel. In Kenya petroleum products account for 23% which is mainly used for manufacturing and transportation. Electricity on the other hand accounts for 9% of energy use according to the report from the ministry. However production of electricity in Kenya depends mainly on hydro sources which are declining day by day due to rising temperatures in the globe that is being experienced as an effect of climate change.

⁵⁷ Ibid 16

⁵⁸ Ministry of Energy, Republic of Kenya, (2002). *Study on Kenya's energy supply and policy strategy for households, small-scale industries and services establishments*

2.3.4 Social Effects of climate change in Kenya

According to the World Bank study⁵⁹, climate change has also had effect on the social sector in Kenya. As aforementioned climate change has affected food and agricultural production lowering yield and crop performance.

In the Northern part of Kenya, climate change has been a source of community conflicts. Communities in the region which are mainly livestock keepers have fought over limited pastures and diminishing water for their livestock leading to several deaths⁶⁰. On the overall, climate change has dissuaded social and economic development in Kenya as the government has spent a lot of resources keeping security in the Northern parts of Kenya, providing relief food and mitigating other effects of climate change, resources which would have been utilized in attaining and promoting the UN Sustainable Development Goals (SDGs)

Climate change has also greatly affected women. Many girls have been unable to go to school or complete their schooling because they have to accompany their mothers on long treks to find water and food. Women have to walk long distances in search of food and water to feed their families. Droughts related to climate change have left many with no source of income hence many cannot afford food leading to malnutrition especially among children below five years and these conditions have affected many women psychologically as they see their children and families suffer.

⁵⁹ Ibid 9

⁶⁰ Colle, D. (2013) *Social and Economic Effects of Climate change in Eastern Africa*

2.4 Effects of Climate Change in Eastern Kenya

Eastern Kenya is an area that was initially referred to as Eastern Province under the old Kenyan constitution. Under the new constitution, Eastern Kenya today is a region composed of eight counties: Embu, Isiolo, Kitui, Machakos, Makueni, Tharaka Nithi, Meru and Marsabit. The eight counties fall into different agro-ecological zones (AEZs). Meru, Tharaka Nithi and Embu fall under Zone II (which is for agriculturally productive areas); Makueni, Kitui and Machakos are classified semi-arid while Marsabit and Isiolo have been classified as arid⁶¹.

Due to the difference in AEZs that these counties belong to, a study by Reid et al⁶² found that they carry out different activities. Meru, Tharaka Nithi and Embu practice crop cultivation while Kitui, Machakos and Makueni practice agro-pastoralism and Marsabit and Isiolo practices pastoralism as the main activity. However a common feature about these counties is that they are all affected negatively by climate change, with Kitui, Makueni, Machakos and Marsabit being the hardest hit.

According to findings by Reid et al⁶³ the lower eastern region has experienced high variability in terms of rainfall received accompanied by rising temperatures which have increased evapotranspiration. Rainfall patterns have become generally variable in many parts of Eastern Kenya making the onset, cessation and consequently the duration of growing seasons to be unpredictable amongst farmers in the region. These fluctuations in rains and temperatures have been largely attributed to climate change. The duration of crop maturity as well as period

⁶¹ Pratt, C. (2012). *Traditional Early Warning Systems and Coping Strategies for Drought among Pastoralist Communities of North and Eastern Province, Kenya*

⁶² Reid, H., Huq, S., and Murray, L. (2010). *Community Champions: Adapting to Climate Challenges*

⁶³ Ibid 23

between the planting seasons has been largely affected in the last five decades as farmers rely upon unpredictable rains and consequently the food security situation in the region has been affected especially in the semi-arid and arid counties of Eastern. A study by CARE International⁶⁴ found out that poor and low yields which have been diminishing year after year in the ASAL of Eastern Region (which are Kitui, Machakos, Makueni and Marsabit and Isiolo) due to climate change have seriously affected development in the area as they undermine efforts of families to feed themselves. They also deny the county and national governments excess produce with which to feed the affected families during the shortage periods.

A study by Omoyo et al.⁶⁵ found that there exists a wide inconsistency and cessation in growing seasonal rainfall which has a negative trend in several areas of Eastern like Machakos, Kitui, Kibwezi and Makindu. They also found there is a steady rise in temperature in Makindu and Machakos over the last decade which has increased evapotranspiration, increased heat stress on planted crops and lowered soil moisture. Consequently the study found, the ASALs counties in Eastern Kenya have experienced a decline in maize production (Kenya's widely consumed food crop) of up to 15 kg per acre per year. Makueni was the most hit by the decline in maize production followed by Kitui according to the study.

As aforementioned different counties in Eastern region have been affected by climate change in different ways and magnitudes. However counties belonging to ASALs in Eastern Kenya (Marsabit, Isiolo, Makueni, Kitui and Machakos) have been most affected as previous studies have found out in the following reports:

⁶⁴ Ibid 10

⁶⁵ Omoyo, N., Wakhungu, J., and Oteng'i, S. (2015), *Effects of climate change variability on maize yield in the arid and semi arid lands of Lower Eastern Kenya*

2.4.1 Climate change in Isiolo and Marsabit Counties

In Isiolo and Marsabit Counties which are classified as arid, livestock keeping is the main form of activity practiced. Here many pastoralists have for a long period of time used indigenous weather forecast methods to predict climatic changes⁶⁶. However Winnie et al. notes that with climate change, many animal keepers in Isiolo are finding it hard to predict the weather as climate variability has began following an unpredictable pattern in the last few decades. Many pastoralists in Isiolo especially the Borana and Gabra would observe wind patterns, clouds and at times the intestines of animals they slaughtered as well as patterns of stars to predict coming of rains or drought. However climate variability has rendered all that almost impossible, the study by Winnie et al. concluded.

A study by Orindi et al⁶⁷ found that unlike other regions of Kenya which undergo a major drought season in three or four year periods, ASALs of Eastern County (where Isiolo and Marsabit belong) experience a drought on a yearly basis. This has resulted in great losses in terms of livestock hence affecting the livelihood of pastoralists, who depend on the ecosystem, in these two counties. The counties have experienced unreliable rainfall patterns in the last 30 years and this has seen reduced amounts of pastures for their animals. This is because less rainfall experienced in Marsabit has resulted in extended durations for pastures to grow making livestock production to decrease and eventually many animals die. The study⁶⁸ found that pastoralists in

⁶⁶ Winnie, L., Mcpeak, J., Barret, C., Little, P., and Getchew, G. (2002). *Assessing the Value of Climate Forecast Information for Pastoralists: Evidence from Southern Ethiopia and Northern Kenya*

⁶⁷ Orindi, V., Nyong' A., and Herrero, M. (2008). *Pastoral Livelihood Adaptation to Drought and Institutional Interventions in Kenya*

⁶⁸ Ibid 28

Isiolo and other ASALs in Kenya suffered heavy losses of animals in the 2001 and 2006 droughts which were the worst droughts in 60 years.

Another study by Baird⁶⁹ found that while traditionally farmers in Isiolo and Marsabit have survived droughts by herding their animals even in harsh environments, the 2006 drought saw a 70% decrease in the size of their herds a situation that left 80% of the communities' pastoralists poor and dependent on government relief food. A⁷⁰ study conducted by Oxfam GB found that pastoralists in Isiolo who heavily rely on natural resources (pastures and water) have over time developed means of coping with the ever changing climatic patterns. However, the study concluded that in the face of extreme weather changes which have become frequent of late, their ability to cope after each drought is decreasing.

2.4.2 Climate Change in Makueni County

Classified as a semi-arid area, Makueni County has also not been spared by the effects of climate change. Due to climate change, Makueni has experienced unreliable weather and rainfall patterns and this has greatly affected many farmers as well as animal keepers. The Oxfam GB study found that the main activities in the county are farming and livestock keeping mainly goats and sheep. Many farmers in Makueni have received low yields in the last three decades and this has resulted in meager outcome accrued by farmers in the region.

This pattern of unreliable rainfall has now forced many farmers to shift from food crops such as maize and beans to grow drought resistant crops such as cassava, sorghum and finger

⁶⁹ Baird, R. (2008). *The Impact of Climate Change on Minorities and Indigenous Peoples*

⁷⁰ Oxfam GB (2008). *Survival of the Fittest: Pastoralism and Climate Change in East Africa*.

millet. This has affected the food security of the county as maize is the main food crop yet it has been relegated to being a peripheral crop. The effects of climate change are visible throughout the county.

Many water bodies and streams and rivers in the county have dried up due to increased temperatures and drought. The County has also experienced erratic winds which have been caused by human activities like cutting down of forest covers hence absence of wind breakers. The county has also experienced unreliable rainfall patterns and this has affected farming as well as animal keeping. Major droughts have seen withering of crops and dying of sheep and goats due to reduced pastures and water endangering the life of many livelihoods and homes. The adverse effects of climate change in Makueni County have seen increased social conflicts such as animal keepers quarrel over limited pastures and water as well as farmers clashing with animal keeper for the farmer's acts of grazing on their crops⁷¹.

In the last two decades, Orindi et al⁷² found that the food security situation in the county has been dire with decrease in production of commercial produce as maize and beans have largely failed due to low soil moisture and increased temperatures. Even cash crops have also been affected by climate change and this has seen closure of factories like the Makueni Ginnery and Mbooni Coffee Factory as what farmers produce is not enough to keep the factories fully operational. This has been caused by low rainfalls and droughts which have seen drying up of coffee trees and cotton plantations. Closure of these factories has rendered many youths jobless, witnessed increase in crime and alcohol intake. Health wise climate change has seen farms turn

⁷¹ Pratt, C. (2012). *Traditional Early Warning Systems and Coping Strategies for Drought among Pastoralist Communities of North and Eastern Province, Kenya*.

