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INSTITUTE OF DIPLOMACY AND INTERNATIONAL STUDIES

**GENDER DIMENSION OF CLIMATE CHANGE (CASE STUDY OF
MACHAKOS COUNTY IN KENYA).**

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DEDICATION

This research is dedicated to my late father Josephat Kiseru Miseda, a great scholar who installed in all his children the value of education and knowledge. And to my husband Moses and my kids – Israel and Atarah; you are my jewels from God.

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I wish to extend my heartfelt gratitude, first to God Almighty who gave me the health and strength to endure the rocky path of completing this project. Second, to my husband Moses Otieno for the moral and material support he gave me throughout the research and for believing in me. Third, to my mother Winfred Miseda for encouraging me to press on even as the going got tougher. Also, I would like to extend my gratitude to Oscar Omondi who helped in proof-reading this work. Last but not least to my supervisor Ambassador Professor Maria Nzomo, a phenomenal woman I regard highly among great scholars. To you all I say asante sana.

ABSTRACT

The purpose of this research was to determine the effects of climate change on sub-Saharan woman and to examine the strategies that they have employed to mitigate these effects. The study begins by examining climate change and what has been referred to by world leaders as global warming. The hypotheses are clearly outlined and discussed in chapter 1 of the study.

The literature review was done with rich source of publications to re-emphasize the fact that their ideologies were in line with the study objectives. This strengthened the study. The literature review focused a lot on the research questions and objectives. Thus, the areas largely explored in the literature review were climate talks, resolutions adopted at the various climate talks and the role of Sub-Saharan Africa in such climate talks. It also explored the adaptation strategies for climate change.

The study also explores in detail, global warming and its challenges to a Kenyan woman, with specific reference to women of Machakos County. In addition, the chapter seeks to further enhance the reader's understanding of global warming by exploring various climate talks. It gives provides an in-depth understanding of global warming, taking the readers through the history of climate change.

In conclusion, the study notes that climate change has variously impacted on the Kenyan woman but they have managed to adapt. And the study examines these adaptation strategies. As a result the study recommends that the both national government and county governments need to strengthen women adaptation strategies, so as to enable them respond more effectively to the negative impacts of climate change.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT.....	v
TABLE OF CONTENTS	vi
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
CHAPTER ONE	1
Introduction.....	1
1.1 Background to the Research Problem.....	1
1.2. Statement of the Research Problem	3
1.3. Objectives of the Research.....	6
1.3.1. General Objective	6
1.3.2. Specific Objectives	6
1.3.3. Research Questions.....	6
1.4 Significance of the Study	6
1.5. Limitation of the Study	8
1.5.1 Confidentiality	8
1.5.2 Accessibility.....	8
1.6. Scope of the Study	9
1.7 Theoretical Framework.....	10
1.8. Hypotheses.....	16

1.9. Literature Review.....	16
1.9.1 Global Environmental Change and Resource-Based Conflicts in Africa.....	16
1.9.1.1 Precipitation and Temperature.....	19
1.9.1.2. Natural Disasters.....	20
1.9.2 Impacts of Drought and Urbanization.....	21
1.10 Research Design and Methodology.....	23
1.10.1 Research Design.....	23
1.10.2 Target Population.....	23
1.10.3 Sample Design and Data Collection.....	24
1.10.4 Data Analysis and Presentation.....	26
1.11. Chapter Review.....	26
CHAPTER TWO.....	28
Sub-Saharan Africa and Global Warming.....	28
2.1 Introduction.....	28
2.2 Sub Saharan Africa and Climate Talks.....	28
2.3 The Global Environmental Talks and Their Outcomes.....	30
2.3.1. The Global South in Global Environmental Talks.....	32
2.3.2. The Stockholm Conference.....	35
2.3.3. The Rio De Janeiro Conference.....	38
2.3.4. The Johannesburg Conference.....	40
2.4. Adaptation to Climate Change.....	42
CHAPTER THREE.....	46
Data Analysis, Presentation and Interpretation.....	46

3.1 Introduction.....	46
3.1.1 Response Rate.....	46
3.1.2. Data Analysis.....	46
CHAPTER FOUR.....	77
Summary of Findings, Conclusions and Recommendations	77
4.1 Introduction.....	77
4.2 General Information.....	77
4.2.1. The Relationship Between Dependency Burden and Climate Change.....	77
4.2.2. Influence of Rural-Urban Migration and Drought on Gender Roles	77
4.2.3. How Have Women Adapted to the Effects of Climate Change?.....	78
4.3. Recommendation and Conclusion	78
4.4 Suggestions for Further Research	79
REFERENCES	80
APPENDIX 1: RESEARCH QUESTIONNAIRE.....	84

LIST OF TABLES

Table 1.1: Target Population.....	23
Table 1: Age of Respondent	47
Table 2: Occupation of Respondent.....	48
Table 3: Location of Respondent.....	50
Table 4: Monthly Income of Respondent (Kenya Shillings)	52
Table 5: Does Respondent have Family	53
Table 6: Type of Family	55
Table 7: Size of Family.....	56
Table 8: Contribution in Family	58
Table 9: Support for Extended Family.....	60
Table 10: Time for Leisure	61
Table 11: Involvement in Farming	62
Table 12: Weekly Farming Time	63
Table 13: Fetching Water.....	64
Table 14: Poultry Keeping	67
Table 15: Years Spent in Poultry	68
Table 16: Sand Harvesting.....	69
Table 17: Years Spent in Sand Harvesting	70
Table 18: Small Trading	71
Table 19: Years Spent Trading	73
Table 20: Change in ECON Circumstances.....	74
Table 21: Adaptation Strategy	75

LIST OF FIGURES

Figure 1: Age of Respondent	48
Figure 2: Occupation of Respondent	49
Figure 3: Location of Respondent.....	51
Figure 4: Monthly Income of Respondent (Kenya Shillings).....	52
Figure 5: Does Respondent have Family	54
Figure 6: Type of Family	56
Figure 7: Size of Family	57
Figure 8: Contribution in Family	59
Figure 9: Support for Extended Family	60
Figure 10: Time for Leisure	61
Figure 11: Involvement in Farming	63
Figure 12: Weekly Farming Time.....	64
Figure 13: Fetching Water	66
Figure 14: Poultry Keeping.....	67
Figure 15: Years Spent in Poultry.....	68
Figure 16: Sand Harvesting	70
Figure 17: Years Spent in Sand Harvesting.....	71
Figure 18: Small Trading	72
Figure 19: Years Spent Trading.....	73
Figure 20: Change in ECON Circumstances	74
Figure 21: Adaptation Strategy.....	76

CHAPTER ONE

Introduction

1.1 Background to the Research Problem

Climate is the average change in weather over time. However, over the last three decades, climate change has been more dramatically, more spontaneous than ever before, with more profound effects on the lives of humans. The reasons for this dramatic change in climate are one thing that has left more disagreements than agreements among scholars. While some of them blame it on the human activities, others argue that the earth's natural processes such as natural fires and erosion could be the main cause for all these turbulence in climate. It is also predicted by environmentalists that in the coming years, the change may be worse.

For millennia, since civilizations arose from ancient farming societies, the earth's climate as a whole was relatively stable, with temperatures and patterns of rainfall that have supported human life and its expansion around the globe.¹ Indeed the weather was more predictable, and the ancient civilization, even without modern calendars, would easily know the seasons for planting, sowing, tilling the land and harvesting. In fact, the earliest forms of human civilization, which no doubt began in Africa and later spread to other parts of the world, were largely a success because of the predictable weather. An example of such is Mesopotamia, which thrived between two rivers, Tigris and Euphrates. Mesopotamia is widely considered to be the cradle of civilization to both Africa and the West. Indeed, the earliest forms of writing, governance, irrigation and formal settlements, arts and culture and so many aspects of modern civilization may be traced from

¹ UNFPA - State of World Population 2009

Mesopotamia. All these were possible, plus earliest inventions because of predictable weather.

A growing body of evidence show that recent climate change is primarily the result of human activity and this influence is complex, which also includes population explosion. Climate change comes about as a result of what humans consume, the sources of energy used, the kind of lifestyle lived, and the level of consumption and even the extent to which women and men enjoy equal rights and opportunities.

As the growth of population, economies and consumption outpaces the earth's capacity to adjust, climate change could become much more extreme—and conceivably catastrophic. Population dynamics tell one part of a larger, more intricate story about the way some countries and people have pursued development and defined progress and about how others have had little say in the decisions that affect their lives. Of course, all humans, irrespective of their gender are affected in one way or another by this dramatic change of climate. However, most scholars argue that women are the most affected, and the most vulnerable when it comes to the effects of climate change.

Climate change is about people because they are the ones who cause it and are affected by it. To survive people need to adapt to it. The issues surrounding climate change is as complex as it has been before, and may still remain so for so many years to come. Climate affects all of us, both directly and indirectly. Indeed, climate affects our culture, the way we dress, the food we eat, the shelter we seek and many others. Economically,

climate affects our economic progress and development; it affects the food we grow and the output in our farms and so on. This has been the case in Africa, where food output has increasingly declined over the years. One of the effects of climate change is weather extremes. At one point, flash floods drive people out of their homes, while after a short while, people die of severe droughts. Indeed, weather unpredictability has also become an issue of major concern. But since women are more prone to these effects of climate change, the question remains, to what extent and how have they managed to survive?

Paradoxically, industrialized nations generate the lion's share of climate-altering carbon and other gases but have been relatively immune to the effects of climate change. The developing world has been responsible for a smaller share of greenhouse-gas emissions yet has had to shoulder more of the burden for coping with and adapting to extreme weather events, rising sea levels, floods and drought. However, despite this, there is no part of the globe that has been spared the wrath of climate change. This is the reason why there have been several attempts at cooperation between different nations to mitigate the effects of "global warming" as it is commonly referred to.

1.2. Statement of the Research Problem

Women, as stated above, are so far believed to be most affected by climate change and global warming. Indeed, they have found a way to adapt to climate change even as they go about their daily chores dictated by gender, culture and other natural processes like death of their husbands. Although mitigation has enjoyed greater focus in international

climate change research and policy (Burton et al.2002)², it is increasingly being recognized that adaptation has a major role to play in the overall climate change response strategy (Smith 1997;Pielke 1998; Kane and Shogren 2000). Climate change adaptation is defined as adjustment in ecological, social, or economic systems in response to actual or expected climate change in order to decrease the vulnerability of peoples and ecosystems.³ Past researches have been carried out on climate change and global warming. However, there are very few gaps that touch on how the ordinary people in developing countries, which again are usually the most affected by global climate change, have managed to survive despite the difficult conditions. But to what extent does climate change affect the women, also classified generally as the vulnerable by the United Nations, in their day to day roles of providing for themselves and their families? If so, how do the women cope with these challenges? And what role does gender play in this? These are the core questions that drive this study.

This study will therefore examine the gender dimension of climate change. Climate change affects people all over the world, but in particular, it negatively impacts the lives of women, who are vulnerable to crop failure or natural disasters. Impoverished women in poor countries are already bearing the disproportionate brunt of climate change because they farm land in areas stricken by drought and their homes are often built in marginal areas that are vulnerable to floods and rising seas. They often lack the means and resources to relocate their families when natural disasters strike. Women bear the

² Burton,I.Huq, Sim Lim, B.Pilifosova, E.L Schipper. '*From Impacts Assessments to Adaptation priorities;the shaping of adaptation policy*',Climate Policy 2,148.

³ Ikeme Jekwu. 2001.*Climate Change Adaptational Deficiencies in Developing Countries:The case of Sub-Saharan Africa*. Palgrave, London.

greatest brunt of climate change because they manage the three essentials of household management — food, water and energy – which lie at the heart of the response to global warming and make up biodiversity.

As recognized in Millennium Development Goal 7, biodiversity is important for the wellbeing of all humans on the planet. Without such diversity masses would all be poor, economically, socially and culturally.⁴ In essence, since women are most vulnerable in relation to climate change, most violence which have also been experienced as a result of climate, such as conflict over natural resources like water or pasture, women are most affected. Indeed, the Sub-Saharan Africa region is among the most vulnerable regions to the impacts of climate change. Among the projected impacts of climate change on Sub Saharan Africa include increased intensity of heat waves, droughts, floods and changes to growing seasons which in turn have significant implications for soil productivity, water supply, food security, biological diversity and general human health and welfare.⁵

The independent variable in my study is climate change. The main interest of this study is to investigate the impacts of climate change on women, and their gender roles. In modern world, climate change has become globalized, just like trade, telecommunication, transport, data flow and other aspects of globalization. In fact climate change is even the most complex bit of globalization and its effects felt more heavily. However, just like the impacts of climate change is not evenly distributed globally, so are these effects not

⁴ Biodiversity Gender and Climate change 2009, Pg1

⁵ Sokona Y. And Denton F.2001. 'Climate cahneg impacts: Can Africa cope with the Challenges?' Climate Policy 1(1).121

evenly distributed among the genders. Indeed, women have been left to bear the brunt of climate change more than the male gender.

1.3. Objectives of the Research

1.3.1. General Objective

To examine the impact of climate change on women.

1.3.2. Specific Objectives

- i) To assess the impact of climate change causes resource based conflicts.
- ii) To investigate the influence of rural-urban migration and drought on gender roles.
- iii) To examine the differential impact and adaptation strategies of women to changing world climate.

1.3.3. Research Questions

- i) To what extent does climate change cause resource based conflicts in Kenya, and to what extent are women affected?
- ii) How does increased rural-urban migration and drought impact on gender roles?
- iii) How do women adapt differently from men to the changing world climate?

1.4 Significance of the Study

Past studies on climate change have largely emphasized visible impacts of global warming and global climate degradation such as drought, unpredictable rainfall, the decline of the ozone cover and many other impacts much to the negligence of adaptation

strategies that would enable people who otherwise would be more vulnerable to the effects of global climate change survive these hard times. This study seeks to shift focus from just looking at climate change and overall mitigation strategies adopted at various climate talks all over the world, to focusing on adaptation strategies among the women in the most vulnerable part of the globe-the Sub-Saharan Africa. Through this study, I seek to showcase that climate change is a threat to women in the sub-Saharan Africa and that the effects of climate change has seriously affected their day to day roles of providing for the family vis a vis their gender role. Increasingly, women in Sub-Saharan Africa have taken over the roles previously set aside for men, such as being the bread winners, putting up shelter and so many others. Past studies have shown for example, that more men die as a result of HIV/AIDS in Sub-Saharan Africa than women. This has left more women take charge of their families. Women till the land, do the farming, provide shelter, still carrying out their gender roles like child-rearing, fetching water, cooking and so on. I hope, through this research to show how these women have managed to cope with the effects of climate change, even as they manage to do all these tasks. Therefore, this study will be of paramount importance to the Kenyan government to help them come up with policies that would strengthen women's adaptation strategies to climate change and support them even as they face the reality of changing gender roles.

Since this study, will focus on Machakos County of Kenya, this study will be important to the Kenyan public who need to understand the women of Kenya and the changing gender roles. Indeed, the Kenyan public knows very little, if nothing at all, about climate change, the various climate talks all over the world and how these impact on their own

country, Kenya. In addition, they have very little idea how these have impacted on their increasingly vulnerable women and the women's adaptation strategies. Thus, there is need to educate the Kenyan public on all these.

Finally, Non-governmental Organizations such as the media and the civil society and even intergovernmental organizations that focus on women in Kenya, such as Women's program under the United Nations banner need to understand how climate change affect women and their gender roles, plus their adaptation strategies. Through this study, the civil society which is also seen as the main pressure groups in good governance, and the strongest force to keep the government in checks will also come face to face with the negative impacts of climate change on women. This will strongly inform their decisions, even as they play their role of "pressure groups".

1.5. Limitation of the Study

1.5.1 Confidentiality

The researcher would not gather a lot more information as earlier expected. This was contributed to by the fact that some women would not open up and share all the information about their lives, despite the researcher assuring them of confidentiality. This was further complicated by religion and culture.

1.5.2 Accessibility

Some data key to this study was to be collected from the county offices and from top county policy makers. However, both the top county bosses and the general staff had

limited time during their working hours. This made it hard to get their full attention. The researcher at one point had to drop the questionnaires and come back to collect them later. Due to their busy schedule, also, the researcher could not gather the data to the extent that she wished. Thus, she had to work with only a small sample size.

1.6. Scope of the Study

This study focuses on Kenya's women, and how they manage to cope with the effects of climate change vis a vis the increasing gender roles. The research will be carried out in Machakos County in the outskirts of Nairobi city. The choice of Machakos County is justified by several factors. First, Machakos is a rural socio-politically monolithic county largely dependent on peasant agriculture and sand harvesting as the main economic activities. With largely no white collar jobs, it would be interesting to discover how women manage to compete with men in tasks such as sand harvesting, despite the fact that they still are the caretakers of their families back home. Secondly, Machakos County is increasingly becoming a cosmopolitan county, with many middle-class Kenyans working in Nairobi having built or bought homes in the county. This county also comprises small traders, the working class and the middle class. Demographically, the county has a total population of about 1,098,584 people, with approximately 52% of these, or an equivalent of 571,355 people living in its urban areas. The county is located in Eastern province comprises 6 constituencies i.e Machakos town, Yatta, Kangundo, Kathiani and Mwala. Additionally, the researcher's choice of the county was informed by the fact that she currently lives in Machakos county, Kathiani constituency and is part

of the urban population living in this county but working in Nairobi. This gives the researcher a head start in terms of data collection and knowledge of vital County offices. Also, because of this the researcher finds it cost-effective for her in terms of travel expenses and time management.