⁷² Ibid 28

to dust due to prolonged droughts and this has seen increase in dust related illness like Tuberculosis in the region.

2.4.3 Climate Change in Machakos and Kitui

Orindi et al⁷³ noted that agriculture was one of the largest economic activities that have been affected by climate change in Kitui and Machakos counties. The two counties have experienced rising temperatures in the last two to four decades hitting the agricultural sector hard. The counties have experienced extreme weather patterns of floods and droughts in the past but in the last ten years the report noted that the amount of rainfall has reduced drastically.

Machakos County has experienced poor performance of crops which wilt before maturity or perform poorly due to rising global temperatures⁷⁴. Many livestock keepers (who mainly keep goats, sheep and a few cattle) have seen their animals suffer due to lack of pastures until they die. Many river beds and dams in the county have dried up due to increased evaporation rates caused by rising temperatures.

According to a GoK report⁷⁵, the county also experiences flash floods when the county is experiencing the long rains and these flash floods cause water logging which destroys maturing crops. In Kitui county, decreasing animal pastures have seen inter-clan as well as inter-community conflicts between livestock keepers themselves as well as between livestock keepers and farmers. Just like Machakos, Kitui has experienced scarcity of water for both domestic,

⁷³ Ibid 28

⁷⁴ Deressa, T., and Hassan, M. (2009). *Economic impact of climate change on crop production in Kenya*.

⁷⁵ Government of Kenya. (2009). *Food Security analysis: Kenya. Agricultural sector development strategy*

agricultural and animal use and this has reduced the county to depend on relief food and aid by the international as well as community based organizations operating in the area.

The two counties have experienced reduced livelihood options as poverty has become prevalent with failure of crops and death of animals. This has also seen failure of parents to take their children to school due to lack of resources to buy books and uniforms. As a result, many girls especially in Kitui have dropped out of primary schools while for those who manage to get to secondary schools, majority drop out in form two or three⁷⁶.

Another effect of climate change is that Kitui and Machakos counties have experienced outbreak of pests and parasites. In a study by the International Institute of Tropical Agriculture (IITA)⁷⁷, the institute discovered that caterpillars, coffee thrips and army worms which are highly associated with climate change are prevalent in the two counties and destroy both cash and food crops. IITA also found that Kitui County has experienced dry river beds and this has caused water scarcity throughout the county which can be used for irrigation and water for animals.

The study (by IITA) found that Kitui County has experienced human-wildlife conflicts due to human encroachment and interference by livestock herders who graze their animals in the Kora and Tsavo East areas. This has at times resulted to loss of lives and animals from attacks by wild animals like hyenas.

⁷⁶ Mogaka, H. (2006). *Climate change and the socio-economic implications in Kenya*

⁷⁷ International Institute of Topical Agriculture (IITA). (2004) *Report on climate change patterns in East Africa*

2.5 Conclusion

It is evident from the foregoing analysis and study of reports and studies, that climate change is now an issue whose magnitude can no longer be overlooked by any sector of the Kenyan Society. This realization has made the national government, as well as county governments to seek partnerships with Non-governmental organizations like CARE International and Oxfam GB in tackling the problems posed by climate change in Kenya. What makes climate change such an issue of enormous magnitude is its socio-economic cost which from the foregoing analysis can be summarized as follows;

- ❖ The economic cost occurred in addressing drought has a deep effect on the economy. For example the losses incurred by the country in the 1998/1999 drought alone was estimated by the World Bank (2001) to be 2.8 billion dollars, incurred in loss of lives, crops, animals, damage to fisheries and ecosystems, low industrial production etc.
- ❖ The 2006 flood affected 1 million Kenyans and cost the economy between 0.8 to 1.2 billion dollars (according to World Bank 2001 estimates) including destruction to key infrastructure like roads.
- ❖ Overall the World Bank (2001) estimates that Kenya losses approximately 500 million dollars to tackling effects of climate change which has a huge effect the overall economic growth of the country.

The study has confirmed through analysis of various reports and studies that Eastern Kenya has borne the brunt of climate change due to the fact that many of its counties fall in the ASALs bracket. The region has suffered significantly from climate change and this has had huge

implications on food security of the entire Eastern Region. The cost of climate change in Eastern Kenya has been felt on human, animal and crop yields as well.

The study also found out that climate change is a big contributing factor to inter-clan and inter-community conflicts especially in Isiolo and Marsabit counties where livestock keepers fight over meager pastures and limited water for their animals. Climate change has also led to human-wildlife conflicts caused by human encroachment in wildlife habitations and interference of wildlife habitat by herders grazing their livestock in the wildlife parks resulting to loss of lives, injuries and loss of livestock. In conclusion, climate change is one of the biggest hurdles to development in Eastern region today as it severely compromises food security putting lives at risk and lowering ability of households to feed themselves as well as gain income.

CHAPTER THREE: VULNERABILITY AND ADAPTIVE MECHANISMS OF WOMEN IN EASTERN KENYA TO CLIMATE CHANGE

3.1 Introduction

This chapter is aimed at addressing the research question ‘What is the vulnerability and adaptive capacity of women in Eastern Kenya to Climate Change?’ In answering the research question, the study will rely on analyzing primary data collected from two groups of respondents i.e. residents of Machakos and Isiolo counties and, two women groups from Machakos and Isiolo (one women group from each of the counties). The study aimed at reaching 10 women groups but in the confines of time and availability of the women groups themselves, would only locate and reach two women groups whose views were collected in form of Focus Group Discussions (FGDs) of seven participants each.

In Machakos County, the Twone Mbee Women Group based Mwala Sub County, Mbiuni location (hereafter referred to as the Machakos FGD) was used while in Isiolo, the Tawakal Women Group based in Isiolo town (hereafter referred to as the Isiolo FGD) was used.

3.2 Characteristics of the research Respondents

To better understand the information provided by the respondents, the chapter will begin by analyzing the characteristics that define the respondents from the two counties i.e. their gender, age, level of education and home County. (The data from the two counties will be analyzed together because they were administered with the same questionnaires over the same period of time).

3.2.1 Gender composition of the respondents

In the study, the researcher issued 70 questionnaires (35 each county) to residents in the two counties. (17 to male and 53 to female respondents) and got 58 of them back from both counties, 45 of which were female representing 82.7 % and 13 male representing a 17.3 %. The study sought to identify 10 women groups but only managed to identify two (one from each county under study) as represented in Table 2 below.

Note: The researcher intentionally targeted more female respondents from the general residents of the two counties (i.e. 75% women) as opposed to men (25% men) as the chapter aims at understanding the vulnerability and adaptive mechanism of women to climate change hence women are deemed the best source for this information as they know firsthand how climate change affects them.

Table 2.0 Gender composition of respondents

Study Groups	Male	%	Female	%	Total Number
Respondents from both Counties	13	17.3%	45	82.7%	58
Women Groups from both Counties.	0	0	2	100%	2

Source: Study Data

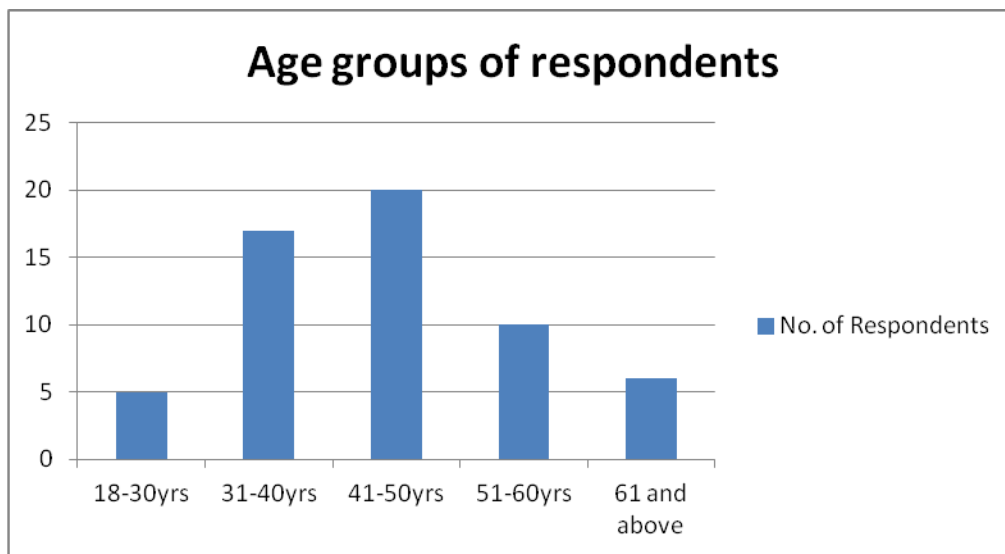
3.2.2 Age composition of the respondents

It was important to include respondents from various ages above 18years (as those below 18 would require the researcher to get parental consent) to enable the study get all-inclusive views from all age groups. While older respondents have lived long have more experience on the

effects of climate change, the young also present the views of a vibrant generation and the way it views and tackles these challenges.

In this study, the age composition was as follows; 18-30 yrs, 5 respondents (representing 8.6% of the total), 31-40 yrs, 17 respondents (representing 29.3%), 41-50yrs, 20 respondents (representing 34.5%), 51-60 yrs, 10 respondents (which translates to 17.2%), and 61 yrs and over, 6 respondents (accounting for 10.3%). These figures are represented in the chart below.

Fig 3.0: Age composition of Respondents



Source: Study data

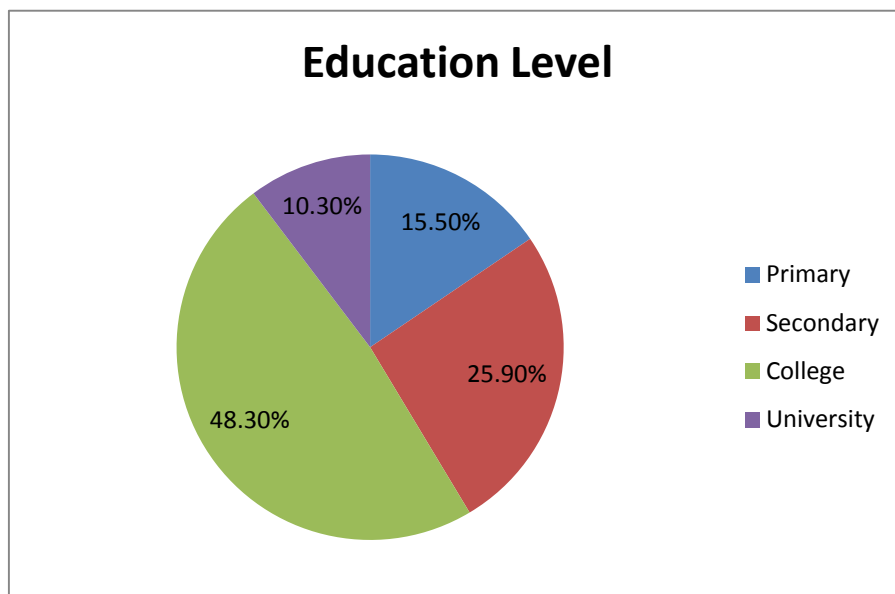
3.2.3 Highest Education Level of Respondents

Level of education was an important consideration for the respondents. Generally to be well informed about issues of climate change and its impacts; one must have at least secondary education. This turned out to be true in this study too, as respondents with higher levels of formal

education understood climate issues better in their counties as compared to those with little formal education.

The highest levels of education of the respondents from the two counties analyzed together break down as follows: Primary (9 respondents translating to 15.5%), Secondary (15 respondents translating to 25.9%), College (28 respondents translating to 48.3% of the total), University (6 respondents translating to 10.3%) as represented in the pie chart below;

Figure 4.0: Education Levels of Respondents



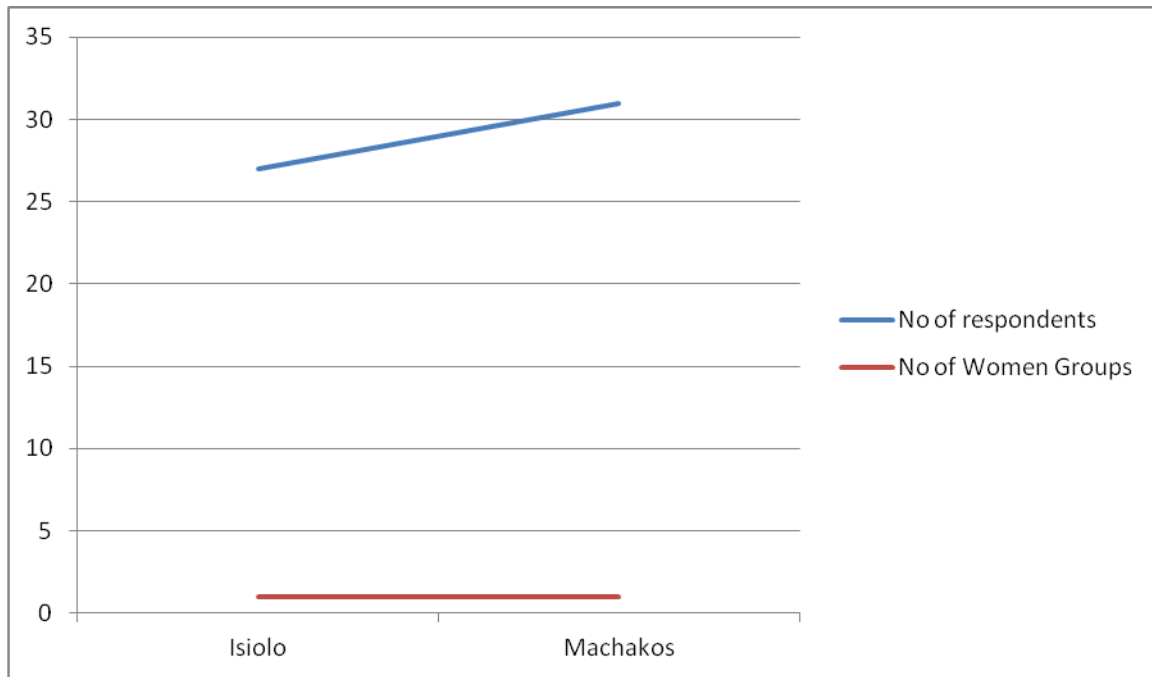
Source: Study Data

3.2.4 Home County of respondents

The study was carried out in two counties-Machakos and Isiolo-which were sampled to be a case study in understanding climate change in Eastern Kenya. 35 questionnaires were given in each of the two counties (making a total of 70) and 58 were collectively given back.

Of the 58 returned, 31 questionnaires were from Machakos (representing 53.4% of the total questionnaires returned) while 27 were from Isiolo (representing 46.6% of the total questionnaires returned). Also, one women group was interviewed in a FGD from each of the two counties.

Figure 5.0: Home County of the Respondents



Source: Study Data

3.3 Respondents' opinions

In this section of the chapter, respondent opinions are discussed and analyzed. Views of respondents on vulnerability and adaptation mechanisms of women to climate change in Eastern Kenya are hereby discussed.

3.3.1 Gender Vulnerability to climate change in Eastern Kenya

The first question posed to the respondents through the questionnaire is who (in their opinion), between men and women is the most affected by climate change in their county. In responding to the question 42 respondents (representing 72.4% of the total respondents) thought it is women who are most affected by climate change in both counties, another 12 (representing 20.7% of the total respondents), felt it was men who are most affected while 4 respondents (accounting for 6.9% of the totally respondents) felt both genders were equally affected. The same question was posed to the FGDs where the Isiolo FGD agreed that it was the women who were most affected while the Machakos FGD was divided halfway in saying both genders seem affected by climate change.

Upon reaching the conclusion that it is women who are most affected based on the foregoing responses, the respondents were asked what makes women more vulnerable to climate change effects as compared to men. 34 respondents (58.6%) felt it was due to biological characteristics of women. This include issues like women having tender skins unlike men, women's hormonal reactions etc, while another 20 respondents (34.5%) felt it was due to the social roles associated with women (which include issues like women remaining home to take care of the children while men go away to look for resources or jobs). The remaining 4 participants (6.9%) said it's the economic activities women perform like farming that are rain dependent hence they are more vulnerable to climate change as low rains affect their ability to feed their families.

The next question was posed to the women FGDs. It required the participants to rate on a scale of 1 to 5 (with one being the lowest and five the highest) how vulnerable women are to climate change in their county. In the Machakos FGD, 5 participants rated the vulnerability between 4 and 5 while the remaining two, rated it 3. In the Isiolo FGD 6 participants rated it between 4 and five while one did not rate it.

3.3.2 Gender based effects of climate change in Eastern Kenya

The study sought to know how differently women are affected by the effects of climate change as compared to men in the two counties and the question was posed to respondents. 15 respondents (representing 25.9% of all respondents) said climate change has variedly affected women and men in terms of life longevity. The said women in the two counties generally survive longer in the effects of climate change as compared to men as they adapt faster compared to their male counterparts and hence women have high longevity periods as compared to men. 10 respondents (which are 17.2% of the total respondents) said women are forced to deal with the psychological effects of climate change whereas men do not. This they said happens when men go away in search of resources while women are left at home to deal with the psychological distress of their children who need food and water that are scarce commodities in these dry counties.

The same question was posed to the women FGDs. The Machakos FGD raised the issue of low rainfall affecting women more as they depend on farming that is rain reliant hence they have been forced to go extra miles to feed their families. The Isiolo FGD raised the issue of water scarcity due to rising temperatures in the county which affects women more than men as

all household chores women do require water unlike men who mostly need the commodity only to water their animals.

3.3.3 Effects on climate change on economic activities in Eastern Kenya

The respondents were asked to identify the economic activities that are carried out by women in their respective county. The most mentioned activities were farming, bee-keeping, animal (livestock) keeping in Machakos and animal keeping coupled with subsistence farming in Isiolo.

The next question was posed to the women FGDs. The question sought to know how climate change has affected the economic activities practiced in the two counties. The Machakos FGD participants said there have been low and poor quality yields due to overdependence of rain fed agriculture and this has seen many families starve and in most times such families rely on government relief food. They also raised the fact that they have been forced to grow other crops which are drought resistant and unlike the traditional crops the drought resistant ones take long periods to mature and be ready for harvesting. They have therefore been forced to adapt to longer cycles of farming which have also reduced their planting seasons from two per year to one.

The Isiolo FGD raised the issue of livestock deaths which they say are on the rise due to reduced pastures and water for the animals. They said prolonged drought seasons experienced in Isiolo coupled with unreliable rainfall has seen many livestock farmers lose their animals to drought. They also raised the issue of the low productivity of the animals. Due to lack of pastures, animals are not strong enough to give birth to healthy young ones and lately many livestock take long durations before they desire to be served by the artificial inseminators. Some

participants raised the issue of new livestock diseases brought about by rising global temperatures.