1.7 Theoretical Framework

Neo-Malthusians theory would have made a big contribution to this study given its relevance to human population explosion, declining natural resources and resource-based conflicts. This discourse would have as well been very much rooted to the Neo-Malthusian notions of carrying capacity. Neo-Malthusians argue that human population growth, coinciding with increases in affluence and per capita rates of consumption, will cause exponentially increasing demands on natural resources, inevitably leading to shortages, land and water degradation and distributed conflicts as well (Ehrlich, 1969; Ehrlich & Ehrlich, 1990; Goldstone, 1991, 2002; Homer-Dixon, 1999). With these resulting shortages, women are the most affected in terms of gender roles and their ability to adapt to these negative impacts of population explosion. Indeed, increased pressure on the declining natural resources as a result of population explosion could also lead to violence, many of them resource-based. Such violence have been witnessed even in Kenya, especially the Northern part of the country. Some of the resources that have so much been fought over include land, water and pasture among the pastoralist communities, and so on. In such violence, women are never spared, Indeed, men are usually more abled to defend themselves in such cross-fires, but women and children are usually very ill-equipped to engage in any meaningful self-defence efforts.

And the potential of technological innovation as a solution to these problems is considered remote due to lower stocks of human capital and therefore latent innovative capacity which ultimately produces an ingenuity gap between innovative and stagnant societies that exacerbates existing asymmetries of access. However, like most theories in Social Science research, neo-Malthusian scholars have had their own share of criticism. First, this theory is criticized on theoretical and empirical grounds. One such critic is Gleditsch who argues that the causal mechanisms are too elaborate, operating through multiple paths of causality and several layers of intervening variables and failed to account for differing levels of economic and political development on resource consumption and conflict-that is, highly developed economies and polities may experience lessened conflicts over natural resources, even though demand may increase and population explosion may be experienced. ⁶

Secondly, even if it were assumed that the conventional causal mechanisms are valid; neo-Malthusian analysis does not identify short-term causes that trigger the outbreak of conflict. It does predict conflict over access to resources, but the causal mechanisms are so complex, and the environmental changes so gradual, that identifying theoretical or empirical thresholds that trigger violence once crossed is difficult. Hauge and Ellingsen (1998) concluded that countries subject to environmental damage, including deforestation and land degradation, were more likely to experience internal and external conflict. However, their coding of these variables was subjective and based on somewhat arbitrary cut points for collapsing continuous variables into dichotomous variables, and all their

⁶ Gleditsch, N. P., Norda°,s, R., & Salehyan, I. (2007). *Climate change and conflict: The migration link*. International Peace Academy. Coping with Crisis Series. New York: International Peace Academy.

environmental measures were stationary. Moreover, a recent reanalysis by Theisen (2006) found that the study could not be replicated. Esty et al. (1998) found no relationship between environmental degradation and various types of state failure, including civil conflict. These shortcomings are so glaring to be ignored in a study that focuses majorly on women and how they have managed to adapt to the challenges brought upon them by global climate change, gender disparities and changing gender roles. This is why, this study finds it more appropriate to be rooted in Sandra Harding's model.

Sandra Harding's feminist standpoint epistemology will form the basis upon which this study will be based. This theory challenges the masses to see and understand the world through the eyes and experiences of oppressed women and apply the vision and knowledge of oppressed women to social activism and social change.⁷

Feminist standpoint epistemology requires the fusion of knowledge and practice. It is both a theory of knowledge building and a method of research—an approach to knowledge construction and a call for political activism. While many thousands of men's lives have been recognized and recorded for centuries and across cultures, women's life stories have been documented far less often at times even forgotten.

As Joyce Nielsen (1990) puts it, women's culture, history, and lives have remained “underground and invisible,” relegated to the “underside” of men's culture, history, and lives (p. 10).

Sandra Harding (Ed.).2004. *The feminist standpoint theory: Political and intellectual controversies*. Cambridge Press, New York.

Beginning in the late 1960s and 1970s, however, and as a result of feminist consciousness raising efforts both inside and outside of academia, women began to draw attention to the omission and exclusion of their voices and experiences in multiple arenas—politics; public policy; the professions of law, medicine, and social sciences.

In sociology classrooms, for example, female students began to express frustration with the fact that the predominantly male-centered theories and concepts they were learning about failed to take their own experiences as women into account. In the words of feminist sociologist Dorothy Smith (1987), the sociological theories and methods being taught did not apply to “what was happening” as the women “experienced it” (p. 86).

Women’s growing awareness of the contradiction between their own life experiences and the *research* studies and theoretical frameworks they were learning about—the failure of these studies and frameworks to accurately reflect their lives—inspired them to construct new models of knowledge building.

These new models, or “alternative ways of thinking,” would be developed by women for women, with the goal of granting authentic expression and representation to women’s lives. One such alternative model of knowledge building came to be known as feminist standpoint epistemology. Feminist standpoint epistemology requires us to place women at the center of the research process: Women’s concrete experiences provide the starting point from which to build knowledge.

Feminist standpoint scholars emphasize the need to begin with women's lives, as they themselves experience them, in order to achieve an accurate and authentic understanding of what life is like for women today. Building knowledge from women's actual, or concrete, life experiences is acutely important, feminist standpoint scholars argue, if we are to repair the historical trend of women's misrepresentation and exclusion from the dominant knowledge canons. And only by making women's concrete life experiences the primary source of our investigations can we succeed in constructing knowledge that accurately reflect and represent women. As feminist standpoint scholar Patricia Hill Collins (1990) puts it, when making knowledge claims about women, we must always remember that it is women's "concrete experience" that provides the ultimate "criterion for credibility" of these knowledge claims (p. 209). Women's concrete experiences consist of what women do. They are the wide and diverse range of activities that women engage in as part of their everyday lives. Just one aspect of women's lives, previously understudied and undervalued, that feminist researchers continue to shed light on is the myriad nurturing tasks that many women perform on a daily basis. These nurturing tasks, from cooking, cleaning, and taking care of their families (De Vault, 1991), to caring for the children of others (Collins, 1990), to caring for their own children from afar (Hondagneu-Sotelo & Avila, 1997), are examples of women's concrete experiences. Further, from each of these concrete experiences, women have cultivated particular knowledge and unique sets of skills.

Feminists question why one gender is dominant in most global issues. For instance in as much as women are the most affected by climate change, in the international conferences where issues related to climate change are discussed, very few women are in such panels. Most presidents, ministers of environment are men, yet climate change affects women more. Women are visible mostly in low-paying or non-remunerated occupations far from the halls of power. Reports show that 3/5 of the world's one billion poor are women and girls. Estimates suggest that 1/3 of all households worldwide are headed by women a fact frequently obscured by role expectations that derive from the notion that of male breadwinner and female housewives.

Post-modern feminists argue that when women are empowered they will not just be victims but powerful agents of change. Women should thus be empowered by being given access to credit, family planning and a right to education to increase their chances of getting better jobs in the future. Women who are empowered are in a better position to tackle the effects of climate change. Even when women do enter the workforce, they continue to suffer from double burden, meaning in addition to their paid work, they carry most of the responsibility of household labour. The gendered definition of labour also affects women in agriculture. While women do undertake cash crop production, frequently they work as unpaid family labour in small units and in such scenarios men are more likely to gain access to money, new skills and technology.

This study, given the fact that its core interest is to find out the impact of climate change on women and women's adaptation strategies, the theory on which it shall be pegged on is Sandra Harding's feminist theory.

1.8. Hypotheses

- i. Climate change has an influence on Kenya's women and gender roles.
- ii. Climate change has no influence on Kenya's women and gender roles.
- iii. There is no relationship between climate change and change in gender roles among Kenya's women.

1.9. Literature Review

1.9.1 Global Environmental Change and Resource-Based Conflicts in Africa

The study of international security is expanding to include threats from a changing global environment. The Independent Commission on Human Security identifies three sources of threats: consumption of fossil fuels and increased pollution in urban environments; land degradation due to overuse, erosion, and desertification; and the buildup of greenhouse gases that "threaten widespread climate change" (Commission on Human Security, 2003, 17). The causal link between climate change and threats to security, however, is not specified. Armed conflicts within and among nations have no doubt had disastrous humanitarian and economic consequences throughout the world. But perhaps there is no region in the world that has known the real consequences of armed conflict as the horn of Africa, and in Africa in general. In most parts of this continent, armed conflicts have been a norm for the last five or so decades, since the end colonial period.

Indeed, almost all countries in Africa have witnessed some form of violence with women and children being the most vulnerable victims. More than two thirds of the countries in Sub-Saharan Africa have experienced civil conflict since 1960. However, recent times have seen the decrease in the number of coup d' tats or armed struggle for power. But this notwithstanding, a new form of violence has cropped up- resource based conflicts.

Indeed, of recent times, understanding the causes and consequences of conflicts in Sub-Saharan Africa has become the major focus of Social Science research, with most empirical work highlighting the role of economic fluctuations in shaping conflict risk, possible declines in global food production as a result of global climate change and significant sea level rise. Such findings have encouraged claims that climate change will worsen instability in already volatile regions.⁹ Most existing studies linking climate change and conflicts in Africa however, have mainly focused on the role of precipitation in explaining conflicts in Sub-Saharan Africa. Given that most African countries remain highly dependent on rain-fed agriculture for both employment and economic production, with Agriculture accounting for more than 50% GDP and up to 90% of employment across much of the continent, this focus on precipitation is understandable and one that is most certainly on the right path to establishing the correlation between armed conflicts in Africa and climate change.¹⁰ This argument put forward by Hendrix and Glaser, is closely supported by Cullen and Glaser who argue that the discourse relating climate change to conflicts in Sub-Saharan Africa focuses on long term trends in temperature and

⁸ Miguel E, Satyanath S, Sergenti E (2004). *Economic Shocks and Civil Conflict: An Instrumental Variables Approach*. *Journal of political Economics* 112.pg.746.

⁹ Marshall Burke, et al (2009). *Warming increases the risk of Civil War in Africa*. *National Academy of Sciences*, New York.pg.49

¹⁰ Hendrix CS, Glaser SM (2007) *Trends and triggers: Climate, climate change and civil conflict in sub-Saharan Africa*. *Political Geography* 26:695-715.

precipitation that define ecosystems and their subsequent impact on access to renewable resources. The two observe that both long term and short term climatic triggers have significant impacts on civil wars in Sub-Saharan Africa. They point out that climates more suitable for Eurasian agriculture are less associated with likelihood of conflicts, while fresh water resources per capita are positively associated with the likelihood of conflict. Moreover, positive changes in rainfall are associated with a decreased likelihood of conflicts in the following year.¹¹

As natural resources such as fresh water and arable land increasingly deteriorate due to overexploitation and global warming, it is argued that rising human populations will be forced to migrate internally or cross borders and indeed, distributional conflicts will arise as populations compete for pieces of an ever-dwindling pie.¹² Increasing climate variability, as pointed earlier in this study may lead to conflict. The environmental consequences of greater variability are declines in system predictability and stability, and perhaps an increase in extreme events such as tropical storms, all of which may affect access to resources. Because the effects of resource scarcity are mediated by existing asymmetries of access and wealth, these effects are especially threatening to Sub-Saharan Africa, the population of which is primarily rural, poor, and dependent on forests for fuel and rain-fed subsistence agriculture.

According to Gleditsch (2008), a liberal peace seems to be in the making with a decreasing number of armed conflicts and lower severity of war measured by battle-

¹¹ Hendrix Cullen and Sarah Glaser. *Trends and Triggers: Climate, climate change and civil conflict in Sub-Saharan Africa*. Department of Political Science and Center for the Study of Civil War, International Peace Research Institute, Oslo, Norway. *Journal of International Peace* (26).2007.pg 702.

¹² Ibid.709.

related deaths. Indeed, the globe is increasingly witnessing long term decline in violence, within, as well as between states. At the same time, there has been a strong increase in democracy, trade, international economic integrations, and memberships in international organizations, as well as in international peacekeeping and mediation efforts. However, financial crises, globalization, population growth, and fundamentalist ideology are still widely seen as severe obstacles on the continuing road towards a less violent world. But the greatest challenge to the global liberal peace, and to a national security at the national level, is the threat of climate change.¹³

1.9.1.1 Precipitation and Temperature

The neo- Malthusian model of conflict argues that climate change results in a reduction of essential resources for livelihood such as food, water and natural pasture. And usually, those affected by the decline in these natural resources may soon start fighting over the remaining resources. Alternatively, people may be forced to leave the area and create new scarcities when they encroach on the territory of other people who may be also resource-constrained. This scenario is usually more common in those countries in which, a majority of the population is still dependent on agriculture as a main source of income and food. Kenya being one of such countries that depend so heavily on primary sector, and Machakos county being one of the counties dependent so much on peasant farming, it is likely that such scenario, as so predicted by the Malthusian theory would occur. Machakos county has to a larger extent experienced almost all the signs and symptoms that could be associated to climate change and attached to the neo-Malthusian model: the

¹³ Magnus Ole Theisen and Gleditsch Peter. 2013..*Is climate change a driver of armed conflict?**Journal of Climate Change*. pg.614

county has experienced significant reduction in the amount of rainfall received, higher temperatures that together cause drought, and reduced access to natural resources that sustain livelihoods with poverty more common and widespread among the people living in this county. This study proposes however, that in all these women have been the most affected.

A long line of research links hot temperatures to individual aggression, including violent crime and riots. Psychologists for example, have long associated relative deprivation or opportunity cost and scarcity to be associated with more violence and crime. Miguel (2005) concludes that both positive and negative extremes in rainfall increased the frequency of witch killings in a rural Tanzanian district. Using a field experiment from semi-arid Tanzania, Lecoutere et al. (2010) find water scarcity to drive conflictive behaviour, particularly so for poor and marginalized households. Environmental degradation is considered to be an important cause of political crises as it contributes to livelihood insecurity and fuels conflict and civil war.¹⁴

1.9.1.2. Natural Disasters

Global warming is predicted to increase the frequency and intensity of natural disasters. Natural disasters such as drought, floods and so on lead to declined economy and at times, forced migration and displacements. Indeed, decline in natural resources has become not only a problem to the Kenyan citizens at large but even to the government. Several conflicts have emerged in many parts of this country over resources, notably,

¹⁴ Ibnouf O. Fatma. 'Challenges and Possibilities for achieving household food security in the Western Sudan region: the role of female farmers.' *A journal of food security in the Africa Horn*.2011(3).

water and natural pasture. Machakos County, being a relatively arid county has over the years experienced prominent water shortage. How this has impacted on the residents, women more so and how they have managed to deal with this problem is the major question.

1.9.2 Impacts of Drought and Urbanization

One of the key goal of Kenya government, although not formally spelt out, but very much in line with Kenya's vision over the next 20 years, also dubbed *Vision 2030*, is to reduce hunger and achieve food security as a broad goal of development policy. Thus, declining rainfall and drought have major impacts on both the natural resource base and human systems, making it difficult to maintain livelihoods. In Machakos County, the rate of urbanization has increased in recent times, with most people working in Nairobi opting to purchase land in the county. This has had another negative impact on women and gender roles. As more and more middle-class people working in Nairobi, choose to live in Machakos County due to congestion around the city, more young people are moving out of the villages to seek alternative sources of income in the growing urban areas, such as Syokimau, Athi River, Mlolongo, and so on. Most of these urban migrants are men, leaving women behind to take full charge of providing for their families.

Eastern Kenya, which Machakos County is a part, is subject to two challenges of environmental crises: the area is known to be the region most adversely affected by recurrent droughts, desertification and other environmental hazards. It is also vulnerable to climate change and is expected to experience increased intensity of heat, waves,

drought and occasionally floods which have significant implications for soil productivity, water supply, food security and general human health and welfare.

Women are the most likely to suffer from climate change, but they are also the most capable of creating change and adaptation within their communities. Results of many past studies have clearly shown that women play a major role in producing and providing food for their households in these high-risk climate, and even conflict areas of Sub-Saharan Africa and Machakos County is not an exception. Women are in most cases, single-handedly responsible for food preparation, processing, and food preservation and are wholly responsible for attending to household garden plots.¹⁵ They therefore contribute more to household food security than men, although this contribution is hardly recognized in official statistics. By mere fact that women are the major contributors of household food security, yet still the caretakers of their families, and increasingly becoming heads of families, women stand a better chance of influencing adaptation strategies to climate change and focusing on them would give the government the real picture on how best to formulate policies that would mitigate the impacts of climate change.

Women's lifestyle has so much been affected by change in climate all over the world, changing gender roles, poverty and above all, gender discrimination. All these have made women more vulnerable than before. Climate change has particularly left the poor

¹⁵ Ibnouf.F.O. Challenges and possibilities for achieving household food security in the Western Sudan region: The role of female farmers. Development Studies and Research Institute (DSRI), University of Khartoum Press, Sudan. 2012

women, even poorer, as achieving household food security has become harder than before.

1.10 Research Design and Methodology

In this section, the researcher will discuss the design of the study in gathering the information, study population, sampling design, data collection instruments, reliability and validity of data and data analysis.

1.10.1 Research Design

The study will be carried out at the villages in Machakos County and at the headquarters of this County, which is Machakos town..

1.10.2 Target Population

The target population of this study will be those living in Machakos County. About 200 respondents are targeted. The researcher also targets some county legislators and other officials of the county government.

Table 1.1: Target Population

Population Category	Population frequency	Percentage (%)
Machakos Town	30	15
Kathonzyoni Village.	40	20
Mlolongo Urban center	30	15
Kathiani Village	50	25
County Government officials	50	25
Total	200	100

Source: Author (2012)

1.10.3 Sample Design and Data Collection

The primary method in this study will be quantitative survey. Questions will be delivered verbally due to the widespread prevalence of illiteracy in the study area. A random stratified sampling method will be used to draw a representative sample from each perceived by the researcher to be representative of the diversity required in the study.

The researcher intends to obtain the list of the villages and possibly village inhabitants from the County records offices. The researcher will then disaggregate the lists by gender into male and female subgroups and a random sample selected from each group according to the total number of the inhabitants in the selected village. The researcher will then pick randomly the name of the participant from the list. In case of non-availability or non-willingness of the person selected to participate in the survey, the researcher shall again randomly replace the person with another one from the same list.

A sample will then be chosen from each of the village to participate in a focus group discussion. The researcher intends to use about thirty focus group discussions for the verbal interviews (two in each village-one for men and another for women) within the study area. Focus group discussions only require people to participate who are willing to give views voluntarily (Bryman:2001). Therefore, members of these groups should feel comfortable even as they give out information for the purposes of this study. The number of people who will be selected to participate in the focus groups may vary from four to eight, depending on the village population sizes. The researcher will use tape- recorders to record the discussions, some in English while others in the native Kamba language, which will later be translated to English.

The other tool for primary data collection will be the questionnaire which will have both open and closed-ended questions. Respondents to the questionnaires will be the target population. The questionnaire will be structured in three parts as follows: Part A: General information; Part B: focused on objectives which are to establish how climate change affect women and Part C will focus finding out the adaptation strategies employed by women in their response to climate change. Drop- and- pick- later method will be used to administer the questionnaire since it is deemed cheaper and convenient, especially for those top county government officials who may find it hard to afford time to sit down with the researcher. The researcher will also be present physically to clarify any issues that the respondents, especially those of low level of education may encounter.

Therefore, although verbal interviews backed by focus groups will be the primary source of data, questionnaires will play an important role in supplementing these data, especially among those living in urban areas where literacy level important to this study has been achieved by the residents. In addition, the researcher shall enlist the use of secondary data such as journals, books by different authors, and other relevant literature for the purposes of comparison so as to get the most accurate data possible.

1.10.4 Data Analysis and Presentation

After the field work and before analysis, checking for reliability and verification of all the questionnaires will be done. This will be coupled with translation of all the verbal information collected in native Kamba language; the data will then be analyzed using descriptive statistics using tables, charts and percentages. In addition, quantitative data also contributed significantly to the drawing of conclusions and inferences.

1.11. Chapter Review

Chapter I

Chapter one defines the Problem, the Research Questions, the Dependent Variables, the Thesis, and Hypothesis and the Methodology. This chapter introduces our research study first by setting the broad context of our research study. It gives the statement of the problem, justification of the study, theoretical framework, literature review, hypotheses plus the methodology of study.

Literature Review on the effects on climate change on women.

Chapter II

In this chapter, we shall look at climate change in-depth and look at the various talks aimed at mitigating the effects of climate change. This chapter shall also discuss the effects of climate change, not only to women in Kenya, but to women across Sub-Saharan Africa.

Chapter III

This chapter will look at the adaptation strategies employed by women in countering the effects of climate change on them and changing gender roles.

Chapter IV

This chapter will analyse the data collected in the light of the hypotheses and theoretical frameworks already stated.

Chapter IV

Shall provide the conclusions of the study, recommendations and suggestions on areas for further study.

CHAPTER TWO

Sub-Saharan Africa and Global Warming

2.1 Introduction

This Chapter presents an in depth discussion and analysis of the various global climate talks, the role of Sub-Saharan Africa in these talks and the impacts of these talks on the Sub-Saharan Africa.

2.2 Sub Saharan Africa and Climate Talks

The Sub-Saharan Africa region has been ranked among the most vulnerable regions in the world, to the impacts of climate change. Among the projected impacts of climate change on Sub-Saharan Africa include intensity of heat waves, droughts, floods and changes to growing seasons which in turn have significant implications for soil productivity, water supply, food security, biological diversity and general human health and welfare.¹⁶ Several studies carried out by different scholars in the Sub-Saharan Africa point out to a more specific but clearly severer and multidimensional nature of the projected impacts on the region. Greco et al. (1994), projects that there would be less water in most of the large rivers in the Sahel over the next 30-60 years with significant implications on water availability. Watson (2000) projects a decrease in overall agricultural productivity of up to 30% in the region during the next century. Similarly, SSA's coastal zone is under threat from climate change. Particularly, the coastal nations of West and Central Africa, such as Nigeria, Senegal and Angola, with low lying lagoon coasts and high susceptibility

¹⁶ Magadza, C.H.D.: 1996, 'Climate change: Some likely multiple impacts on Southern Africa', in T.E. Downing (ed.), *Climate Change and World Food Security*, Dordrecht, Springer-Verlag, pp. 449

to erosion are threatened by sea level rise (IPCC 1996). Also expected to be affected by the change in climate is the distribution and prevalence of pests and disease-carrying vectors, with adverse implications for health and spread of diseases .Increased cholera infections, meningitis and malaria epidemic are among the concerns raised by this attribute of climate change to SSA.¹⁷

The nature of these impacts of climate change on the sub-Saharan Africa is such that they will entail not only significantly have economic impacts on SSA but also significant social impacts. Some of the social impacts may include conflicts over resources, increased rural-urban migration of men, leaving behind women to carry more burden of raising families single-handedly, deaths and increased number of orphans, and so on. The potential economic cost of climate change to SSA is further exacerbated by the predominant dependence of the region's economy on primary commodities which are highly susceptible to climate variability. Agriculture accounts for 33% of SSA's GDP, 66% of its labour force, and 40% of its exports.¹⁸ UNCTAD (1999) report has it that in 14 SSA countries, more than 80% of the total labour force is still in Agriculture. This suggests that changes in climate could seriously destabilize the basis of these economies and intensify the process of impoverishment. Droughts and severe water scarcity, for example, will limit cash crop production and in severe circumstances may make the emergent climate less suitable for the production of the traditional cash or food crop.

¹⁷ Birmingham, M.E., Deming, M.S., Hersh, B.S., Lee, L.A., Ndayimirije, N., Nkurikiye, S. and Wells, J.G.: 1997, 'Epidemic cholera in Burundi: Patterns in the Great Rift Valley Lake Region', *Lancet* 349(9057), 984

¹⁸ World Bank: 1989, *Sub-Saharan Africa: From crisis to Sustainable Growth*, Washington DC., World Bank.

Studies by Parry et al.(1999) suggest that climate change-induced reductions in yield and decrease in production could put between 55-70+ million extra people in Africa at risk of hunger and abject poverty by the 2080s. These figures, although, seems to be just a rough estimate, they still provide an indication of the magnitude of climate change impacts to which SSA nations are susceptible.

Also, an important point to note here, is that several of these impacts will not come as isolated events, rather they tend to have a reinforcing effect on each other as well as contribute towards intensifying the cycle of poverty and destitution in the region. For instance, droughts in SSA often translate to famine, which leads to acceleration of urban drift to cities which are not equipped to absorb such migrations, and this in turn could result in low sanitation in urban areas and a general breakdown of infrastructure (IPCC 2001). Similarly, droughts threaten energy security due to its capacity to disrupt energy supplies from hydropower systems. This in turn will have ripple effects on the social and economic development fabric of the society. The nature of the forward and backward linkages among the different categories of impacts and human systems further validate the interwoven linkages between the environment and the human society and calls for a holistic approach to designing adequate response to climate change.

2.3 The Global Environmental Talks and Their Outcomes

In June 1992, the United Nations Framework Convention on Climate Change (UNFCCC), was negotiated as an international treaty at the United Nations conference on Environment and development (UNCED), informally known as the earth Summit. This

summit was held in Rio de Janeiro. The objective of this summit was to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. This treaty sparked off a series of climate talks, aimed at mitigating the effects of climate change. However, the major global conferences that have shaped the global environmental politics can be classified into three key global conferences: Stockholm 1972, Rio de Janeiro 1992, and Johannesburg 2002.¹⁹ The pre-Stockholm era was characterised by a politics of contestation by the south. However, the Stockholm to Rio period was a period of reluctant participation as a new global compact emerged around the notion of sustainable development; and the post-Rio years have seen the emergence of more meaningful, but still hesitant engagement by the developing countries in the global environmental project but very much around the promise and potential of actualizing sustainable development.²⁰

The group of the developing countries, otherwise referred to as the global south, as stated earlier did not start off the environmental talks as a force to reckon with, neither were they enthusiastic about these talks. Perhaps, because of their small economies, they thought they had rather an insignificant role to play in global environmental talks that emerged over the last half century. Although they are still rather sceptical about the global environmental enterprise, they have come a long way from being the vigorous contestants that they were three decades ago. This transformation – although slow, halting, reluctant, and still incomplete – has been a fascinating evolution which has not

¹⁹ Najam, A. (2004a), *The View from the South: Developing Countries in Global Environmental Politics*, in R. Axelrod, D. L. Downie, and N. J. Vig, eds., *The Global Environment: Institutions, Law and Policy* (pp. 228). Washington, DC: Congressional Quarterly Press.

²⁰ *Ibid.* 235

only changed the views of developing countries but has also transformed the shape of the global environmental discourse, most significantly by turning what used to be global environmental politics into what is now the global politics of sustainable development.

2.3.1. The Global South in Global Environmental Talks

Global environmental debates are very much a subject of North-South politics. Most developing countries continue to operate, at least in part, under the collective banner of the global South in international environmental negotiations. The insistent choice to use the term “South” is more than a matter of semantics and reflects a central aspect of their collective identity and their desire to negotiate as a collective.²¹ Of course, on several occasions, the individual developing countries- particularly the larger and more powerful ones- retain ,and aggressively pursue their own national interests, either, collectively as “the global south” banner, or separately. This does not in any way, make insignificant, and the fact that these countries usually approach global talks collectively. Therefore, this paper shall look at the global south as a collective bargaining tool when it comes to climate talks. Besides, the more dominant presence of developing countries in global environmental politics has come through the collective voice of the South, articulated through the Group of 77 (G77).

Indeed, the last 10 years of global environmental diplomacy has only made the South, as a term as well as a negotiating tool, more visible and grow in prominence on the global politics. The reinvigoration that the South, especially the G77, seems to have enjoyed

²¹ Najam, A. (2003a), ‘The Collective South in Multinational Environmental Politics’, in S. Nagel, ed., (pp. 201). Lanham: Lexington Books.

during and since the 1992 Rio Summit, and the prominence gained by the South as a relatively cohesive negotiating collective took many by surprise. After all, the long-standing economic, political and geographic differences within the South could only be compounded by the environmental differences between them.²² In fact, at many turns during the 1992 Earth Summit, and in global negotiations since then, differences within the developing countries of the G77 have led to apparent fractures and frictions in the collective. For example, in the climate change negotiations the influential oil-producing members of the G77 have had a significantly different agenda than the G77 members of the Alliance of Small Island States (AOSIS) and other coastal nations that are frontline states for possible sea-level rise.²³ And In the negotiations on desertification the dispute between African and non-African members on the priority for Africa within the Convention nearly brought the G77 to a halt while Negotiations on the bio safety protocol within the biodiversity convention also saw the developing countries differing significantly based on their particular trade priorities.²⁴ Yet, in looking at the accumulated experience, these differences have been neither deep nor lasting. Indeed, they have been exceptions to an otherwise remarkable sense of collectivism. This is a weak unity, but a resilient collectivism. The surprise is not that developing countries had different priorities on specific issues. Rather it is that even when they chose to pursue their differentiated interests in global negotiations they nearly entirely did so within the framework of the

²² Murphy, C. (1984), *The Emergence of the NIEO Ideology* Boulder: Westview Press.pg.102.

²³ Miller, M. A. L. (1995), *The Third World in Global Environmental Politics* Boulder: Lynne Rienner.

²⁴ Cosbey, A. and S. Burgiel (2000), *The Cartagena Protocol on Biosafety: An Analysis of Results*, IISD Briefing Note, Winnipeg, Canada: International Institute for Sustainable Development

G77 collective. True to form, the collective has remained remarkably resilient in the face of conditions that should have predicated disintegration.²⁵

Institutionally, the South consists of two distinct organizations, the Non-Aligned Movement (NAM) and the Group of 77 (G77). The roles played by the two in furthering the Southern agenda have been distinct, but complimentary. According to Sauvart (1981: 5), “while the Non-Aligned Countries [have] played a key role in making the development issue a priority item of the international agenda, the Group of 77 has become the principal organ of the Third World through which the concrete actions are negotiated within the framework of the United Nations system.” In terms of actual negotiations in general, and environmental issues in particular, the G77 remains the collective voice of the developing countries in global environmental politics. To the extent that there is a meaningful collective voice of the developing countries as a group, it is articulated by the G77. The Group of 77 as been described by Julius Nyerere (1980: 7), former President of Tanzania, as the “trade union of the poor” and is functionally the negotiating arm of the developing countries. Although it emerged around the same time as NAM, G77 has its own distinctive origins and, unlike NAM, was born within – and primarily as a result of the changing composition of the United Nations in the 1960s. Starting as a temporary caucus of 77 developing countries, it has now grown into an ad hoc but quasi-permanent negotiating caucus of 134 members, plus China (which has, from the very beginning, had a special status as Associate Member, but which again plays an influential role in the collective bargaining. Annual Ministerial Meetings,

²⁵ Porter, G., J. W. Brown and P. S. Chasek (eds.) (2000). *Global Environmental Politics* (3rd ed.), Boulder; Westview Press.

convened at the beginning of the regular sessions of the UN General Assembly, serve as the major decision-making body. Special Ministerial Meetings are periodically called to focus on particular issues or to prepare for important global negotiations. G77 hubs have sprung up at New York, Geneva, Rome, Vienna, Paris, Nairobi, and Washington where various international organizations are based.²⁶ In addition, G77 caucuses are active in most international negotiations where they adopt joint bargaining positions and strategies, and the group's Chair serves as the spokesperson for the entire caucus. The G77 chairmanship rotates between its three regional sub-groups – Asia, Africa and Latin America – on an annual basis and the Chair's delegation serves as a de facto secretariat assisted by a very small secretariat staff at the UN headquarters in New York.²⁷

2.3.2. The Stockholm Conference

Stockholm, Sweden, hosted the 1972 United Nations Conference on the Human Environment (UNCHE). UNCHE was one of the first major global forums (outside of the UNCTAD – the United Nations Conference on Trade and Development) where the South consciously negotiated as a unified collective and adopted many of the very same substantive arguments and negotiation strategies which were soon to become the hallmark of its call for a New International Economic Order (Rowland 1973). Developing countries came to Stockholm quite reluctantly and after much cajoling by the conference secretary general, Maurice Strong. They questioned the need for such a conference and viewed it not just as a distraction but as a threat to their interests; indeed, at one point before Stockholm there was the real fear that the developing countries might decide not

²⁶ Sauvant, K. P. (1981), *The Group of 77: Evolution, Structure, Organization* New York: Oceana Publications.pg.44.

²⁷ *Ibid*.pg.49.

to show up for the conference (Kay and Skolnikoff 1972; Rowland 1973). Some developing countries distrusted Stockholm as an attempt to “ratify and even enhance existing unequal economic relations and technical dependence, miring them in poverty forever” (Hecht and Cockburn 1992: 849). Others argued that having created comfortable standards of living for themselves, the industrialized countries wanted to pull the ladder up behind them to slow planetary industrialization in order to replenish the spoiled ecosphere.²⁸ Exemplifying this mind-set was the famous statement from Ivory Coast, which announced that it would prefer more pollution problems [in comparison to poverty problems] in so far as they are evidence of industrialization.²⁹

To their own surprise, however, Stockholm provided the developing countries an unanticipated and unprecedented opportunity to craft and present a Southern position on global environmental issues. The position that the South adopted – that “poverty is the worst form of pollution” in the words of Indian Prime Minister Indira Gandhi – was not new, but the prominence it gained at Stockholm was.³⁰ Many in the developing world saw environmental concerns in the North as an effort to sabotage the South’s developmental aspirations; for most environmentalists at the time, development (especially industrialization) was the most important cause of environmental problems, while for developing countries this meant that a focus on the environment not only

²⁸ Rowland, W. (1973), *The Plot to Save the World* Toronto: Clarke, Irwin & Co.pg.47

²⁹ *Ibid.*50

³⁰ Susskind, L. E. (1994), *Environmental Diplomacy: Negotiating More Effective Global Agreements* New York: Oxford University Press.pg.121.

distracted attention from what they considered to be more important problems, it actually questioned the very means (i.e. development) of solving those problems.³¹

The Southern position at Stockholm – which was essentially a position of contestation, questioning the very legitimacy of the global environmental agenda as it was then conceived – not only had a deep impact on the 1972 Stockholm conference but has had a lasting impact on the global environmental discourses since then, including at Rio in 1992 and Johannesburg in 2002. Arguably, it was this position that triggered the subsequent discussions on what eventually became “sustainable development” and, therefore, the Southern contestations at Stockholm may well be one of the most meaningful legacies of that conference.³²

With the South still contesting the very idea of global environmental governance, it was not surprising that the developing countries were not particularly supportive of creating a new formal institution for global environmental governance. The United Nations Environmental Program (UNEP) was created as a result of the Stockholm conference of 1972 not because of, but despite, Southern support (Rowland 1973). However, once it became evident that it would be headquartered in a developing country (Kenya), the rest of the South rallied behind Kenya and UNEP not because they were supportive of environmental governance, but as an act of Southern solidarity (since UNEP would become the first and only UN agency headquartered in a developing country) and also in an attempt to “developmentalize” this fledgling United Nations organization (Agarwal,

³¹ Ibid.126

³² Rowland, W. (1973), *The Plot to Save the World* Toronto: Clarke, Irwin & Co.pg.102

Narain and Sharma 1999). In retrospect it has been argued that the decision to house UNEP in Kenya has not only allowed developing countries to exert influence on this organization but, in fact, it has also helped move developing countries from their politics of contestation towards greater participation in the global environmental agenda (Najam 2004b).