The respondents were also asked if the effects of climate change they had noted were spread throughout their respective county or were they witnessed in specific segments of the county. 42 of the respondents (representing 72.4% of the total respondents) from both counties said the effects were fairly witnessed across their entire respective counties while the remaining 16 respondents (representing 27.6% of the total respondents) said the effects were worse in some parts of the county as compared to the others.

3.3.4 Women adaptation capacity to climate change in Eastern Kenya

The FGDs were asked if the women in their county had adapted to the effects of climate change aimed at determining the capacity of women in Eastern to adapt to climate change. In the Machakos FGD, 6 of the participants (accounting for 85.7%) felt that the women in Machakos had adapted to the effects of climate change in Machakos while the remaining 1 participant (accounting for 14.3%) said most women are still struggling to cope hence cannot be fully said to have adapted to climate change. Those who felt they had coped, said many women had now turned to drought resistant crops in the county which performed averagely well as compared to traditional crops and were using this drought resistant crops to feed their families. In the Isiolo FGD, all the 7 participants were of the view that women in Isiolo have fully adapted to the effects of climate change in the county. This they said is explained by the fact that unlike most men who have gone away to towns to find jobs and escape the harsh climate in Isiolo, many women have stayed behind and are struggling to provide for their children every day. They said

it's now common to see women taking care of livestock as many men have left the families and travelled to towns

In further assessing the capacity of women to adapt to climate change in Eastern Kenya, the respondents were asked a similar question of rating between 1 and 5 (with one being the lowest and 5 the highest) the capacity of women to adapt to climate change in their respective county. Of the total 58 respondents, 47 rated the adaptive capacity of women between 4 and 5, while 10 respondents rated them at 3 and 1 respondent rated them at 2.

3.3.5 Women adaptation mechanisms to climate change in Eastern Kenya

Both women FGDs were asked to identify any mechanisms devised by residents in their counties to tackle the effects of climate change in relation to economic activities practiced in their respective counties. In Machakos FGD the participants identified the use of drought resistant seeds by farmers. They said the county in collaboration with some learning institutions and the Kenya Seed Company had developed some drought resistant seeds and farmers were turning to this seeds. They also identified the fact that many farmers had shifted from growing traditional food crops like maize and beans and switched to drought resistant crops which though take longer time to mature, perform relatively well in the prevailing climate like cotton, mango, cassava etc.

Participants also noted that many farmers had started practicing irrigation especially those practicing subsistence farming as it is easier to irrigate small farms. Another mechanism the residents have adopted is practicing new economic activities that are less affected by climatic conditions like bee keeping which is on the rise the county.

In Isiolo, the FGD said many livestock keepers have resorted to keeping goats and camels as opposed to traditionally keeping cows. This is because goats can eat many forms of shrubs which can grow even in dry areas unlike cows which mostly eat only grass that is hard to find in the dry county. Camels can also travel for long distances without water and food hence making them ideal for the type of climate in Isiolo.

Other participants noted that a good number of pastoralists still keep cows but have resorted to keeping the African breeds which survive longer in harsh environment as opposed to the western breeds. Many pastoralists in Isiolo have also come together and dug up wells and boreholes which are mainly used communally in watering their animals and for home use.

Water harvesting was a common feature that was identified by both FGDs as one of the mechanisms locals are engaging in both counties in tackling the problems posed by climate change. The construction of dams in Machakos and Isiolo initiated by efforts of residents in a new step that locals in the two counties are taking so as to harvest rain water once the long rains come and this water can then be used by the locals during the drought. In this regard some dams are under construction by locals in partnership with Non Governmental Organizations (NGOs)

3.3.6 Public awareness of government policies tackling climate change in Eastern Kenya

The study also sought to know whether there were government policies (referring to both levels of government-county and national) being implemented on the ground that are aimed at tackling effects of climate change. Additionally, the study aimed to find if these policies exist, if citizens were aware of them and also, how successful the residents felt these policies were.

In answering the first part, the respondents and both FGDs were asked if they were aware of any policies introduced by either the county or national government aimed at assisting locals adapt to effects of climate change in their respective counties. 48 of the total respondents (representing 82.8%) said there were aware of policies introduced by county and national governments to tackle effects of climate change while 10 respondents (accounting for 17.2%) said they were not aware of any. All the seven participants of the Machakos FGD said they were aware of at least one policy initiated by the county government to tackle effects of climate change while 5 out of the 7 participants (which is 71.4%) of the Isiolo FGD said they were aware of policies initiated by county government to tackle climate change. The remaining 2 (accounting for 28.6%) said they did not know of any policies either by the county or national government.

3.3.6.1 Government policies aimed at tackling climate change targeting women

The study having established awareness among locals of government policies aimed at tackling climate change, sought to know from the women FGDs if any of these policies were specifically formulated to help women cope with the effects of climate change. In the Machakos FGD, 6 participants said they were aware of policies aimed specifically at women adaptation which have been initiated by the county government. The remaining one said she only knew of the existing policies but did not understand if they specifically targeted women or not.

In the Isiolo FGD, 4 participants said they were aware of policies targeting women in adapting to effects of climate change while 1 said she was not sure if the policies in place targeted women. Two participants said they were not aware of any policies targeting either of the gender by either the county or national government.

3.3.6.2 Effectiveness of existing government policies tackling climate change in Eastern Kenya

Lastly, the study sought to know how effective the respondents and women FDGs felt the existing policies were in tackling the effects of climate change in their respective counties. They were asked to rate the effectiveness on a scale of 1 to 5 (with one being the lowest and five the highest) From the 48 respondents who said they were aware of government policies aimed at tackling effects of climate change in the county, 36 of them rated the policies between four and five, 7 respondents rated them at four while the remaining 5 rated them between one and two.

Among the Isiolo FGD, all the five participants who said they were aware of government policies aimed at tackling climate change in the county rated the effectiveness of the policies between four and five while in the Machakos FGD, 5 participants rated the effectiveness of the policies between four and five while the remaining two, rated them at three

3.4 Chapter Summary and Conclusion

The study found out that women are the most affected gender by the effects of climate change in Eastern Kenya as witnessed by 72.4% of the respondents who felt women are most affected. This situation arises due to various reasons as contained in the opinion of respondents and these ranges from biological characteristics of women to the social roles allocated to women down to the economic and agricultural activities performed by women in general. Further, climate change has affected women variedly from men in terms of life longevity and in terms of negatively affecting the economic activities they carry out like farming leading to low productivity.

In terms of economic activities, the study concluded that farming, bee keeping and livestock keeping are among the most prevalent economic activities practiced in Eastern Kenya. The study found out that climate change has had a negative effect in many of the economic activities practice in Eastern Kenya as it has led to low productivity in farm produce and has forced farmers to plant drought resistant crops. For the livestock keepers the study found out that there have been low productivity due to lack of pastures and water and farmers have also been forced to resort to goats and camel keeping as opposed to cows.

Women were also found to have generally adapted to climate change as was the opinion of 6 participants in the Machakos FGD and all the 7 participants in the Isiolo FGD. Eastern residents have resorted to various measures to tackle climate change like water harvesting, planting drought resistant crops and keeping African livestock breeds that are more adaptable to harsh climates as some of the measures of tackling climate change.

Many residents of Eastern Kenya are aware of government policies initiated to tackle climate change as stated by 82.8% of the residents and majority of the women FGDs are aware of some policies which have been initiated to target women adaptation to climate change. The policies initiated by both governments have averagely performed well as was the opinion of many respondents.

In conclusion, climate change has had adverse effects in Eastern Kenya and it has generally affected women more than men. Women have however demonstrated higher ability to cope to the harsh climatic conditions as compared to men and this has been evidenced by their resilience to stay in the region and take care of their families amidst the hardships. However on a

positive note, the government (both county and national) has initiated policies/projects (with some aimed at women) which coupled with efforts of the locals will go a long way in helping residents cope with the effects of climate change in Eastern Kenya.

CHAPTER FOUR: EFFECTIVENESS OF GOVERNMENT-LED CLIMATE CHANGE MEASURES IN ADDRESSING ADAPTATION OF WOMEN TO CLIMATE CHANGE IN EASTERN KENYA

4.1 Introduction

This chapter of the study is aimed at answering the research question ‘How effective are existing government-led climate change measures in addressing adaptation of women to climate change in Eastern Kenya?’ In answering the research question, the study will analyze and present findings from a field study targeting policy makers from the National Environment Management Authority (NEMA), Ministry of Water and Irrigation, and Ministry of Environment and Natural resources which are the key ministries addressing issues relating to climate change in the country in collaboration with county governments (counties of Machakos and Isiolo in this case) and other development partners.

The study targeted 30 officials in the two ministries and one parastatal (NEMA) and issued 30 questionnaires (ten to each) of which 26 questionnaires were filled and received back.