2.3.3. The Rio De Janeiro Conference

Twenty years down the road from Stockholm, the Southern position had not really changed in any significant way but the paradigm of the discourse on global environmental politics had begun to shift, most importantly with the advent of the language of “sustainable development” (Adede 1992). The fact that this was now the United Nations Conference on Environment and Development (UNCED) meant that the link between environment and development had been formally accepted in the very nomenclature of the conference, that the South’s contestation at Stockholm had paid off, and that the developing countries came to Rio relatively more willing to participate in the process of global environmental policymaking than they had at Stockholm. The job, however, was far from done and much of the South’s rhetoric in and around UNCED still mirrored the concerns it had been articulated at Stockholm.³³

With two decades of experience in global environmental policy behind them, a key concern for many Northern environmentalists was designing effective environmental institutions and instruments. For most in the South, however, the key concerns were still

³³ Najam, A. (2005), *Why Environmental Politics Looks Different from the South*, in Peter Dauvergne, ed., *Handbook of Global Environmental Politics?* (pp.114). Cheltenham, UK: Edward Elgar Press.

those that related to the legitimacy of these institutions and instruments. Thus, for example, as one follows the debates around the Global Environment Facility (GEF) or around the Framework Convention on Climate Change – both of which were negotiated at or around UNCED – one finds that the North’s primary concerns tended to be about whether these institutions and instruments would work and result in demonstrable improvements to the global environment, while the cardinal concerns of Southern governments, scholars and nongovernmental organizations (NGOs) tended to ask questions about the fairness and justice of the proposals, especially in terms of their focus on developmental aspects.³⁴

The case of the Commission on Sustainable Development (CSD), which came out of the Rio process is even more interesting because developing countries became proponents of this organization precisely because it had a development mandate and was seen as a means of addressing the legitimacy deficit in the global environmental governance system by creating a body that was specifically designed to highlight and monitor the implementation of the sustainable development agenda (Porter, Brown and Chasek 2000). The discussions that went into the structure of the Global Environment Facility (GEF) at the Rio Earth Summit shows a similar set of priorities by the developing countries who, on the one hand, were resisting the control of the World Bank over this Facility by raising concerns about the legitimacy of the governance structure of the World Bank and, on the other hand, were seeking a more expansive mandate for the GEF by wanting it to focus not only on narrower ecological concerns but also broader developmental priorities.

³⁴ Agarwal, A., S. Narain and A. Sharma (eds.) (1999), *Green Politics: Global Environmental Negotiations 1*, Centre for Science and Environment, New Delhi.pg.99

³⁵Yet, what was new and palpably different at Rio was that the developing countries had moved – hesitantly, but visibly – from the politics of contestation that had defined their positions at Stockholm to participation, even if hesitantly so. The price that the South sought for this participation was an assurance that the global environmental enterprise would itself become “legitimate” in the South’s eyes by internalizing the longstanding development concerns of the South.

2.3.4. The Johannesburg Conference

If the Rio Earth Summit marked the beginning of meaningful participation by the South in the global environmental governance enterprise, the post-Rio period has seen developing countries becoming ever more actively engaged in the environmental discourse (Miller 1995; Porter Brown and Chasek 2000).

The move from an earlier politics of contestation and then the politics of hesitant participation, to this new phase of active engagement has also meant that even though the questions of legitimacy still remain relevant for the South, the issues of effectiveness are now finally beginning to assume a more prominent role in the Southern discourse. This shift was quite evident at the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa where the focus (by the Summit’s mandate as well as by the South’s choice) was clearly on issues of implementation and, therefore, on effectiveness of that implementation. Even as Southern advocates acknowledged the advances that had been made in the global environmental discourse, their concern had now begun to shift towards the assessment that the focus on sustainable development in

³⁵ Ibid.103

the discourse, although welcomed, had not translated into demonstrated impact on the actions and outcomes on the ground (Wilson and Munnik 2003).

The net result of these dynamics is that protestations about the legitimacy of this enterprise have begun to recede and the pangs that come with engagement have become more apparent, including in terms of concerns about effectiveness. By the time Johannesburg came along, Southern voices were relatively less concerned about whether there is a need for global environmental governance (i.e., legitimacy concerns) and more preoccupied by whether developing countries would be able to meaningfully participate in this governance (i.e., effectiveness concerns).³⁶ Having fought hard to incorporate their concerns and developmental priorities into the documents and decisions coming out of Rio, the developing countries were beginning to get impatient with what they saw as a lack of implementation, particularly in the areas dearest to them (Wilson and Munnik 2003). Similarly, new concerns were getting voiced, for example, in the worries about the negotiation overload that had characterized the world of global environmental policy since the Rio Earth Summit. The proliferation of global environmental agreements, it has begun to be argued, is leading to a negotiation fatigue amongst all countries but particularly amongst developing countries because the limited and already stretched human resources available to these countries are further thinned by ever increasing demands of ever more complex and ever more demanding environmental negotiations (Miller, 1995),

³⁶ Rowland, W. (1973). *The Plot to Save the World*. Toronto: Clarke, Irwin & Co. 181.

The net result of all these dynamics was that the South came to Johannesburg quite eager to discuss how global environmental governance could be made more effective; hence their insistence on giving priority to implementation issues (Wilson and Munnik 2003). This, it should be emphasized yet again, was different from the attitude that the developing countries had demonstrated at either Stockholm or Rio, where they were mostly preoccupied with whether global environmental governance was needed and, if so, for what purpose. What is also important to note, however, is that in general the effectiveness concerns of the South remained qualitatively and substantively different from those from the North. Even to the extent that both have tended to agree that sustainable development is the ultimate goal of global environmental governance, those from the North tend to highlight the ecological aspects of this compact while those from the South tend to be far more concerned about the developmental aspects (Sachs et al.2002). Given that it has been the inclusion of this developmental dimension that has made the global environmental governance project legitimate in Southern eyes, it should not come as a surprise that developing countries at WSSD were focusing most vigorously on the implementation effectiveness of the developmental aspects of sustainable development (for example, issues related to development assistance, trade barriers, poverty, etc.) much more than the ecological aspects.

2.4. Adaptation to Climate Change

Though mitigation has enjoyed greater focus in international climate change research and policy (Burton et al. 2002), it is increasingly being recognized that adaptation has a major role to play in the overall climate change response strategy. Climate change

adaptation is defined as adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts (IPCC 2001). Thus adaptation measures constitute actions designed to adjust or cope to the consequences of climate change in order to decrease the vulnerability of peoples and ecosystems. It represents an important way to increase readiness and address the impacts of climate change.³⁷

Distinction has been made between reactive and anticipatory adaptation strategies. Reactive adaptation measures are those taken in response after climate has changed. Its main drawback is that it allows for the damaging effects of climate change before action is taken. Anticipatory adaptation on the other hand is taken in advance of climate change in order to forestall its impacts and reduce vulnerability.³⁸ The process of designing an effective anticipatory adaptation strategy is, however, obfuscated by the uncertainties surrounding the pace, pattern, extent and severity of climate change. For instance, the timing and the specific distribution of the change in climate is not known for certain (Mitchell and Hulme 1999). Doubts about the occurrence of any change in climate have even been expressed. Some see a few degrees' ambient temperature increase spread over a century as something which would hardly be noticed, perhaps even benefiting colder countries in the North (Schelling 1992).

³⁷ de Loe, R., Kreutzwiser, R. and Moraru, L.: 2001, 'Adaptation options for the near term: Climate change and the Canadian water sector', *Global Envir. Change* **11**, 231

³⁸ Fankhauser, S., Smith, J.B. and Tol, R.S.J.: 1999, 'Weathering climate change: Some simple rules to guide adaptation decisions', *Ecol. Econ.* **30**, 64-69.

Under this cloud of uncertainty, the question in the mind of policy makers when considering adaptation policy options could be ‘Why adopt a policy today to adapt to a climate change that may not occur, for which there is significant uncertainty about regional impacts, and for which benefits of the anticipatory measures may not accrue for decades?’³⁹

To SSA, and indeed many developing countries, early introduction of adaptation measures is of crucial importance. All available indicators suggest that SSA region will be one of the hardest hit regions in the event of any significant change in climate. The precautionary principle and common sense of preservation would thus suggest that they should be among the most prepared adaptation-wise. Additionally, some of the required adaptation measures to climate change may actually yield some development benefits that are not related to reduction in vulnerability. Energy efficiency and expansion of renewables, for instance, is one of the required adaptational measures in SSA in order to reduce the dependence on both hydroelectric power sources expected to be severely disrupted by climate change, and the soon to be phased out fossil fuels (Denton,2002).

The developmental benefit of this will be improvement in the energy outlook of the region, especially by virtue of the fact that energy savings via greater efficiency could enhance supply opportunities to none-served areas. In the same vein, switch to solar and wind-powered renewable energy will alleviate the epileptic nature of power supply experienced by hydroelectric power dependent economies in the region, who have increasingly suffered in the periods of dry season when river flows dry up. It may also be

³⁹ Sokona, Y. and Denton, F.: 2001, ‘Climate change impacts: Can Africa cope with the challenges?’, *Climate Policy* 1(1), 117

a more suitable and cheaper alternative for rural dwellers where grid extension is too costly. All of these considerations serve to strengthen the argument that adaptation is an attractive and cost-effective response to climate change for SSA.

Fankhauser et al. (1999), provides a framework for assessing the adaptational preparedness of an economy for climate change. According to their thesis, successful adaptation depends on three elements: timely recognition of the need to adapt, an incentive to adapt, and ability to adapt. The next three sections will be devoted to assessing the preparedness of SSA to adapt to climate change within the above analytical framework.

CHAPTER THREE

Data Analysis, Presentation and Interpretation

3.1 Introduction

This chapter presents a summary of the findings collected from the target audience. The data was obtained through the use of questionnaires which were the main tools for data collection used in the study. In addition, there was focus group discussion with a section of the sample population. The data was interpreted in light of research questions and objectives. The questionnaires were distributed to the target audience and the data provided information that formed the basis for discussions and the interpretation of the results.

3.1.1 Response Rate

The questionnaires were distributed to a total of 200 respondents. Out of 200 questionnaires distributed, the researcher managed to get back 51.5% (103) of the total questionnaires distributed whereas 48.5% (97) questionnaires were not returned by the respondents.

3.1.2. Data Analysis

SECTION A: BIODATA

From the below data, the total response rate from the questionnaires was 51.5%. The low response rate could be attributed to the fact that most respondents were illiterate or semi-literate. However, the researcher tried to explain certain things that were not clear to the respondents, thus the 51.5% response rate.

Grouped according to age, most respondents were those classified by the researcher as the older/ senior in age. The researcher classified the respondents' age according to three categories. The first category was the youth, believed to be between (18-32), then the middle aged (33-45) and finally the senior or old age (45 and above). What is interesting here however, is that the response rate among the old aged was the highest at 41 respondents. This was closely followed by the middle age at 39 and finally the youth at 23. Represented as a percentage of the total population of the respondents, the aged stood at 39.8%, followed by middle-age at 37.9% and finally the youth at 22.3%. The higher response among the old age could be explained by the fact that most middle-aged men have left the villages, and moved into nearby urban centers of Athi-River, Mlolongo, Kitengela, or even Nairobi City in search of formal employment, while the middle aged women are also on the go, trying to fend for their dependants. Therefore, most of the people who could be found at home were the old aged. In most of the homes, the old aged were left attending to the young babies while their mothers are out in the fields.

Table 1: Age of Respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YOUTH	23	22.3	22.3	22.3
MIDDLE AGED	39	37.9	37.9	60.2
OLDER	41	39.8	39.8	100.0
Total	103	100.0	100.0	

Figure 1: Age of Respondent

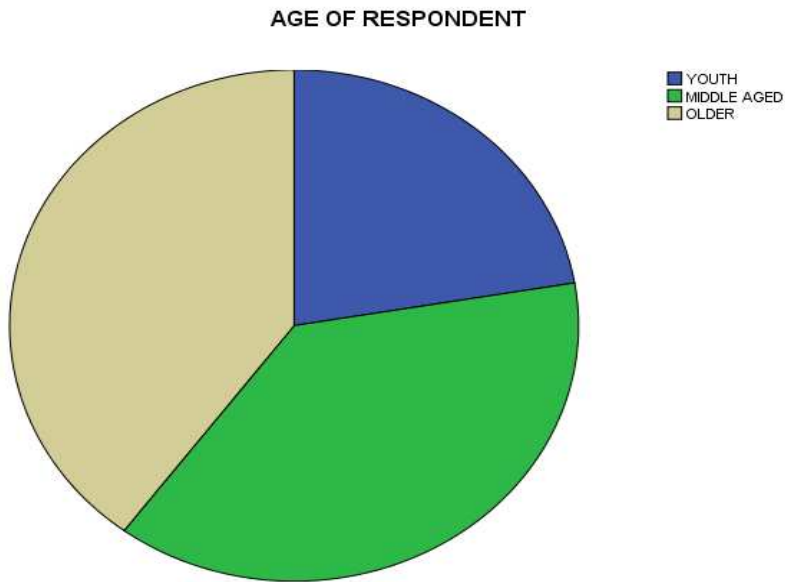
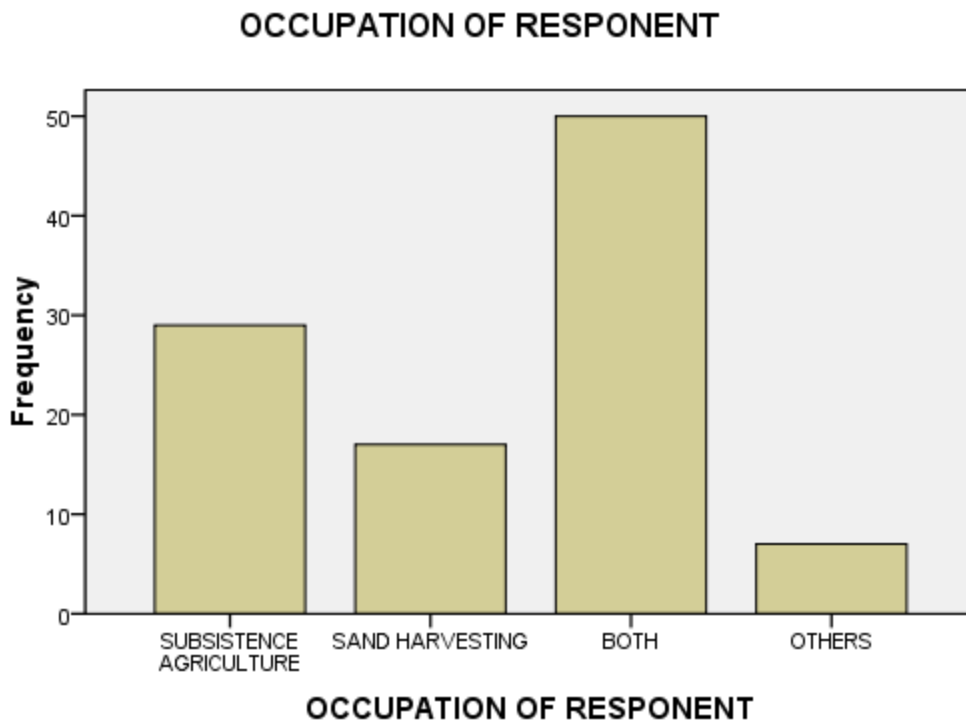


Table 2: Occupation of Respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid SUBSISTENCE				
AGRICULTURE	29	28.2	28.2	28.2
SAND HARVESTING	17	16.5	16.5	44.7
BOTH	50	48.5	48.5	93.2
OTHERS	7	6.8	6.8	100.0
Total	103	100.0	100.0	

Figure 2: Occupation of Respondent



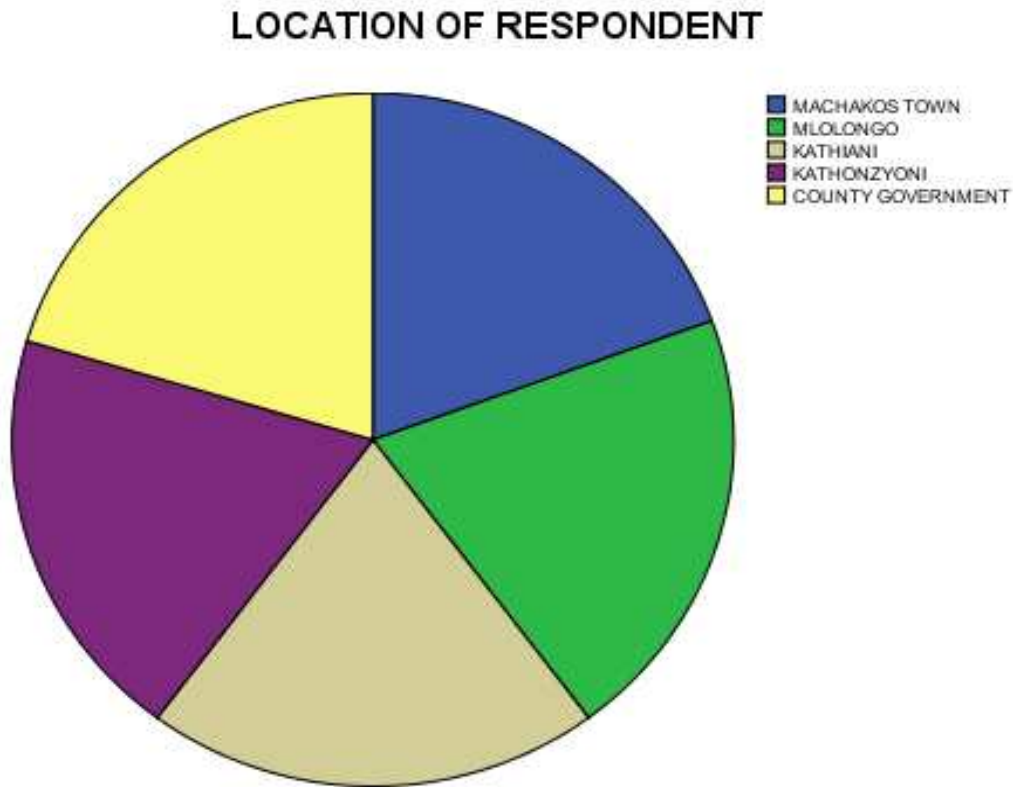
The researcher also classified the respondents according to their occasions. In this category, most respondents were both practicing subsistence agriculture, while at the same time, also engaging in sand harvesting to supplement the meagre income earned from Agriculture. This category stood at 50 respondents all the respondents. However, those practicing Agriculture alone stood at 29 out of the total number of respondents. Those practicing Sand harvesting alone as their main economic activity stood at 17, followed by those engaging in other activities, not so common in this area at 7%. Represented in percentage form, those practicing both subsistence agriculture and sand harvesting were rated at 48.5%, followed by those specializing in only subsistence agriculture at 28.2%, then those who somehow specialize in sand harvesting at 16.5%,

and finally other economic activities at 6.8%. This data is significant to the study, as it portrays the fact that most of the middle aged women in the area of study engage in more than one economic activity to make ends meet. And according to focus group discussion, most of these women engage in more than one economic activity mainly to supplement their meagre incomes and to enable them to support the huge number of dependants that they leave home, each day as they set out to work. This is clearly one of the adaptation mechanisms to reduced earnings from agriculture due to change in climate.

Table 3: Location of Respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid MACHAKOS TOWN	20	19.4	19.4	19.4
MLOLONGO	21	20.4	20.4	39.8
KATHIANI	21	20.4	20.4	60.2
KATHONZYONI	20	19.4	19.4	79.6
COUNTY	21	20.4	20.4	100.0
GOVERNMENT				
Total	103	100.0	100.0	

Figure 3: Location of Respondent

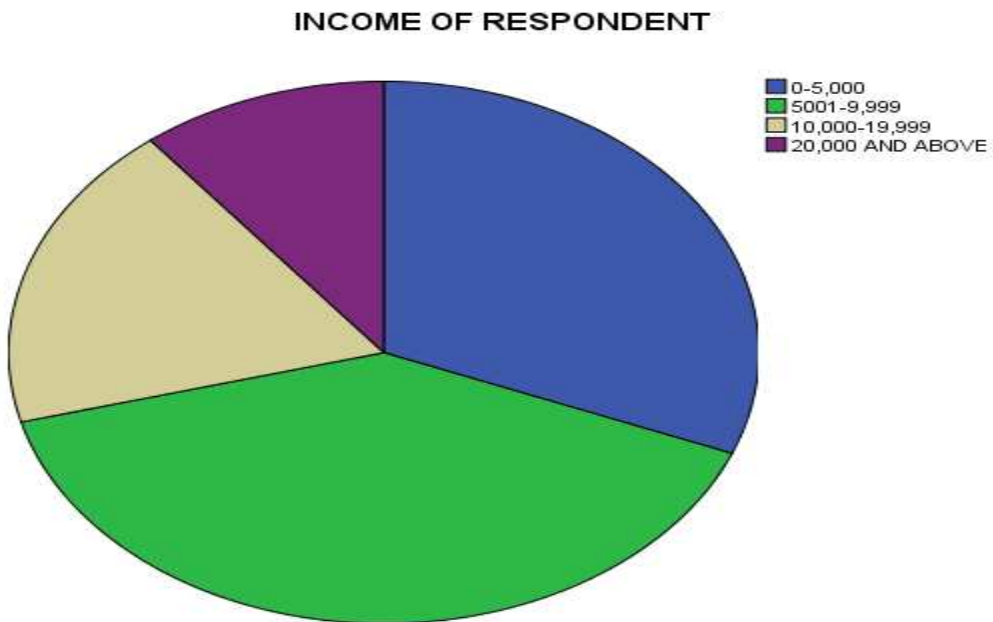


The third question sought to find out the exact location of the respondents. In this category, the response was fairly distributed, in fact almost equally distributed among the areas stratified by the researcher as his respondents' strata. Machakos town was represented by 19.4% of the total respondents, Mlolongo area 20.4%, Kathiani 20.4%, Kathonzyoni 19.4% and the Machakos County Government at 20.4%. This shows certain similarity, or consistency in behaviour among the people in this region.

Table 4: Monthly Income of Respondent (Kenya Shillings)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0-5,000	32	31.1	31.1	31.1
5001-9,999	41	39.8	39.8	70.9
10,000-19,999	19	18.4	18.4	89.3
20,000 AND ABOVE	11	10.7	10.7	100.0
Total	103	100.0	100.0	

Figure 4: Monthly Income of Respondent (Kenya Shillings)



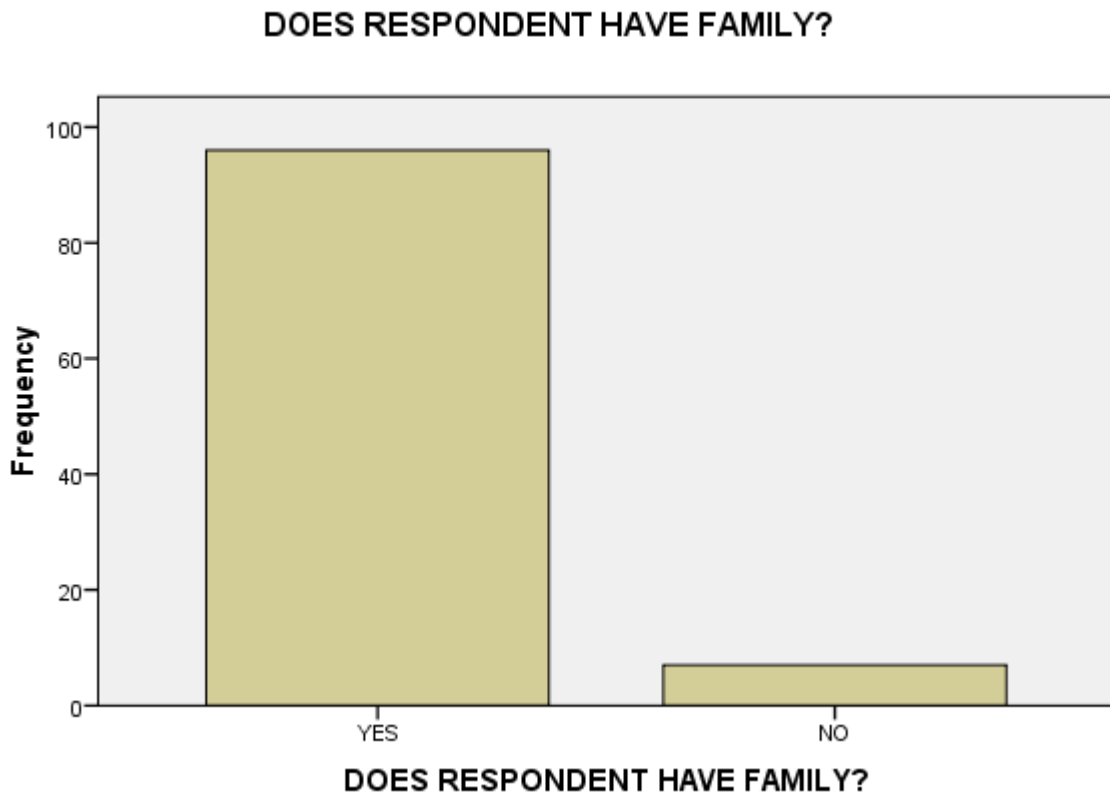
When grouped according to the level of income, the highest response rate was gotten from those with an income of between 5,001-9,999. Which can be interpreted to mean that most of those in this region, fall in between this category of income. This group seems to constitute the largest percentage of the population in this study area. Those with monthly earnings of between Kshs. 5,001 and 9,999 stood at 39.8%, followed by those with an average monthly earning of Kshs. 0.00-5,000 was at 31.1%, those with an average monthly earning of 10,000-19,999 stood at 18.4%, and finally, those with average monthly earnings of 20,000 and above stood at 10.7%.

The response rate in this category of the questionnaire portrays the average income of this area. It shows it is an area where most people's incomes range between Kshs. 0.00-9,999 per month. This in turn means high dependency ratio on those few that could be having a better income.

Table 5: Does Respondent have Family

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	96	93.2	93.2	93.2
NO	7	6.8	6.8	100.0
Total	103	100.0	100.0	

Figure 5: Does Respondent have Family



The researcher also wanted to find out the percentage of the respondents with families. This would give a bearing on the dependency level in this area, plus roughly, give a projection of how densely or sparsely populated the area is. Grouped according to how many respondents have families, a whopping 96 out of the total 103 respondents have families back at home. This translates into 93.2% in favour of those with families, and only 6.8% of the respondents do not have families yet. Indeed, this also shows another important bearing to the population factor. It could be interpreted to mean that early pregnancies are rampant in this area. Indeed, early pregnancies are associated with several other social disadvantages such as low literacy level, poverty, lack of awareness, and so on.

Table 6: Type of Family

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid SPOUSE AND KIDS	32	31.1	31.1	31.1
SINGLE PARENT	29	28.2	28.2	59.2
WITH KIDS BUT ABSENTEE SPOUSE	42	40.8	40.8	100.0
Total	103	100.0	100.0	

The respondents were also classified according to the type of families that they keep. The categories here were those families with spouse and kids, single parent with kids, spouse and kids but with an absentee spouse, and with no kids. Most absentee spouses referred to in this section were male counterparts. 29 out of the total respondents are basically women who take care of their families single-handedly. 32 are those living with their spouses and children, and admit to well being supported by their spouses to raise the families. 42, out of the total respondents are women living with their kids, struggling to raise them, either single-handedly or with very little support from their spouses who are not living with them. Absentee spouses here include the women whose husbands have died while other men have left home to search for better opportunities in urban centers and nearby towns like Athi River, Machakos, Mlolongo and so on. This information is also represented in the figure below.

Figure 6: Type of Family

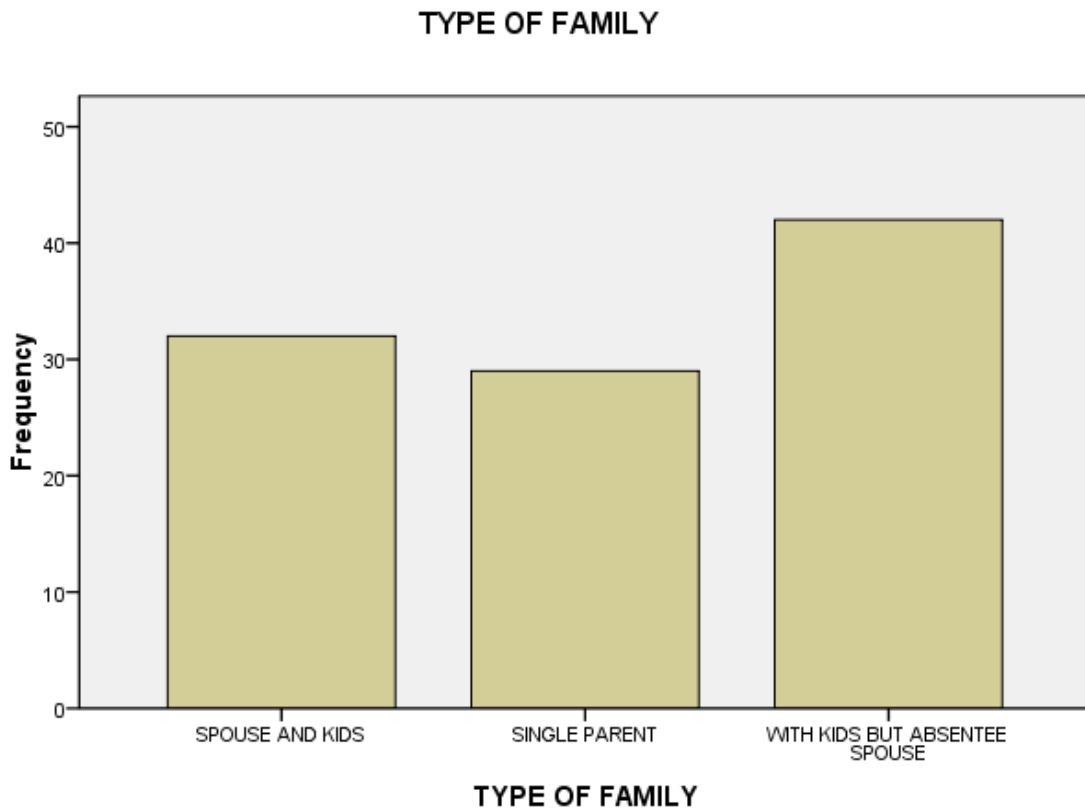
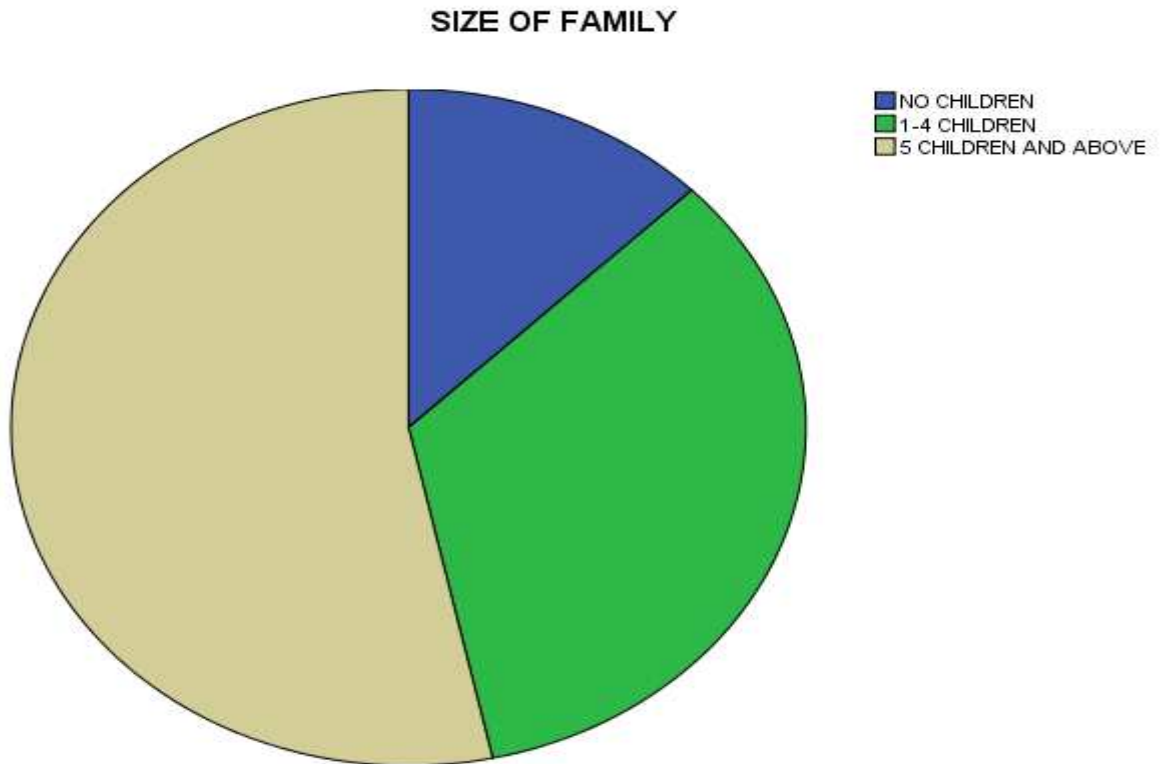


Table 7: Size of Family

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid NO CHILDREN	13	12.6	12.6	12.6
1-4 CHILDREN	35	34.0	34.0	46.6
5 CHILDREN AND ABOVE	55	53.4	53.4	100.0
Total	103	100.0	100.0	

Classified according to the number of children in these families, 53.4% say they have more than 5 children, 34.0% have between 1-4 children, while 12.6% have no children at all. This still has an important bearing on the population size of this area, and is also an important indicator that dependency ratio is quite high among those living in this study area. And being that most of the bread winners are middle aged women, it paints a picture on the kind of burden that these women have to shoulder. This data is further represented in the figure below.

Figure 7: Size of Family

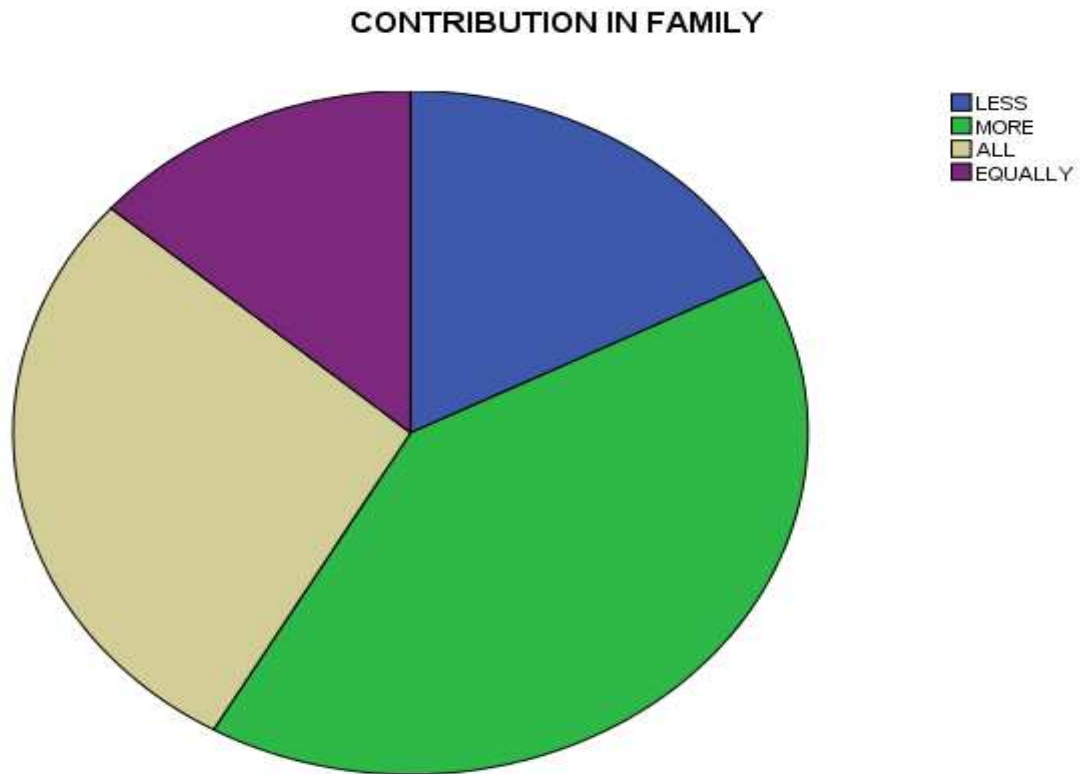


The study also sought to find out the level of financial contribution that respondents in this study make to their families, just in case they have other people supporting them in winning the daily bread in their families. 40.8% of the respondents say they contribute more in their families' well-being. 28.2% of the respondents say they are the sole bread winners in their families, and that their families entirely depend on them. However, 17.5% of the respondents say they contribute less to their families' well-being while 13.6% contribute equally to other sources and share the burden laid upon them by their dependants equally.