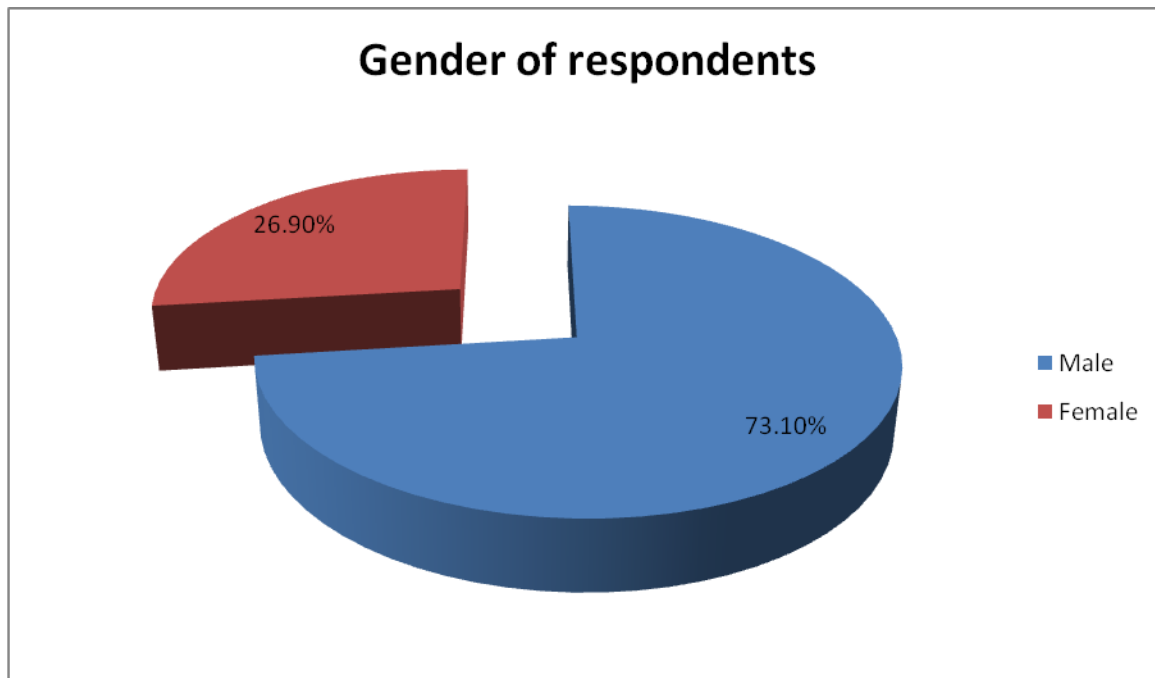
4.2 Characteristics of the research Respondents

For better understanding of the respondents, this chapter will first analyze the characteristics that define the respondents from the two counties i.e. their gender, the Ministry/Parastatal they belong to, level of education and the department they belong to under their ministry/parastatal.

4.2.1 Gender of the respondents

The study issued 30 questionnaires to officials from the Ministries of Water and Irrigation, Environment and Natural resources as well as NEMA, and got 26 of them back from both ministries. From the 26 respondents, 19 were male representing 73.1 % while 7 were female representing a 26.9%. This information is represented in the pie chart below.

Figure 6.0: Gender of respondents



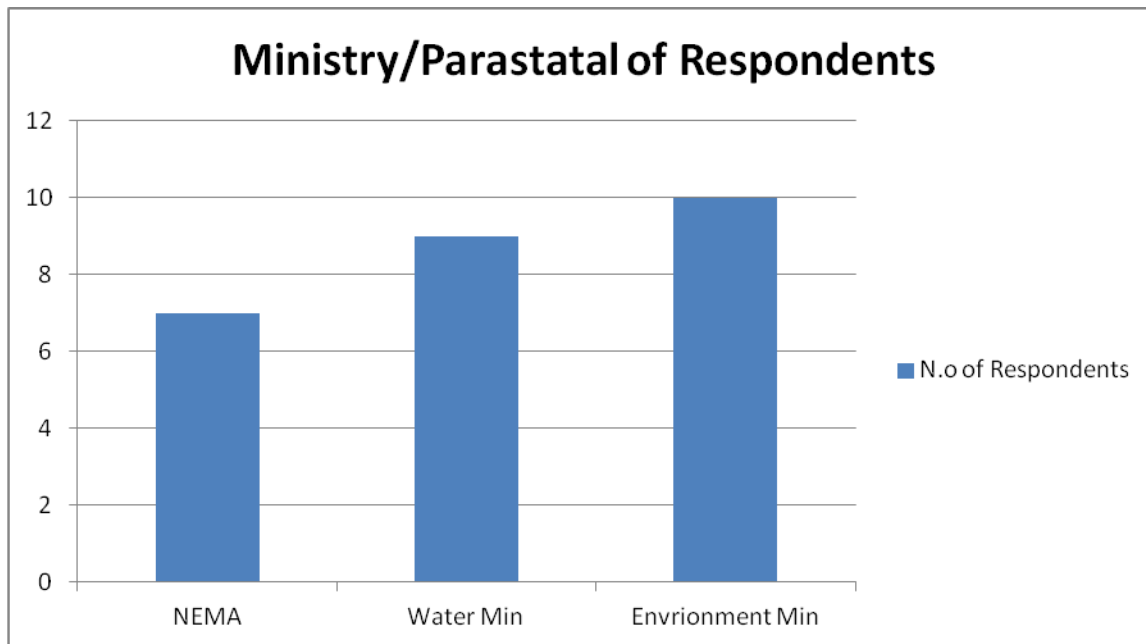
Source: Study Data

4.2.2 Ministry/Parastatal of respondents

This study targeted officials from two Ministries (Water and Irrigation, and Environment and Natural resources) as well as NEMA which is a governmental parastatal targeting 10 respondents from each of the three.

In the responses, 7 respondents were from NEMA, 10 respondents from the Ministry of Environment and Natural Resources while the remaining 9 were from the Ministry of Water and Irrigation as represented in the table below.

Figure 7.0 Ministry/Parastatal of respondents



Source: Study Data

4.2.3 Department of respondents within Ministry/Parastatal

The study collected data from 26 respondents in total (those who gave back their filled questionnaires) from the two ministries and one parastatal. In those two Ministries and one Parastatal, the respondents belonged to different department within this ministries/parastatal as follows

In the Ministry of Environment and Natural Resources; 5 respondents belonged to the National Climate Change Secretariat (NCCS), 3 respondents from the Directorate of

Environment and 2 from the Directorate of Natural Resources. In the Ministry of Water and Irrigation; 3 respondents belonged to the Water Resources Department, while 6 belonged to the Irrigation and Drainage Department. In NEMA; 3 respondents belonged to the Environment, Education, Information and Public Participation Department (EEIPP), 3 respondents came from the Environmental Planning and Research Coordination Department (EPRC), while the remaining 1 respondent came from the Compliance and Enforcement Department (C&E). These figures are represented in table 3.0 below

Table 3.0 Department of Respondents within Ministry/Parastatal

Ministry/Parastatal	Department	No. of Respondents	Total
Min of Environment	Nat. Climate Change Sec. (NCCS)	5	10
	Directorate of Environment	3	
	Directorate of Natural Resources	2	
Min of water	Water Resources Dept.	3	9
	Irrigation and Drainage Dept	6	
NEMA	EEIPP	3	7
	EPRC	3	
	C & E	1	

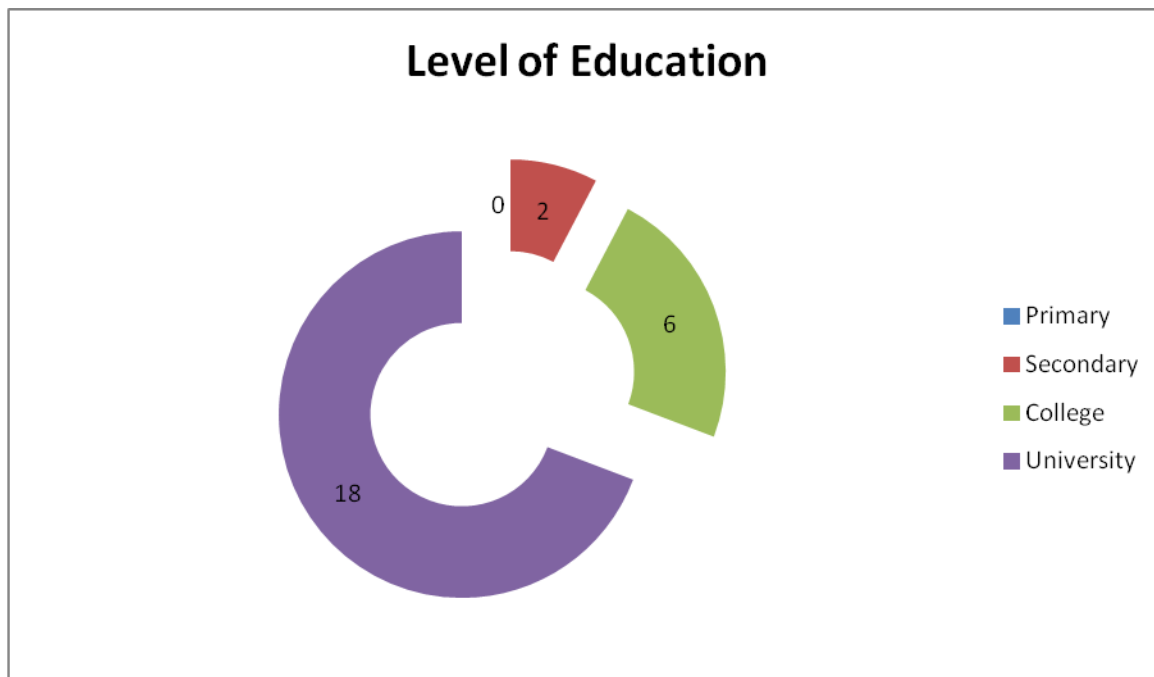
Source: Study Data

4.2.4 Highest Education Level of Respondents

Education level is an important aspect in this study as the guiding assumption is that the higher one's education, the more understanding he/she will have on climate change issues as well as policies and strategies being advocated for by his/her ministry.