Table 8: Contribution in Family

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid LESS	18	17.5	17.5	17.5
MORE	42	40.8	40.8	58.3
ALL	29	28.2	28.2	86.4
EQUALLY	14	13.6	13.6	100.0
Total	103	100.0	100.0	

Figure 8: Contribution in Family



The study directly sought to find out the level of dependence in this area. Therefore, the respondents were asked if at all they have any other dependants apart from their immediate family members, also known as the nuclear family. A whopping 77 out of the total 103 respondents say they have other dependants to take care of, thus an extra mouth to feed. However, 26 say they don't have any external dependants. This could be translated to 74% in favour of those with external dependants and 25.2% can be said to be without any extra dependants.

Table 9: Support for Extended Family

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	77	74.8	74.8	74.8
NO	26	25.2	25.2	100.0
Total	103	100.0	100.0	

Figure 9: Support for Extended Family

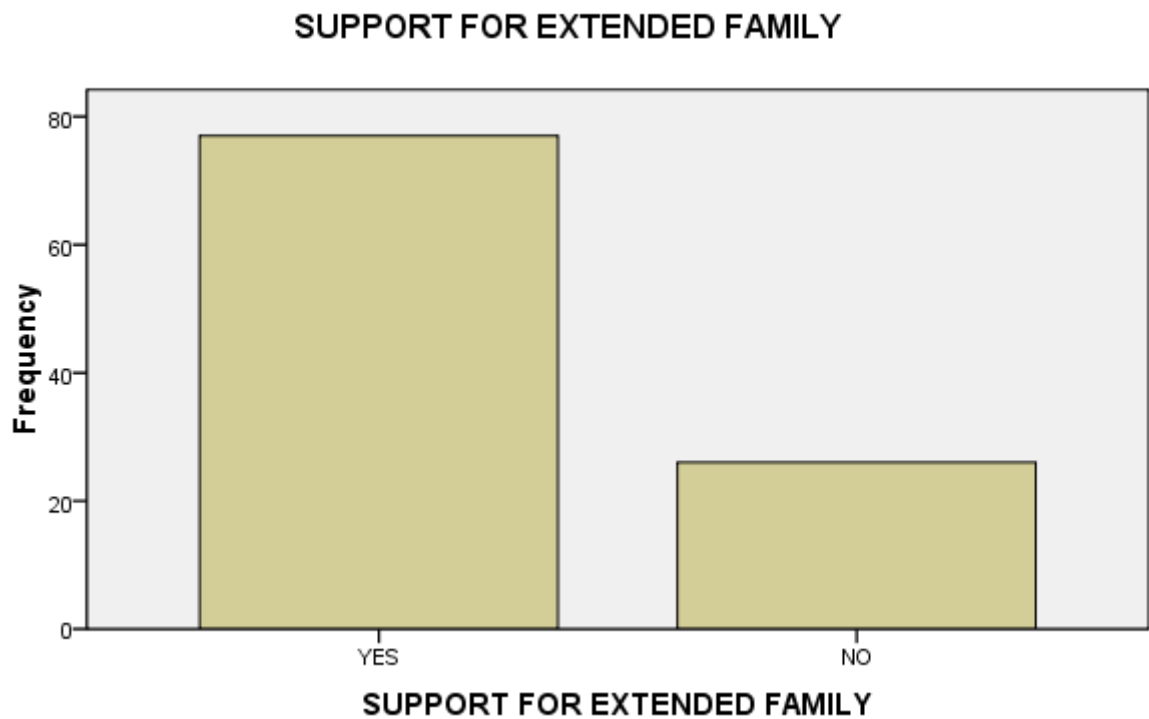
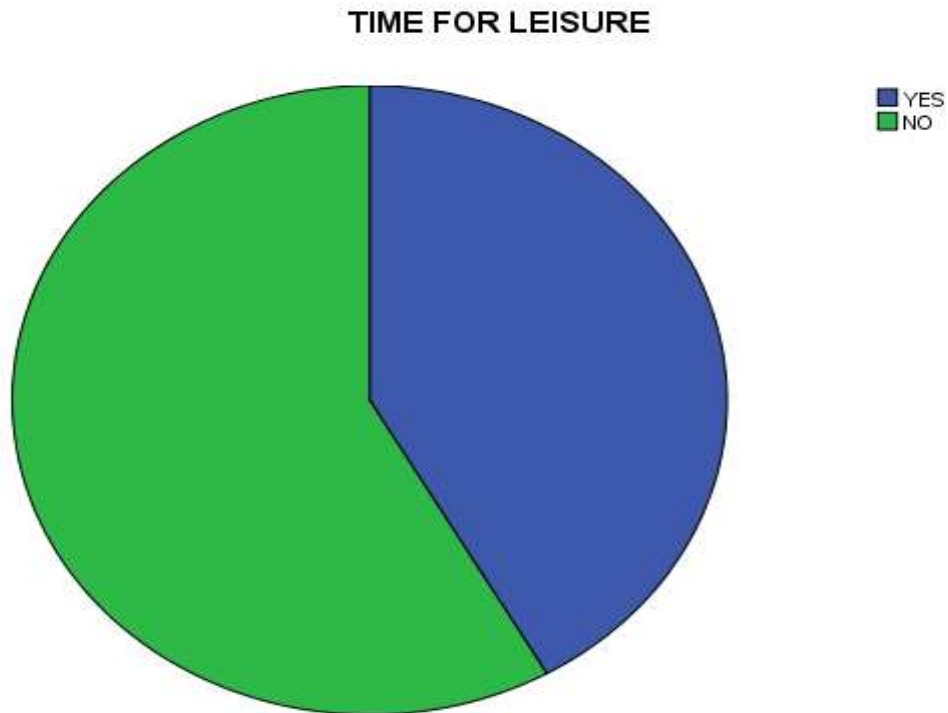


Table 10: Time for Leisure

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	43	41.7	41.7	41.7
NO	60	58.3	58.3	100.0
Total	103	100.0	100.0	

Figure 10: Time for Leisure



The researcher also sought to find out the number of respondents who consider themselves to be able to afford some time, which they can regard as leisure time. Leisure time here was defined by the researcher as that time that the respondent does not

engage in any activity aimed at generating income, and when the respondent can go and involve them in relaxing activities, such as spectator sports, e.g. football. 41.7% said they often afford some time to go out and relax, and not getting involved in any income-generating activity, while 58.3% said they have no time for leisure. This section of respondents which claimed they have no time for leisure, mentioned engagement in other “part-time” activities to supplement their meagre earnings and high dependency ratio, as the main reason as to why they did not have any leisure time.

Table 11: Involvement in Farming

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	79	76.7	76.7	76.7
NO	24	23.3	23.3	100.0
Total	103	100.0	100.0	

The study also sought to find out the type of side-activities that the respondents do on the side during their leisure time, apart from their usual economic activities. 79 of the total respondents engage in peasant farming, while 24 do not. This is translated to 76.7% and 23.3% respectively.

Figure 11: Involvement in Farming

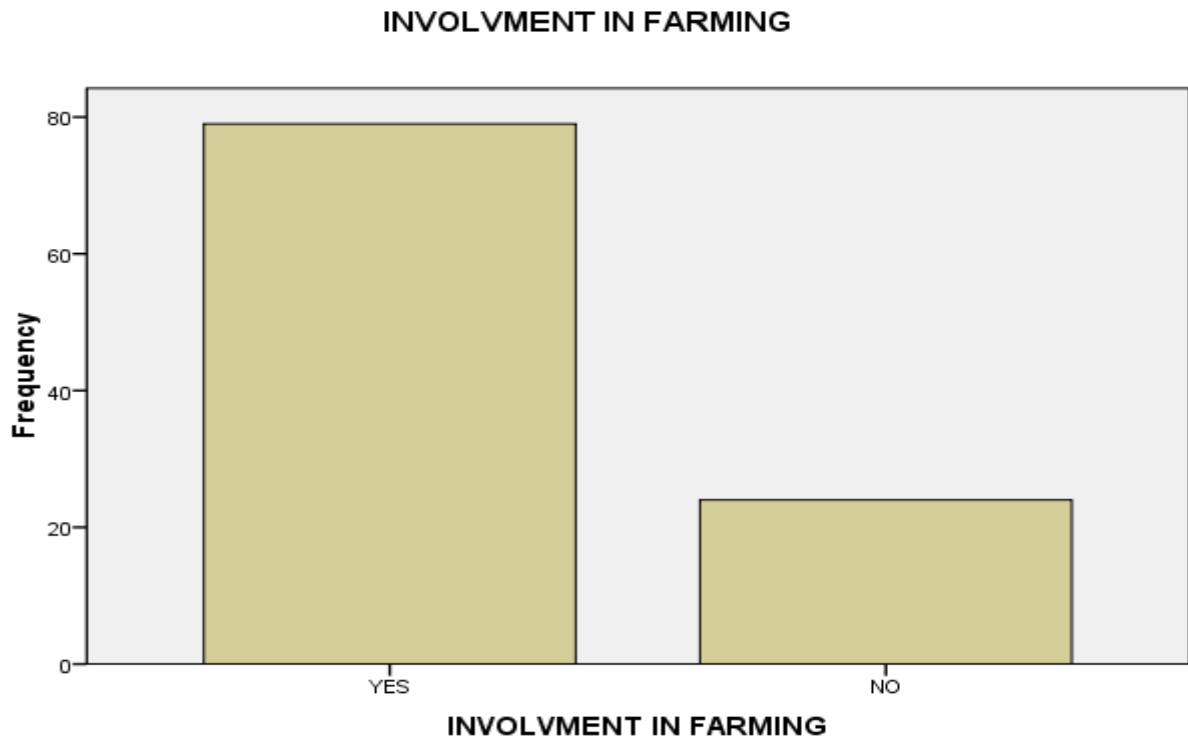


Table 12: Weekly Farming Time

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid LESS THAN 5 HRS	6	5.8	7.6	7.6
6-10 HRS	23	22.3	29.1	36.7
10 HRS AND ABOVE	50	48.5	63.3	100.0
Total	79	76.7	100.0	
Missing System	24	23.3		
Total	103	100.0		

Figure 12: Weekly Farming Time

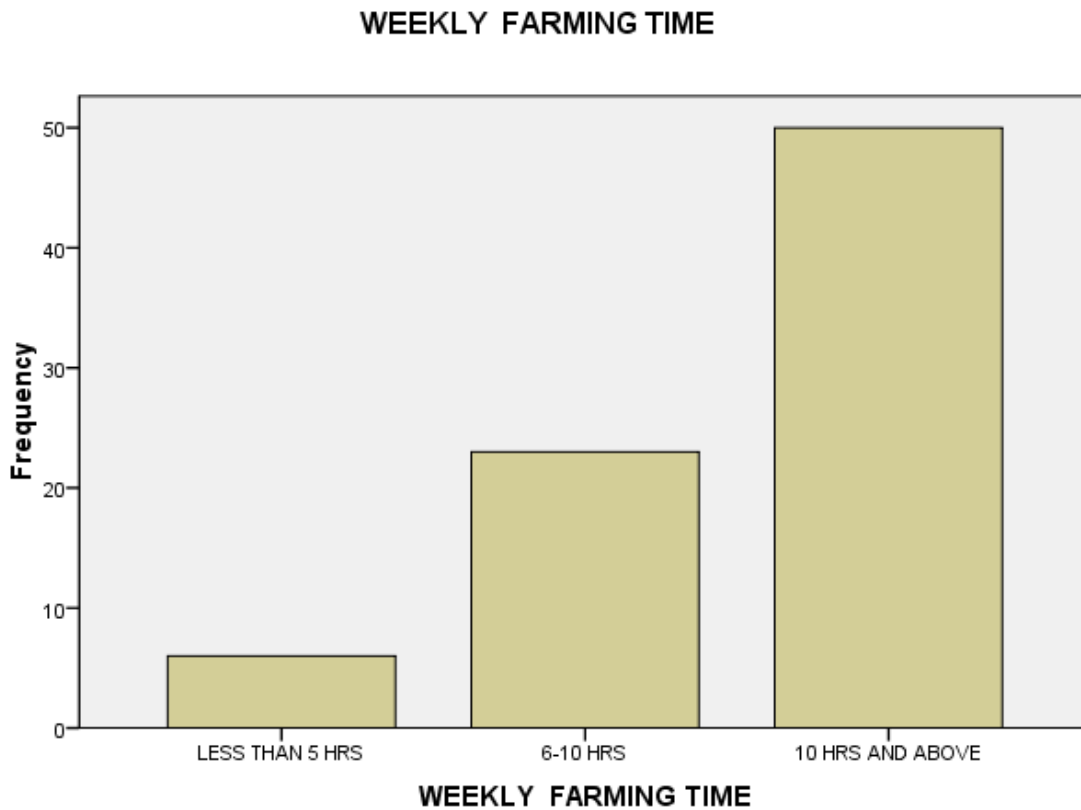


Table 13: Fetching Water

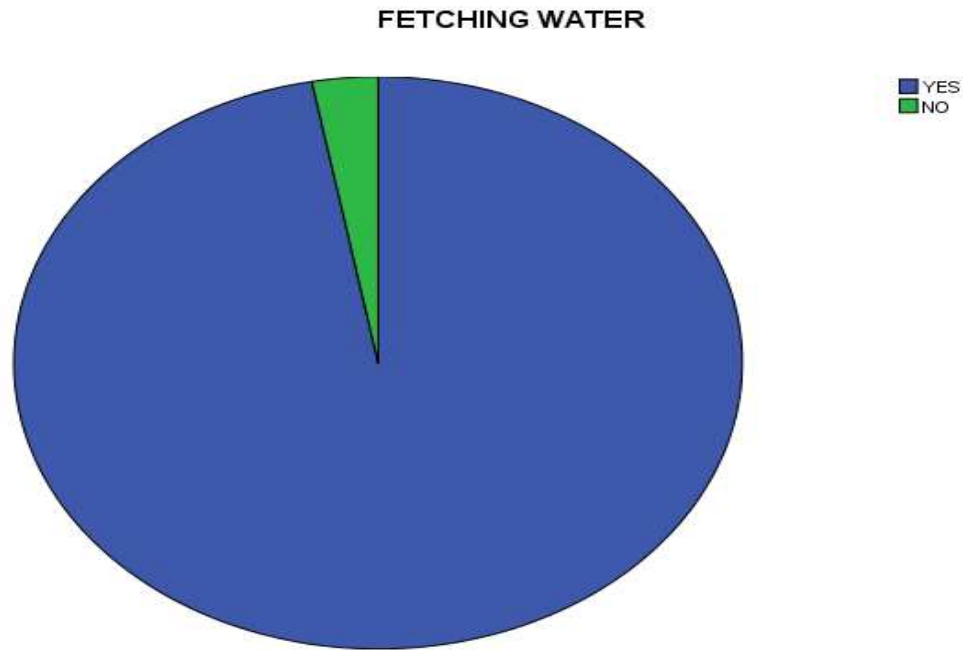
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	100	97.1	97.1	97.1
NO	3	2.9	2.9	100.0
Total	103	100.0	100.0	

Apart from peasant farming, the other activity commonly pursued by the women of Machakos County is commercial water-fetching. Most of the women, during their free

time, would go and fetch water for small token. Since people walk long distances for water, these women walk long kilometres to fetch water, then sell them to some well-to-do families, those that don't feel comfortable walking all the way for water. Indeed, the study established that a bucket of clean water could be sold to as much as ten shillings. Accordingly a whopping 100, out of 103 respondents say they engage in this economic activity while only 3 out of the 103 respondents say they do not engage in this activity.

This translates to 97.1% and 2.9% in favour of those who would engage in fetching water as an alternative economic activity. When asked the reason as to why this activity seems so popular among the young women in this county, more than even peasant agriculture, which most people would expect to be the most popular activity among most populations in Kenya, most of the respondents claims its a source of "quick-cash". That anytime, one is severely broke, she does not have to wait, like in agriculture for crops to grow up, and then convert it to food, or cash. It's a source of cash that as they claim, is only 10 to 20 minutes away. And as the researcher found out, there is always an undying ready market for this commodity in this county. Indeed it's a rare commodity, but again its a selling commodity. Thus, one would inarguably conclude that the women of Machakos County have very successfully managed to turn water into a "cash cow" commodity.

Figure 13: Fetching Water



Machakos County is poultry farming. The study sought to find out the amount of period that the respondents have spent in poultry farming, if at all they have ever participated in this economic activity, 6.8% said they have practiced poultry keeping for less than a year.36.9% say they have kept poultry for between 1-5 years, 7.8% for five years and above. Then the study sought to find out the percentage of respondents who currently keep poultry as an additional source of income.53 out of the total number respondents said they currently keep poultry, while 50 respondents said they don't. This can be translated to 51.5% and 48.5% respectively.

Table 14: Poultry Keeping

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	53	51.5	51.5	51.5
NO	50	48.5	48.5	100.0
Total	103	100.0	100.0	

Figure 14: Poultry Keeping

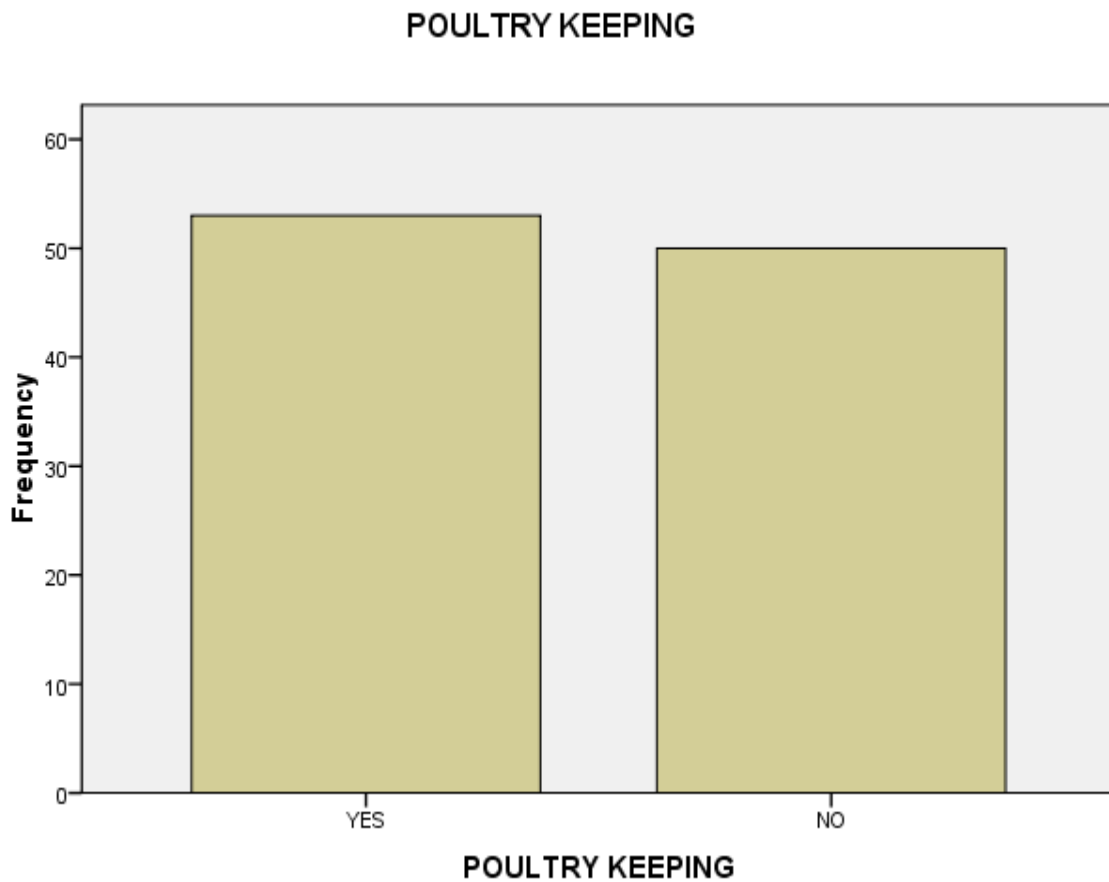
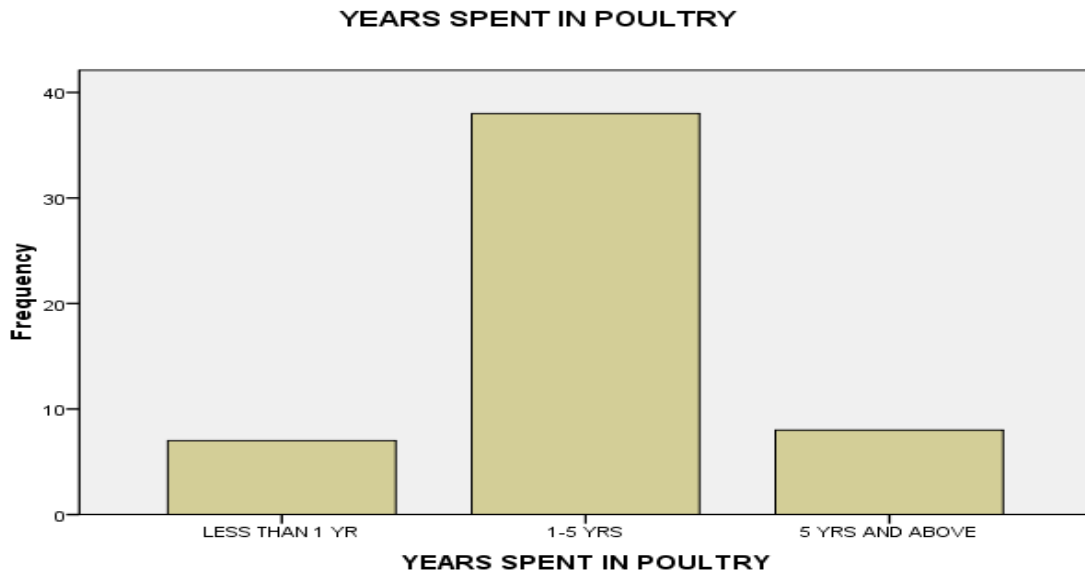


Table 15: Years Spent in Poultry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	LESS THAN 1 YR	7	6.8	13.2	13.2
	1-5 YRS	38	36.9	71.7	84.9
	5 YRS AND ABOVE	8	7.8	15.1	100.0
	Total	53	51.5	100.0	
Missing	System	50	48.5		
Total		103	100.0		

Figure 15: Years Spent in Poultry



The next common economic activity was sand harvesting.74.8% of the respondents say they engage in sand harvesting as an additional economic activity, while 25.2% said NO. The bigger percentage attributed to this economic activity, is explained by the same reasons the respondents had for engaging in fetching water in exchange for cash. Many of the respondents see it as quick source of cash. Initially, predominantly, an activity for men, this economic activity is now increasingly becoming associated with women too. The young women no longer see it as a reserve activity for men.

Table 16: Sand Harvesting

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	77	74.8	74.8	74.8
NO	26	25.2	25.2	100.0
Total	103	100.0	100.0	

Figure 16: Sand Harvesting

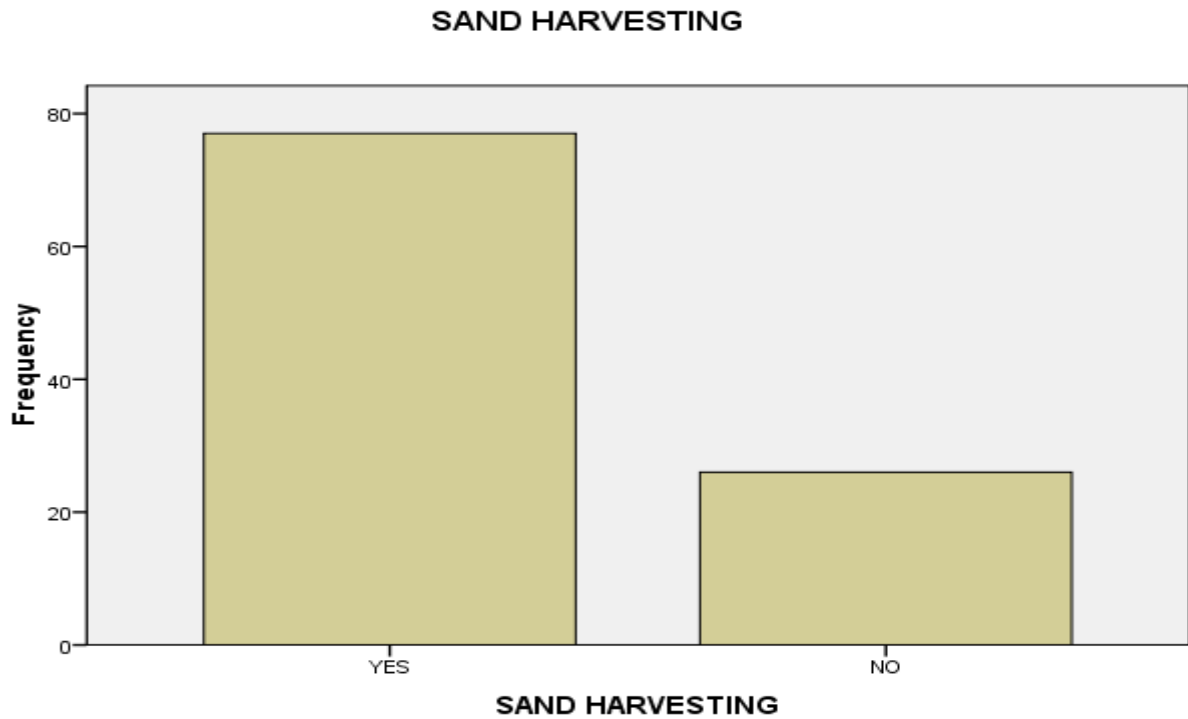


Table 17: Years Spent in Sand Harvesting

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid LESS THAN 1 YR	2	1.9	2.6	2.6
1-5 YRS	9	8.7	11.7	14.3
5 YRS AND ABOVE	66	64.1	85.7	100.0
Total	77	74.8	100.0	
Missing System	26	25.2		
Total	103	100.0		

Figure 17: Years Spent in Sand Harvesting

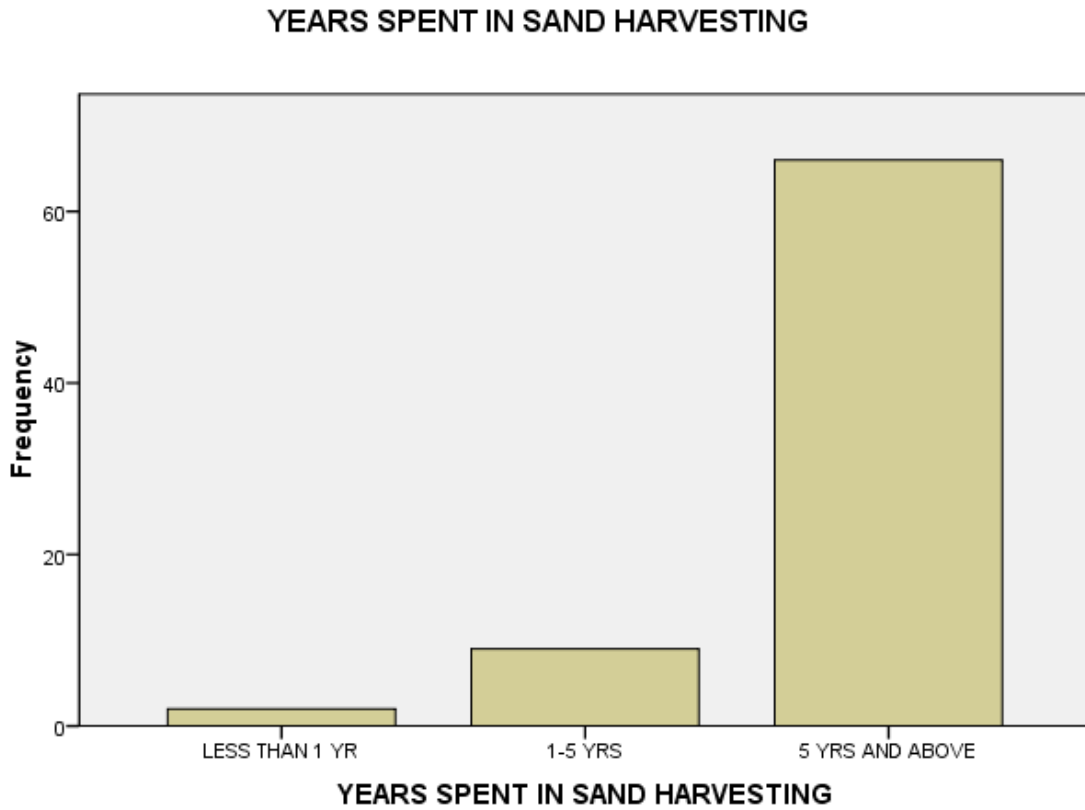


Table 18: Small Trading

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	74	71.8	72.5	72.5
NO	28	27.2	27.5	100.0
Total	102	99.0	100.0	
Missing System	1	1.0		
Total	103	100.0		

In addition to sand harvesting, 71.5% of the respondents engage in small trading to supplement their incomes. This include hawking of items like tomatoes, road-side maize roasting, trading in vegetables, and so on. However, 27.2 say they do not engage in such activities.

Figure 18: Small Trading

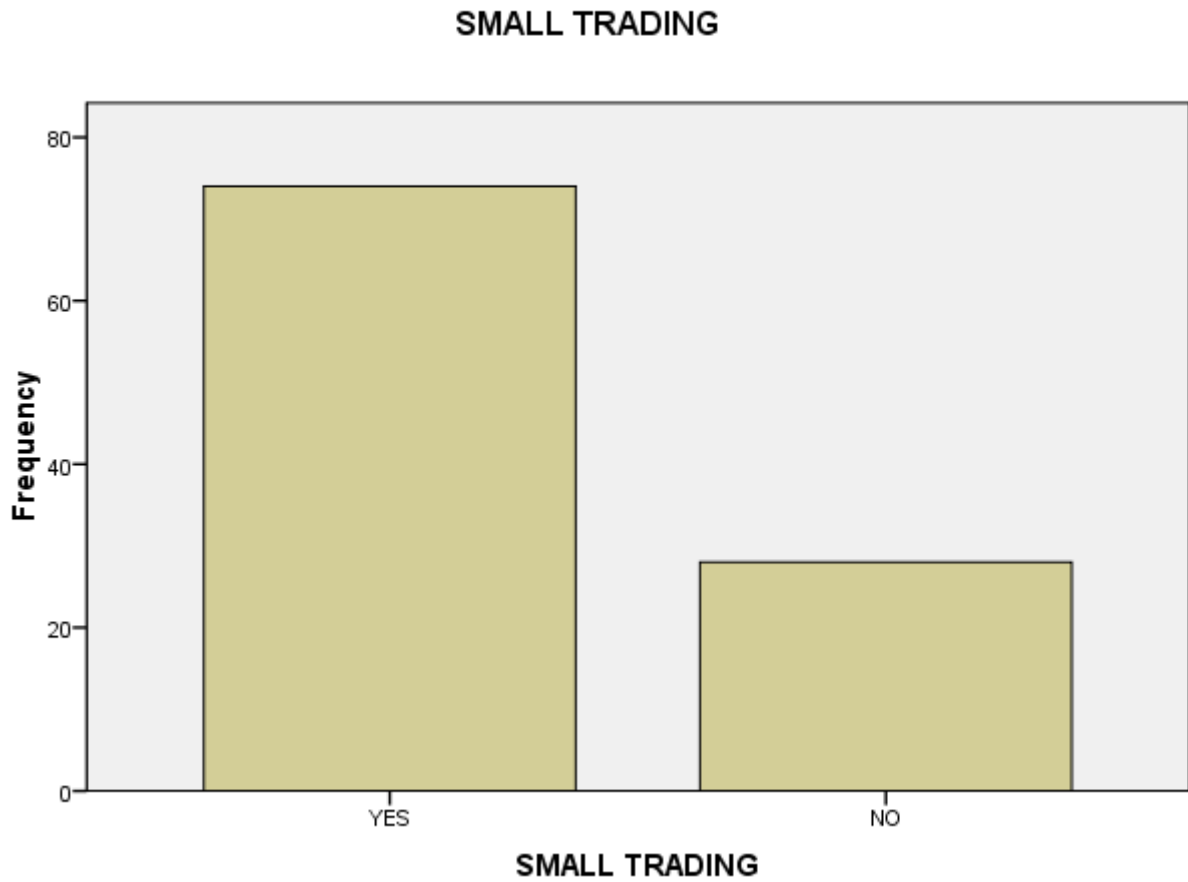


Table 19: Years Spent Trading

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid LESS THAN 1 YR	7	6.8	9.3	9.3
1-5 YRS	23	22.3	30.7	40.0
5 YRS AND ABOVE	45	43.7	60.0	100.0
Total	75	72.8	100.0	
Missing System	28	27.2		
Total	103	100.0		