The respondents attained different education levels but majority had high education levels (college and above) as follows, 2 respondents had attained secondary level education (thus 7.7% of the total), 6 respondents had attained college level education (23.1% of the total) while 18 respondents had attained university education (accounting for 69.2% of respondents). This can be represented as follows

Figure 8.0 Highest Education Level of respondents



Source: Study Data

4.3 Response from Respondents

This section of the study will analyze the responses given by the 26 respondents on various issues related to effectiveness of government-led policies and strategies on climate change in Eastern Kenya and how effective they are in aiding women to adapt to effects of climate change in the region.

4.3.1 General effect of climate change in Kenya

The study first sought to know how serious the respondents understood the effects of climate change to be in Kenya. The question was posed to all the respondents asking them to give a general picture of climate change and its effects in Kenya.

Five respondents noted that there have been average weather variations in Kenya in the last one decade which can be attributed to climate change. One noted that traditionally Kenya used to have two rain seasons (which farmers used as planting seasons) one around February to April and another around August to December. However this has changed as now only the August rains are being experienced whereas the February rains have not been experienced for the past few years. Another remarked these changes have had the effect of reducing agricultural activities to only one planting season.

7 respondents talked of change in temperatures. They noted that the last one decade has seen hotter days and colder nights with temperatures rising during the day. The issue of seasonal rains and flooding of areas that used to be dry before like Turkana and western parts of Kenya was also raised by 3 respondents. In summing up the effects of climate change in Kenya in the

last decade, one respondent noted them as rising temperatures, poor yields, unreliable rain patterns, floods, and new tropical diseases affecting both animals and plants.

4.3.1.1 General effects of climate change in Eastern Kenya

In understanding the general picture of climate change in Eastern Kenya from the policy maker's eyes, respondents were asked to describe the general effects of climate change in the Eastern region. The following were the most prominent effects mentioned.

Climate change has had far reaching effects especially in the ASALs of Eastern Kenya. 5 respondents from NEMA noted that Agricultural activities have been affected in the ASALs of Eastern Kenya due to climate change. 3 respondents from the Ministry of Water added that low rainfalls in Machakos and Isiolo has forced farmers into begging from the government for food handouts as traditional food crops like maize and beans do not thrive under the harsh weather. Many farmers have been forced to grow drought resistant crops like cotton and cassava. 5 respondents noted that livestock farmers have suffered losses due to death of their animals because of lack of water and pastures. This has been caused by the prolonged drought sessions in the ASALs of Eastern Kenya.

4 respondents from the Ministry of Water and Irrigation also mentioned the issue of flash floods especially in the counties of Machakos and Mwingi which often destroy crops and the semi-permanent mud houses common among many of the locals throwing their lives into misery.

To further expand understanding of this issue, respondents were asked to specify the effects climate change has had in Agricultural activities, Livestock keeping and the environment

in Eastern Kenya. In response, 22 respondents (84.6%) noted that agricultural activities have suffered a big blow in the ASALs of Eastern Kenya with low yields and new crop diseases. In Livestock keeping, 15 respondents (57.7%) felt farmers have lost many animals especially in Isiolo and Marsabit due to lack of pastures, water and new tropical diseases killing many cows and goats. In the Environment, the respondents majorly noted issues of flash floods, rising temperatures and low rainfalls in the ASALs of Eastern.

4.3.2 General strategies/policies devised by government to aid adaptation of residents to effects of climate change in Eastern Kenya.

All the respondents were asked to describe the general strategies or policies that have been improvised or are being implemented by their departments to help residents of Eastern Kenya to mitigate effects of climate change. These are general policies that are not gender engineered targeting all residents of the region. 5 respondents from both Ministry of Irrigation and NEMA (representing 57.7%) noted that their departments had spearheaded tree planting exercise in the county of Machakos and Isiolo. They noted that residents especially in Machakos which receives some rainfall have been supplied with tree seedlings to plant during the rains period.

4 respondents from NEMA (representing 15.4% of all respondents) mentioned that their department had established 'Greenpoints' throughout the country which embrace the use of green economy calling for use of green economy and natural resources and one of the 'Greenpoints' was located in Isiolo County.

5 respondents from the two ministries (19.2% of the total respondents) said their ministries had carried out civic education in the two respective counties on environment issue. 8 respondents (representing 30.8%) from all the three ministries/parastatals noted that the national government was reaching out to external development partners and NGOs to help them in addressing the effects of climate change. To this end, the respondents pointed out the numerous NGOs operating in the ASALs of Eastern Kenya offering humanitarian aid, relief food, civic education on better agricultural practices and alternative economic activities.

16 respondents from both Ministries (representing 61.5%) of total respondents mentioned the efforts by the national government to harvest water on large scale by building dams which are used to harvest rain water, and also serve the dual purpose of preventing floods sweeping into people's homes. Several dams are undergoing construction funded by the national government in partnership with international development partners like USAID and JICA.

5 respondents (representing 19.2%) also noted the various irrigation efforts being advocated by their departments in conjunction with the respective county governments. Other strategies and policies mentioned by the respondents include; discouraging deforestation and burning of charcoal, buying off farmer's livestock for slaughter during famine instead of the animals dying (especially in Isiolo), urging livestock keepers to practice goat and camel keeping which are more adaptable to harsh environment as opposed to cattle, buying off farmer's surplus produce after harvest to sell back to them during drought and allocating emergency funds for procuring of relief food during famine

4.3.3 Strategies/policies devised by government to aid adaptation of women to effects of climate change in Eastern Kenya

The study sought to know if there are any existing policies/strategies being implemented by the government which are aimed at aiding women adaptation to the effects of climate as they are the most vulnerable group.

In answering the question, 18 respondents (accounting for 69.2% of all respondents) said yes there were strategies/policies are specifically targeted at women. 7 respondents from the Ministry of Environment and Natural Resources (representing 26.9% of the total respondents) noted that their ministry in conjunction with the county government of Machakos is supplying seedlings of drought resistant crops to women to plant as the traditional crops of maize and beans have failed to perform under the harsh climatic condition in the county. This targets women as they form the bulk of farmers in the two counties.

Respondents from NEMA noted that they had carried out civic education among the women folk in the two counties as well as ASALs of Kenya, meant to sensitize residents on the effects of climate change in the county as well as educating them on some basic measures like storing water during heavy rains as well as harvested food for use during dry seasons. Residents have been urged to buy tanks for water storage due to the shortage of water in the region.

3 respondents from NEMA (representing 11.5% of the total respondents) noted that NEMA had carried out capacity building of women groups in Machakos and Isiolo in conjunction with the Ministry of Environment. This was followed by civic education for sustainable development which aimed at educating women on how to save and start businesses

4 respondents from the Ministry of Water noted that in collaboration with the Ministry of Agriculture, they had initiated alternative economic activities which are targeted at women groups and an example of this is bee keeping. Here they provide bee hives and technical assistance in installation and harvesting at a fee which the women groups pay after selling the honey.

However 5 respondents (accounting for 19.2% of all respondents) said no there were no specific policies targeted at women that they know. According to them, the existing policies are for all residents and are not gender specific. The remaining 3 respondents (accounting for 11.5% of all respondents) said they did not know or are not sure if there are policies aimed at women specifically. Respondents from both the two ministries and one parastatal said the national government has also been providing direct funding to women groups which have established entrepreneurial businesses within the ASALs of eastern Kenya as a means of getting extra income under the harsh economic climate as well as adapt to the effects of climate change in the region. These are given in terms of grants which the women groups pay back without interest and on flexible terms.

In assessing the effectiveness of these strategies/policies aimed at women, respondents were asked to rate the effectiveness of these policies between 1 and 5 (for those who said there are policies/strategies targeted at women) with one being the lowest and five the highest. From the 18 who said such policies exist, thirteen respondents rated the effectiveness of the policies between 4 and 5 while three respondents rated them at 3 and the remaining two respondents rated then 2.

4.3.4 Most successful climate change adaptation strategies/policies in Eastern Kenya

The study asked respondents which one among the strategies/policies being implemented by their departments to help residents of Eastern Kenya adapt to effects of climate change was the most successful in their opinion. This was aimed at informing the study which policies have been of great success for learning purposes and also to advocate for adoption of those policies in the other places experiencing similar climatic conditions in Kenya.

10 respondents (38.5% of all respondents) identified the civic education of residents being carried out by the national government (in collaboration with the county governments, agricultural extension officers and NGOs) to both farmers and livestock keepers in the region as the most successful strategy so far. Another 5 respondents (19.2% of all respondents) identified funding being extended by the national government and international development partners such as USAID and JICA to organized groups mostly women groups. They noted this fund has turned the life of residents around as it has enabled them venture into alternative economic activities like bee keeping that do relatively well across all climatic conditions. 9 respondents (that is 34.6%) mentioned the related issues of irrigation and construction of dams to harvest water once rains come. They said the dams have led to various small scale irrigation schemes taking place across farms and is having a positive effect on the life of citizens in the area.

4.3.5 Additional policies/strategies being devised for the future in Eastern Kenya

Lastly, the study sought to enquire from respondents if there are any more policies their department are still devising to help Eastern Kenya residents more so those from ASALs to adapt to the effects of climate change.

5 respondents from the Ministry of Water noted that the national government is seeking collaboration from international development partners to launch multiple large scale irrigation schemes across the county. 3 respondents from NEMA in conjunction with the Ministry of Environment said the government was carrying out research into which breeds of cattle are best suited to survive in the harsh climate in the region and trying to cross-inseminate several breeds.

4.4 Chapter Summary and Conclusion

Climate change has had far reaching effects to the entire nation as a whole even though the ASALs of Eastern Kenya has been hard hit. As noted by national government officials, Kenya has typically been reduced to one planting season, there has been a rise in temperatures with hotter days and colder nights, seasonal rains and flooding of traditionally dry areas like Turkana and western parts of Kenya and low yields all attributed to climate change.