Figure 19: Years Spent Trading

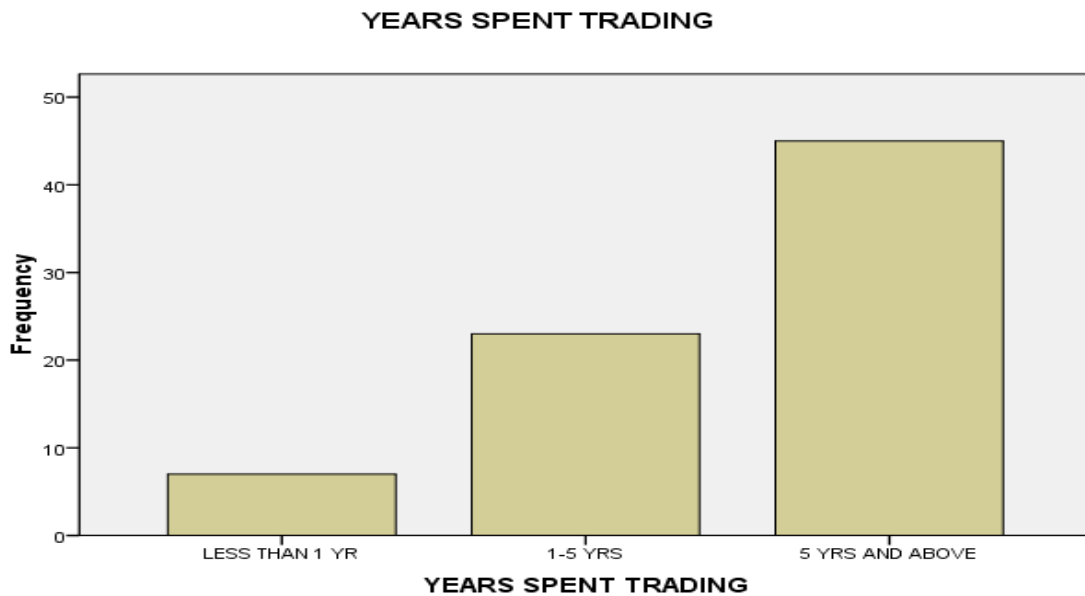
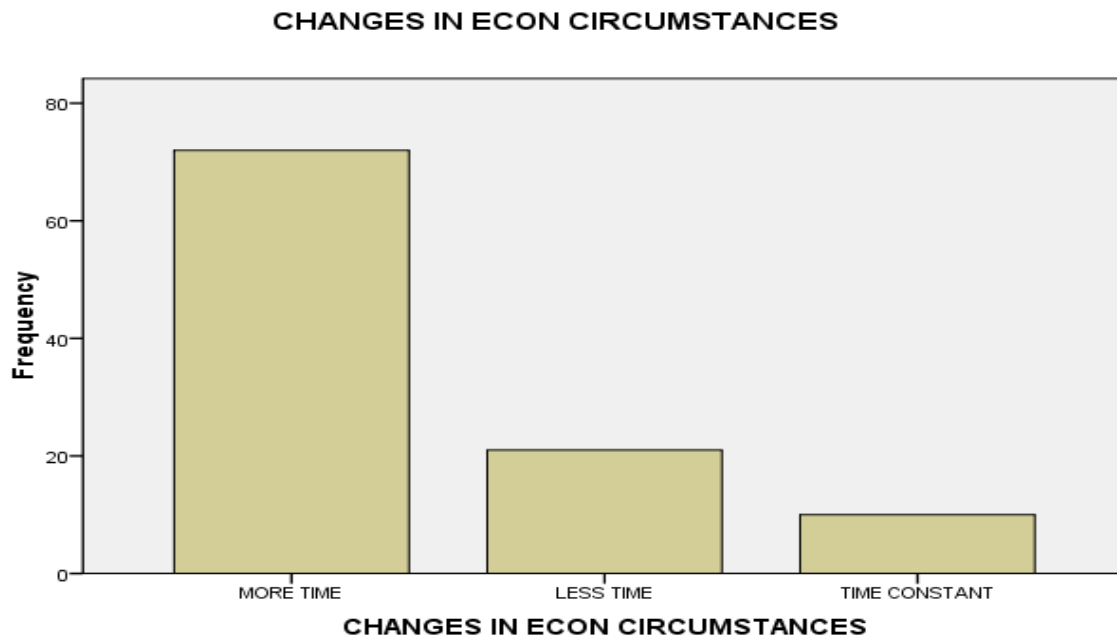


Table 20: Change in ECON Circumstances

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid MORE TIME	72	69.9	69.9	69.9
LESS TIME	21	20.4	20.4	90.3
TIME CONSTANT	10	9.7	9.7	100.0
Total	103	100.0	100.0	

Figure 20: Change in ECON Circumstances



Changes in economic circumstances section aimed at measuring the amount of time that the respondents spend in their other economic activities, other than those they regard as their primary economic activities. 72, out of a total 103 respondents say they find

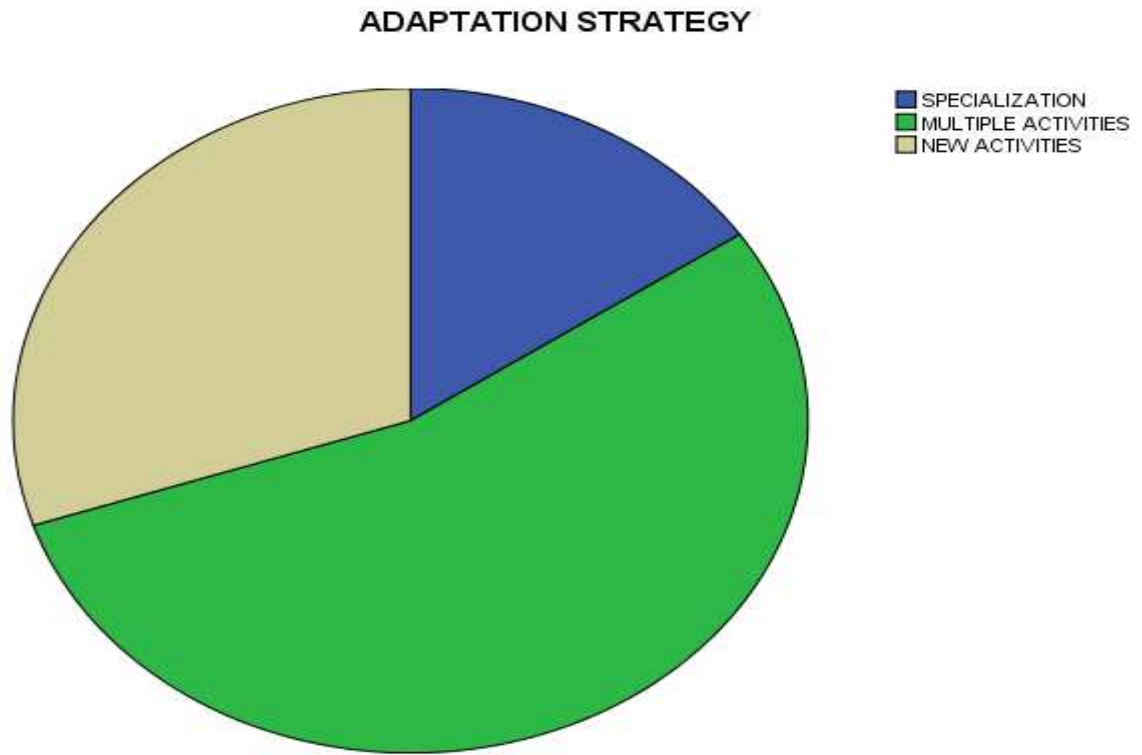
themselves increasingly spending more and more time in their side-economic activities each passing day. However, 21 say they spend less time, while 10 respondents say there is not change in the amount of time they spend on the side economic activities. This is represented by 69.9%, 20.4% and 9.7% respectively for the three categories of respondents.

Table 21: Adaptation Strategy

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid SPECIALIZATION	16	15.5	15.5	15.5
MULTIPLE ACTIVITIES	56	54.4	54.4	69.9
NEW ACTIVITIES	31	30.1	30.1	100.0
Total	103	100.0	100.0	

Finally, the study sought to find out the most preferred adaptation strategy among the women in Machakos County. Most of them seem to prefer engaging in multiple economic activities, as they say this boosts their income and lessens the dependency burden that they have to carry on their shoulders. Thus, 54.4% say they prefer to engage in other economic activities, while 15.5% say they prefer to specialize in just one economic activity. Still 30.1% are not satisfied with their current economic activities and say, they would like to try out new ideas, or engage in totally new economic activities.

Figure 21: Adaptation Strategy



CHAPTER FOUR

Summary of Findings, Conclusions and Recommendations

4.1 Introduction

The main objective of this study was to investigate the dimension of global climate change, and its effects on Kenya's women. In addition, the study sought to find out the adaptability of these women to the impacts of climate change. This chapter presents the summary of the major findings, answers to research questions, conclusions and recommendations of the study. It also presents suggestions for future studies.

4.2 General Information

4.2.1. The Relationship Between Dependency Burden and Climate Change

From the above data, one can easily notice that as a result of extreme weather conditions, basically associated with climate change and global warming. A big percentage of the respondents admit that they take care of other relatives, apart from their immediate members of their families, thus the high dependency ration.

4.2.2. Influence of Rural-Urban Migration and Drought on Gender Roles

From the collected data again, the study proved that urbanization and drought, which is basically as a result of the climate change has led to reversed gender roles. Traditionally, men were responsible for fending for their families. But as it it now, at least according to the data gathered from the field by the researcher, most men have neglected their parental roles, making most women to be single mothers. However, even in those families where men are

present, either living with their women or moved into urban centres to in search for better incomes, women still bear the biggest burden in family upkeep.

4.2.3. How Have Women Adapted to the Effects of Climate Change?

The study revealed, in the light of data collected, that most women engage in more than one economic activity in order to supplement their meagre income and to raise meet their responsibilities comfortably. Therefore, one of the strategies we can say most women have used to counter the effects of climate change in the larger Machakos county is basically engaging in other economic activities to supplement their income.

4.3. Recommendation and Conclusion

In light of the data in chapter 3 above, women have been most affected by Climate change. These impacts can be seen from the reversed gender roles, high dependency level, the increased rate of single-parenthood, high illiteracy levels and so on. However, what was so glaring in the course of this study is the level of neglect with which these women have been neglected. Both the county government and national government alike should come in handy and help with strengthening adaptation strategies for the sub-Saharan woman. The governments for example could assist in training these women on best farming methods to boost their farming income, educate them on weather fluctuations so that they may know clearly, the planting season, build dams to make water more available for irrigation, and so on.

4.4 Suggestions for Further Research

The researcher recommends that further research should be conducted to further establish how sub-Saharan governments, especially Kenya, has managed or can help to mitigate problems associated with climate change. This study focused more on the climate change and how it affects women. However, since effects of climate change and government mitigation strategies should go hand in hand for a country to develop wholesomely, there is need to find out the strategies that can be used by governments to mitigate climate change.

REFERENCES

- Adede, A. O. 1992. *International Environmental Law from Stockholm to Rio*.
Environmental Policy and Law 22(2), 88–105.
- Agarwal, A., S. Narain and A. Sharma (eds.) 1999. *Green Politics: Global Environmental Negotiations 1*. Centre for Science and Environment, New Delhi.
- Bryman, A. (2001). *Social research methods*. Oxford: Oxford University Press.
- Birmingham, M.E., et al. 1997. ‘*Epidemic cholera in Burundi: Patterns in the Great Rift Valley Lake Region*’, Lancet Inc. Canada.
- Commission on Human Security. (2003). *Human security now*. Washington, DC: Communications Development Incorporated.
- Denton, F., Sokona, Y. and Thomas, J.P.: 2002, *Climate Change and Sustainable Development Strategies in the Making: What should West African Countries expect?* Dakar, OECD and Environment et Développement du Tiers Monde (ENDA-TM).
- Ehrlich, I. (1973). *Participation in illegitimate activities: a theoretical and empirical investigation*. *Journal of Political Economy*, 81(3), 521e565.
- Ehrlich, P. R. (1969). *The population bomb*. New York: Sierra Club.
- Ehrlich, P. R., & Ehrlich, A. H. (1990). *The population explosion*. New York: Simon and Schuster.
- Fankhauser, S., Smith, J.B. and Tol, R.S.J.: 1999, “Weathering climate change: Some simple rules to guide adaptation decisions”, *Ecological Economics*. **30**, 67–78.

- Greco, S., Moss, R.H., Viner, D. and Jenne, R.: 1994, *Climate Scenarios and Socio-Economic Projections for IPCC WGII Assessment*, Washington DC, IPCC.
- Goldstone, J. A. (1991). *Revolution and rebellion in the early modern world*. Berkeley: University of California Press.
- Goldstone, J. A. (2002). "Population and security: how demographic change can lead to violent conflict". *Journal of International Affairs*, 56(1), 3e21.
- Hansen, R. D. 1979. *Beyond the North-South Stalemate*. New York: McGraw-Hill
- Hecht, S. and A. Cockburn .1992. *Rhetoric and Reality in Rio*. Palgrave, New York.
- Homer-Dixon, T. F. (1999). *Environment, scarcity, and violence*. Princeton: Princeton University Press.
- IPCC: 2001, *Climate Change 2001: Impacts, Adaptation, and Vulnerability*, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change.
- IPCC: 1996, *Regional Impacts of Climate Change: An Assessment of Vulnerability*, Geneva, IPCC.
- K.. Haq, ed.1978. *Dialogue for a New Climate Order*. New York: Pergamon Press.
- Kay, D. A. and E. B. Skolnikoff . 1972. *World Eco-crisis: International Organizations in Response*. Madison: University of Wisconsin Press.
- Kreutzwiser, R. and Moraru, L. 2001, "Adaptation options for the near term: Climate change and the Canadian water sector", *Global Environmental Change* **11**.

- Lecoutere E, D'Exelle B, Van Campenhout B (2010) *Who engages in water scarcity conflicts? A field experiment with irrigators in semi-arid Africa*. MICROCON Research Working Papers 31. Accessed at http://www.microconflict.eu/publications/RWP31_EL_BD_BVC.pdf
- Lynne Rienner, et al .2003.*The World Comes to One Country – An Insider History of the World Summit on Sustainable Development*. Heinrich Boll Foundation, Berlin.
- Miguel E (2005) *Poverty and witch killing*. Rev Econ Stud 72(4):1153–1172.
- Miller, M. A. L. 1995. *The Third World in Global Environmental Politics*. Boulder Press.
- Mitchell, T.D. and Hulme, M.: 1999. “*Predicting regional climate change: Living with uncertainty*”. Journal of Physical Geography. **23**(1), 57–58.
- Najam, A. 2004a. *The View from the South: Developing Countries in Global Environmental Politics*. The Global Environment: Institutions, Law and Policy (pp. 224–243). Washington, DC: Congressional Quarterly Press.
- Parry, M., Rosenzweig, et al. 1999. *Climate change and world food security: A new assessment*. Global Environmental Change 9(99), 51–67.
- Peter Dauvergne, ed. 2004. *Handbook of Global Environmental Politics*. Cheltenham, UK: Edward Elgar Press.
- Porter, G., J. W. Brown and P. S. Chasek (eds.) 2000. *Global Environmental Politics*. Boulder; West view Press.
- Rowland, W. 1973. *The Plot to Save the World*. Toronto: Clarke, Irwin & Co.
- Sandra Harding (Ed.) 2004. *The feminist standpoint theory: Political and intellectual controversies* (pp. 213–224). Cambridge Press, New York.

- Sauvant, K. P. 1981. *The Group of 77: Evolution, Structure and Organization* .New York: Oceana Inc. Publications.
- Schipper, E.L, et al. 2002. “*From impacts assessment to adaptation priorities: the shaping of adaptation policy*”. *Climate Policy* **2**, 145–159.
- Sokona, Y. and Denton, F.: 2001, “*Climate change impacts: Can Africa cope with the challenges?*”*Climate Policy* **1**(1), 117–123.
- Watson, R.: 2000, *Presentation of Robert Watson at the Sixth Conference of the Parties. In the proceedings of COP6*. The Hague, IPCC.
- Zabelin S . 2002. *The Jo_burg Memo: Fairness in a Fragile World*. Heinrich Boll Foundation, Berlin.

Appendix 1: Research Questionnaire

DIMENSIONS OF CLIMATE CHANGE (CASE STUDY OF MACHAKOS COUNTY
IN KENYA).

PART A (Biodata)

1. Name(Optional)

2. Age (TICK)
18-24 years []
25-35 years []
36 years and above []

3. Where do you come from? (TICK)
Machakos Town []
Mlolongo Urban Center []
Kathiani Village []
Kathonzyoni Village []
County Government []

- 4.a) What do you do for a living?
Subsistence Agriculture []
Sand Harvesting []
Both of the two above []
Other (specify).....

b) How much is your monthly income from the above source of living?

Ksh. 0 -5000 []

Ksh. 5001-9,999 []

Ksh. 10,000 -19,999 []

Ksh. 20,000 and above []

5. a) Do you have a family?

YES [] NO []

b) If YES for 6 a) above, choose below which option **BEST** describes your family

I have a spouse and children []

I am a single parent []

b) If Yes, what is the size of your family?

No Children []

1-4 Children []

5 Children and above []

c) If YES for 5a) above, choose one of the following options which **BEST** describes your family economic relationship

I contribute **less** than my spouse to the sustenance of my family []

I contribute **more** than my spouse for the sustenance of my family []

As a single parent, I am the sole breadwinner for my family []

My spouse and I contribute equally for the sustenance of my family []

d) Other than your immediate (nuclear) family, do you support any extended family members?

YES [] NO []

PART B (Effect of Climate Change on Women)

6.a) Do you have time that you personally regard as leisure time?

YES [] NO []

b) If YES above, how do you spend your leisure time

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

c). If NO above, please briefly explain.

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

7. List the economic activities which you used to do about 10 years ago

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

8. For each of the following economic activities indicate appropriately if you involvement

Economic Activity	Yes	No
Farming		
Fetching water		
Keeping Poultry		
Harvesting sand		
Small scale trading		

9. For the above (Q.8) economic activities, indicate how long you have been involved

Economic Activity	Less than 1 year	Between 1-5 years	5 years and above
Farming			
Fetching water			
Keeping Poultry			
Harvesting sand			
Small scale trading			

10. For the above (Q.9) economic activities, please indicate how much average time you spend on each on a weekly basis.

Economic Activity	Less than 5 hours weekly	Between 6-10 weekly	Above 10 hours weekly
Farming			
Fetching water			
Keeping Poultry			
Harvesting sand			
Small scale trading			

PART C (Women adaptation to Climate Change)

11.a). Choose one of the options below which in your opinion best describes the circumstances of your involvement in the above (Q.10) economic activities

Of late, I spend **MORE** time than I used to pursuing the
above economic activities []

Of late, I spend **LESS** time than I used to pursuing the a
above economic activities []

The amount of time I spend pursuing the economic
activities has neither **increased** nor decreased of late. []

b) Briefly explain why you think your choice for Q.10 a) above is the way it is.

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

12.a) Based on your choice for Q. 11 a) above, chose one option below which best describes your approach to the pursuit of economic activities in your region. []

I prefer **specializing** in one economic activity for sustenance. []

I prefer involving in **multiple** economic activities at the same time for sustenance []

I am thinking of changing to **new** economic activities altogether for sustenance []

b) Briefly justify your choice for 12 a) above.

.....

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.....

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