The national government is also aware of the effects of climate change in the region which respondents noted such as, low rainfall, flash floods, drought and famine, and new tropical diseases and pests. However it is encouraging to note that having realized these effects, the government in collaboration with international development partners and NGOs have devised various strategies and policies to curb the effects of climate change. This include barring planting trees near rivers, establishing dams and boreholes, providing drought resistant seeds to farmers, introducing alternative economic activities like bee keeping which are mainly funded through women groups by NGOs.

Civic education has also been done to educate farmers and animal keepers on improved farming methods and sensitize them on how to mitigate the effects of climate change for

example by harvesting rain water. More encouraging is that majority of the respondents (18 respondents accounting for 69.2% of all respondents) noted the government together with NGOs and international development partners like USAID and JICA have come up with strategies/policies directly aimed at women as they are the most vulnerable group.

In conclusion, the study found that much has been done to adapt to the effects of climate change in Eastern Kenya. However much of these efforts seem to be directed at farming communities and the livestock keeping communities have not been given much attention. There is need for more research and initiatives to come up with solutions on how to assist the livestock keeping communities of Eastern Kenya mitigate the effects of climate change as well.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This is the last chapter of the study and it will give an overview of the findings obtained. The study aimed to study gender resilience to climate change adaptation in Africa using Kenya as a case study. The chapter therefore starts by giving a general summary of findings of the study as obtained (in the Kenyan case study) and uses these findings to draw continental conclusions to reflect the gender resilience to climate change in Africa. The chapter then concludes by giving continental actionable recommendations based on the problems observed during the Kenyan study to address gender resilience to climate change in Africa.

5.2 Summary of the study

Climate Change has become a national issue of concern whose magnitude can no longer be overlooked by any sector of the Kenyan Society. This realization has led the national government to reach out for partnerships with Non-governmental organizations like CARE International and Oxfam GB to combine efforts in tackling problems posed by climate change.

The study found that the whole region of North Eastern Kenya including Eastern Kenya) has borne the brunt of climate change since the regions largely falls under the ASALs regions. The region has suffered significantly from climate change and this has had huge implications on food security of the country especially during droughts as it posed serious challenges to food security by affecting performance of animal and crop yields.

The study also found out that climate change is a contributor of conflicts in Kenya with inter-clan and inter-community conflicts occurring in the drought prone areas largely from

pasture and water related strife of the communities sharing the resources. Climate change has also led to human-wildlife conflicts caused by human encroachment in wildlife habitations and interference of wildlife habitat by herders grazing their livestock in the wildlife parks resulting to loss of lives, injuries and loss of livestock.

The study established that women and children are the most affected group by climate change in Kenya. This, the research established is due to various reasons ranging from biological characteristics of women to the social roles allocated as well as the economic and agricultural activities performed by women in general. In addition, the study established that climate change has affected women variedly from men in Kenya in relation to life longevity and negatively affecting the economic activities they carry out like farming leading to low productivity.

The study found out that farming, bee keeping and livestock keeping are among the most prevalent economic activities practiced in Kenya's dry regions and climate change has negatively affected the performance of crops and animals in Kenya's ASALs. The study also found that women in Kenya's ASALs have generally adapted to climate change and have resorted to various measures to tackle climate change like water harvesting, planting drought resistant crops and keeping African livestock breeds that are more adaptable to harsh climate.

The Kenyan devolved governments have initiated some policies and strategies to tackle climate change and some are specifically targeting women. Many residents in Kenya's ASALs feel that while these strategies policies have performed averagely, they would do better. The study found that generally in Kenya, women have demonstrated a higher ability to cope to the

harsh climatic conditions as compared to men and this has been evidenced by their resilience to stay in the region and take care of their families amidst the hardships.

The study found that climate change has had far reaching effects in Kenya as a whole even though the ASALs have been hardest hit. Climate change has typically reduced the country to one planting season, there has been a rise in temperatures with hotter days and colder nights, seasonal rains and flooding of traditionally dry areas like Turkana and western parts of Kenya and low yields all attributed to climate change.

The study found that the Kenyan government is aware of the effects of climate change more specifically in the ASALs and recognized some of the effects such as, low rainfall, flash floods, drought and famine, and new tropical diseases and pests. What the study found to be encouraging is that having realized these effects, the government in collaboration with international development partners and NGOs have devised various strategies and policies to curb the effects of climate change. This include barring planting trees near rivers, establishing dams and boreholes, providing drought resistant seeds to farmers, introducing alternative economic activities like bee keeping which are mainly funded through women groups by NGOs.

The Kenyan government has also carried out civic education to educate farmers and animal keepers on improved farming methods and sensitize them on how to mitigate the effects of climate change for example by harvesting rain water. While doing the field study, many respondents from the national government noted that the national government in collaboration with NGOs and international development partners like USAID and JICA has come up with specific strategies/policies directly aimed at aiding women adaptation as they are the most vulnerable group to climate change.

In summary, the study found that much has been done with regards to adaptation to the effects of climate change in Kenya more so in Kenya's ASALs. However the study established that much of these efforts are directed at farming communities while the livestock keeping communities have not been given much attention and have not received help on how they can better cope to the harsh environment that they and their livestock are exposed to.

5.3 Conclusions of the Study.

Climate Change has hit Africa hard and from the findings of the Kenyan case study, the study reached the conclusion that Sub-Saharan Africa (which bears the same conditions as the area under this study) has been the most affected by climate change effects. Many communities in Sub-Saharan Africa are livestock keepers with some of them being agricultural communities, which have similar characteristics to the communities under study in the research, hence the findings of this research, can be used to draw continental conclusions.

The degree to which various African communities are affected by the effects of climate change varies according to their social status, poverty level, gender as well as the control over resources as established in the Kenyan case study. The research reached the conclusion that despite the acknowledgement by the international community that women and men bring different experiences as well as skills to environmental sustainability and climate change adaptation, African women still possess less legal, cultural and political clout. This therefore means African women have been worst hit by climate change due to their inability to cope due to the aforementioned factors. The research study established that Kenyan women (and by extension African women) are more exposed to the adverse effects of climate change than their male counterparts.

According to the research, women across the continent are particularly vulnerable to the effects of climate change because of their high dependence on local natural resources for their livelihood. Across African culture (just like the Kenyan case study) women are charged with social tasks like securing water and firewood and this group face the most challenges especially those living in ASALs of Africa. African women have less access to resources like micro-credit and decision making, they have limited mobility and a host of other challenges that makes them hardest hit by the effects of climate change. African governments have not come up with gendered responses to climate change that can address the challenges of women.

On a security dimension, the study found that climate change is a big contributing factor to inter-clan and inter-community conflicts especially in Kenya's ASALs. This has been the situation elsewhere in Africa's Sub-Saharan and conflict always takes on a gendered dimension in Africa. In Africa's Sub-Saharan region, livestock keepers fight over meager pastures and limited water for their animals. In this fights women are targeted for rape and maiming and majority of the casualties are women. Sub-Saharan Africa has also seen human-wildlife conflicts caused by human encroachment in wildlife habitations and interference of wildlife habitat by herders grazing their livestock in the wildlife parks resulting to loss of lives, injuries and loss of livestock.

However, the research established that women have shown more resilience to cope with the effects of climate change as compared to men and therefore the research concludes that African societies in harsh climatic regions can experience and practice more effective climate change responses if they tap into women experiences, skill and knowledge and support the empowerment of the African woman. However the research concludes that from the findings, it's

clear that in Africa, the impacts of gender inequalities and women's socio-economic disadvantages have been ignored by many governments in the fight against climate change and this has pulled back adaptation efforts. The study therefore concludes that to achieve an effective post-Kyoto climate regime, mitigation and adaptation efforts in Africa must take on a gender dimension.

From the findings of the case study, the paper reaches the conclusion that women play a pivotal role in the management of natural resources as well as productive and reproductive activities in African households and communities. This means women can contribute a great deal to livelihood as well as climate change strategies for adapting to a changing environment. The African woman possesses extensive expertise and knowledge which can be used building resilience to climate change mitigation, reduction of disaster as well as adaptation.

The research proved that African communities perform much better in disasters when women play a role in being part of the solution. Women are eager to share information about the well being of their communities as the research proved out and women resort to energy sources that produce less pollution to the environment. The study reached the conclusion that women across Africa adapt quickly to the environment when the survival of their children is at stake. Rather than move away to find better environments, women would rather stay and fight for the survival of their families in the best way they can. Several studies have revealed that women display enormous zeal when it comes to disaster management and rebuilding after disasters.

The study concluded that women empowerment and gendered approaches are vital to environmental sustainability and adaptation of women to climate change across Africa's Sahara.

More women participation will definitely lead to economic development of communities affected by climate change. More women participation in Africa will also enhance the sustainability and effectiveness of climate change missions and projects. This is because African women have shown they possess great ability to mobilize community members during disasters such as floods and drought. Since they bear the brunt of climate change effects, they also have clear understanding of which strategies are needed in the ground to enhance resilience and adaptation to climate change in Africa.

There has been lack of focused research on the effects of climate change on livestock and agrarian communities as well as the role gender plays in both. Much of the available research across Africa has been focused on farming communities and development of resistant seeds while the livestock keeping communities have not been given much attention. The role various genders play in the climate change resilience has not received adequate researched. There is need for more research to come up with solutions on how to assist the livestock keeping communities of Africa adapt to the the effects of climate change and how women and men can provide gendered responses on tackling climate change in Africa.

Encouragingly, there is growing recognition internationally that supporting women and gender equality in all spheres of development is the key to economic prosperity of all societies. For example between the period 2002 to 2007, the Organization for Economic Co-operation and Development's fund for support for women rose from 2.5 billion Euros in 2002 to 7.2 billion Euros in 2007. However even with such positive steps, the study feels Africa's women are still facing multiple gender-based barriers at both national policy and international stage which hinders their full potential in adapting to the effects of climate change.

5.4 Recommendations

After carrying out the study, analyzing the results and presenting them in the preceding chapters, the researcher gives the following recommendations.

5.4.1 Recommendations to African Governments

- ❖ **African governments should carry out evidence based and in-depth research of the roles played by women and men in areas affected by climate change.** This research should include the strategies that men and women use to cope with climate change. Better understanding of the roles and abilities, as well of knowledge of women and men's roles will form a good basis for development of policies and strategies to address the same.
- ❖ **African Governments should ensure adaptation effort and policies adequately address gender based poverty, inequality and vulnerability.** Due to the socio-economic and cultural barriers facing women leading to their reduced capacity to response to climate change, responses to climate change in Africa must address these barriers as women are central in environmental, economic and societal development hence women empowerment is beneficial to the whole continent.
- ❖ **Closely linked to the above, Africa must ensure they full integrate gender perspectives in climate change programmes so as to address women and men's needs and priorities.** This will also ensure there is meaningful women participation in the fight against climate change so as to achieve gender-equitable results in the fight against climate change. The involvement of women's knowledge and skills in climate change strategies will improve opportunities in education, health and general livelihoods

and create mutual benefits and returns in achieving the UN's Sustainable Development Goals (SDGs).

- ❖ **African governments should also incorporate gender perspectives into national as well as international climate change financial strategies and mechanisms.** To achieve effective, efficient and inclusive financing, gender issues must be at the centre of programming and policies. Therefore, African governments must develop gendered structures, projects, tools and guidelines for all climate change related financing systems supporting adaptation at all levels. Also, a gender based criteria must be developed for allocation of funds to address the historical, socio-economic and political barriers faced by women in sustainable development in general and climate change mitigation in particular.
- ❖ **African continent should create task forces on climate change in all Regional Economic Communities (RECs) as well as a general taskforce on climate change at the continental level.** This taskforces should be well balanced in terms of gender and they should work on policies and strategies for both men and women on climate change. The continental taskforce will coordinate gendered policies of the different taskforces and adaptive strategies throughout the continent with specific focus on Sub-Saharan Africa that is hardest hit by climate change
- ❖ **The continent should develop early warning systems to help track and prepare for disasters related to climate change.** Africa has always had weak early warning systems. There is need to develop early warning systems as drought, floods, earthquakes and tremors can emerge anytime compromising Africa's food security. There is therefore

need to plan adequately for coming droughts and floods to ensure the food security situation is under control as women and children are hard hit in the event of food security situation.

5.4.2 Recommendations to Donors and Development partners

- ❖ **Donors and Development partners should be in the forefront in pushing African governments to integrate gender into their climate change strategies.** This can be achieved by promoting consistency of donor climate change adaptation plans with those of national and continental gender and development policies and providing oversight on gender auditing and budgeting of African policy makers on climate change.
- ❖ **Donors and development partners should lead by example by demonstrating good practice on gender issue in their engagements with Africa on climate change issues.** They should promote gender-inclusive accountability in line with the Convention on Elimination of All forms of Discrimination against Women (CEDAW), the Beijing Platform for Action and other emerging climate change architectures.
- ❖ **They should promote equal access of both men and women to decision making processes and opportunities resulting from African climate change responses:** Donors should call for reduction of cultural, legal and political barriers of women to decision making and promote women to sit at tables making decisions on climate change partly by empowering them for example by offering training to women organizations. Donors should also ensure their funding processes around climate change are transparent and accessible to women and women organizations

- ❖ **Related to the above, donors and development partners should promote gender-responsive climate change negotiations with African governments.** This can be achieved by facilitating multi-stakeholder negotiations that have both vertical and horizontal dimensions, thus promoting inclusion of marginalized groups and ensuring gender is a core issue and not a side event in African climate change dialogues.
- ❖ **Donors should strive to address the African climate change gender disconnect through their project and programme cycles.** They should ensure gender analysis, needs, preferences and capacities of women and girls and the different roles they play in the climate change adaptation and resilience are ingrained in all donor funded projects, monitoring, implementation and evaluation.

5.4.3 Recommendations to Future researchers

While the study has brought out much about African gender perspectives in climate change and the potential women possess in transforming the climate change process, some knowledge gaps exist that future researcher can explore:

- ❖ **More research is needed for a better understanding on how to support women's aspirations to be part of the solution to the challenges of climate change in Africa.**
There is need to understand how African decision makers can tap into the innovation and skills of women in climate change debate and the factors that constrain women into being part of the voices of change in climate change issues in different arenas.
- ❖ **There is need for research also on how the continent can go beyond gender sensitivity and inclusivity to gender oriented action points.** Including women in

continental or societal decision making processes on climate change alone would not be enough. There is need to turn what women say in meetings into action points and this requires more research with governments, learning institutions and think tanks to address deep rooted gender inequalities in Africa.

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APPENDICES

Appendix 1: Questionnaire 1

Dear Respondent,

My name is Salome Oyosi a Master of Arts in International Studies student at the Institute of Diplomacy and International Studies, the University of Nairobi. I am doing a research project titled, **“GENDER RESILIENCE TO CLIMATE CHANGE ADAPTATION IN AFRICA: A CASE STUDY OF WOMEN IN EASTERN KENYA”** and hence collecting data for the same. The information you will provide will be treated with extreme confidentiality and only used for academic purposes. For any clarification needed, reach me through no. **0713078161/** email **salomeoyosi@gmail.com.**

PART I: BIO DATA.

- i) Name (optional) _____
- ii) Gender: Male Female
- iii) Age _____ 18 -30 31- 40 41-50 51- 60 over 60 yrs
- iv) Highest education Primary Secondary College University
- v) Home County: Isiolo Machakos

PART II: VULNERABILITY AND ADAPTIVE MECHANISM OF WOMEN

1. Between men and women, who do you think are the most affected group by effects of climate change in your county? Men Women
2. In your view, how are women affected differently from men by the effects of climate change? _____

3. On a scale of 1 to 5 (with one being the lowest and five the highest) how vulnerable would you say women are to climate change in your county? 1 2
3 4 5

4. What makes women more vulnerable to climate change as compared to men in your county? _____
-
5. What economic activities do women in your county carry out? _____
-
6. How has climate change affected the above stated economic activities? _____
-
7. Are these effects of climate change you stated above spread throughout the county or are they felt more in some areas as compared to others? _____
-
8. On a scale of 1 to 5 (with one being the lowest and five being the highest) what in your opinion is the capacity of women in your county to adapt to effects of climate change?
 1 2 3 4 5
9. Have women in your county adapted to the effects of climate change (especially in terms of the economic activities they carry out) _____
-
10. List any specific mechanisms that you know which they devised to adopt to the effects of climate change in regard to continuing their economic activities (e.g. using drought resistance seeds) i. _____
- ii. _____
- iii. _____
11. Are you aware of any policies introduced by either the county or national government to help local adapt to effects of climate change? No Yes
12. If your answer to No.11 was Yes, do you know any of these policies which are specifically targeted at helping women adapt to climate change effects? No
- Yes
13. If the answer to No.11 was Yes, on a scale of 1 to 5 (one being the lowest and five the highest) how effective can you say this government policies have been? 1
- 2 3 4 5

Appendix 2: Questionnaire 2

Dear Respondent,

My name is Salome Oyosi a Master of Arts in International Studies student at the Institute of Diplomacy and International Studies, the University of Nairobi. I am doing a research project titled, **“GENDER RESILIENCE TO CLIMATE CHANGE ADAPTATION IN AFRICA: A CASE STUDY OF WOMEN IN EASTERN KENYA”** and hence collecting data for the same. The information you will provide will be treated with extreme confidentiality and only used for academic purposes. For any clarification needed, reach me through no. **0713078161**/ email **salomeoyosi@gmail.com**.

PART I: BIO DATA.

vi) Name (optional) _____

vii) Gender: Male Female

viii) What department do you work in/for

ix) What is your job designation/profile in the department _____

x) Highest education Primary Secondary College University

PART II: CLIMATE CHANGE INFORMATION

1. How would you generally describe the effects of climate change in Kenya _____

2. How would you describe the general effects of climate change in Eastern part of Kenya (more so the ASALs of Eastern) _____

3. What are the general effects of climate change on (in the ASALs of Eastern Kenya)

i. Agricultural activities _____

ii. Livestock keeping activities _____

- iii. Environment _____
4. What strategies and adaptation policies have your dept/ministry/organization come up with to enable residents of Eastern Kenya adapt to climate change _____

 5. Women are the most vulnerable group to the effects of climate change in Eastern Kenya. Do any of the policies/strategies you have devise specifically target women adaptation? Yes
No
 6. On a scale of 1 to 5 (with 1 being the lowest and 5 the highest) how effective would you say the policies/strategies you designed for Eastern Kenya (targeting women) region have been _____?
 7. Are there any policies/strategies which you feel have been unsuccessful/encountered challenges among women? Yes No
 8. If the answer to question 8 was Yes, which are these policies/strategies _____

 9. Which ones among your policies/strategies would you say have been the most successful so far _____
 10. Are there any other policies/strategies that you are currently coming up with specifically for Eastern Kenya region (specifically for women) _____? (If yes which ones are they _____

Thank you for your participation