
# NATIONAL DEFENCE UNIVERSITY- KENYA

## NATIONAL DEFENCE COLLEGE

## RESEARCH PROJECT

# IMPLICATIONS OF CLIMATE CHANGE ON NATIONAL SECURITY IN KENYA: A CASE STUDY OF MARSABIT COUNTY


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## SUPERVISOR: ……..


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## DECLARATION

I hereby declare that this research thesis is entirely my own original composition and it has not been presented to any other University.

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**This research thesis has been submitted for examination with my approval as the University Supervisor.**

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## DEDICATION

This research project dedicated to my family (my husband, …….., and my daughters/sons…….. ... and ……..) for their steadfast moral support and unconditional love throughout my studies at the National Defence University-Kenya.

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TABLE OF CONTENTS

DECLARATION ..... **Error! Bookmark not defined.**
DEDICATION ..... i
ACKNOWLEDGEMENT ..... iii
DEFINITION OF TERMS ..... vii
ABSTRACT .....
CHAPTER ONE ..... 1
INTRODUCTION ..... 1
1.0 Introduction ..... 1
1.1 Background Information ..... 1
1.2 Statement of the Problem ..... 4
1.3 Objectives ..... 5
Research Questions ..... 5
1.5 Justification for the Study ..... 5
1.6 Significance of the Study ..... 6
Assumptions of the Study ..... 7
1.8 Scope and Limitations of the Study ..... 7
CHAPTER TWO ..... 9
LITERATURE REVIEW ..... 9
2.0 Introduction ..... 9
2.1 Empirical Literature Review ..... 9
2.2 Conceptual Framework ..... 19
2.3 Chapter Summary ..... 20
CHAPTER THREE ..... 21
METHODOLOGY ..... 21
3.0 Introduction ..... 21
3.1 Research Design ..... 21
3.2 Area of Study ..... 22
3.3. Target Population ..... 22

3.4 Determination of Sample size ..... 22
3.5 Sampling Procedure ..... 24
3.6 Data Collection instruments ..... 25
3.7 Validity and Reliability ..... 26
3.8 Data Collection Procedures ..... 27
3.9 Methods of Data Analysis ..... 27
3.10 Ethical Considerations ..... 28
CHAPTER FOUR ..... 29
RESULTS AND DISCUSSION ..... 29
4.0 Presentation of the data guided by the objectives ..... 29
4.1 Discussion guided by the results ..... 29
4.2 Demographic Information ..... 30
4.2.1 Gender of the Participants ..... 30
4.2.2 Level of Education of Participants ..... 31
4.2.3 Age of the Participants ..... 32
4.2.4 Length of Stay/service in Marsabit County ..... 32
4.2.5 Nature of Occupation ..... 33
4.3 Discussion of the findings ..... 35
4.3.1 Perceptions of the locals in Marsabit County on climate change ..... 35
CHAPTER FIVE ..... 43
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ..... 43
5.0 Introduction ..... 43
5.1 Summary of the findings ..... 43
5.2 Conclusion derived from the Summary ..... 46
5.3 Recommendations of the study ..... 47
5.4 Suggestion for Further Research ..... 48
REFERENCES ..... 49
APPENDIX I: QUESTIONNAIRE ..... 54
APPENDIX 2: INTERVIEW GUIDE ..... 61
APPENDIX 3: SIMILARITY REPORT ..... 62

## LIST OF ACRONYMS

| | | |
|---|---|---|
| **ASAL** | - | Arid and Semi-Arid Lands |
| **EAC** | - | East African Community |
| **FGDs** | - | Focused Group Discussions |
| **GHG** | - | Green House Gases |
| **GoK** | - | Government of Kenya |
| **IPCC** | - | International Panel on Climate Change |
| **NDMA** | - | National Drought Management Agency |
| **NEMA** | - | National Environmental Management Authority |
| **NGOs** | - | Non-Governmental Organisations |
| **SDGs** | - | Sustainable Development Goals |
| **UN** | - | United Nations |
| **UNFCC** | - | United Nations Framework Convention on Climate Change |
| **UNFCCC** | - | United Nations Framework Convention on Climate Change |
| **WWFN** | - | World Wide Fund for Nature |

## DEFINITION OF TERMS

**Adaptation**: A response to climate change aimed at reducing the vulnerability of biological and social systems to sudden changes through appropriate modifications, thereby offsetting the effects of climate change.

**Climate Change**: A long-term alteration in the statistical distribution of weather patterns, typically observed over extended periods.

**Coping**: The process of enduring or managing a stressful condition or situation effectively.

**Global Warming**: The rise in global temperatures due to increased concentrations of greenhouse gases in the atmosphere.

**Mitigation**: Actions taken to reduce the risks and impacts associated with undesirable events or conditions.

**National Security**: As defined by Romm (1993), national security encompasses the protection and defense of a sovereign state, including its citizens, economy, and institutions across all levels.

**Resilience**: The capacity to self-organize, learn, and adapt in response to risks or hazards.

**Security**: A state where the essential aspects of human life are safeguarded, allowing individuals the capacity and freedom to live with dignity.

## ABSTRACT

This research explored the impact of climate change on security in Marsabit County, Kenya. The study aimed to achieve three main objectives: (1) to assess how residents of Marsabit County perceive climate change, (2) to evaluate the impact of climate change on security in the county, and (3) to identify the adaptation strategies employed by the local population in response to climate-related challenges. A mixed-methods design was used, integrating both quantitative and qualitative approaches. The research was conducted across the four sub-counties of Marsabit County—Laisamis, Saku, North Horr, and Moyale. Participants were drawn from a range of groups, including pastoralists, business owners, government and county officials, and staff from humanitarian organizations active in the area. Snowball and purposive sampling techniques were employed to select participants, with data collected through questionnaires and interviews. The analysis included both thematic and statistical methods. Ethical standards were maintained by securing informed consent from all participants before their involvement in the study.The findings revealed that pastoralism is the primary livelihood for most residents of Marsabit County. Climate change has adversely affected livelihood security by decreasing the availability of water and pasture, leading to heightened competition and land encroachment. This has consequently intensified conflict and insecurity within the region. To mitigate these challenges, local communities have diversified their economic and social activities, thereby reducing their reliance on pastoralism.The study recommends conducting further research on the effects of climate change on security in other counties to broaden the understanding and applicability of the findings.

# CHAPTER ONE

# INTRODUCTION

## 1.0 Introduction

This chapter provides an overview of the research project, including the introduction, background information, and research problem statement. It also outlines the study objectives, research questions, and the rationale for the study, as well as its significance. Additionally, it discusses the assumptions underlying the research and addresses the scope and limitations. This foundation is essential for guiding the research process.

## 1.1 Background Information

Climate change is a term that reflects various perspectives, but it generally refers to shifts in the statistical distribution of weather patterns over extended periods. It involves changes in average weather conditions or fluctuations in weather over time within a long-term context. These changes are largely due to the emission of greenhouse gases (GHGs) into the atmosphere, influenced by both natural factors, such as variations in solar radiation, and human activities (Kumssa and Jones, 2010). The ongoing release of these gases has led to significant rises in atmospheric temperatures and global warming, posing threats not only to humans but also to wildlife (NEMA, 2013).

Security generally refers to a state of protection from harm or a sense of relief from worry and anxiety (Barnett, 2003). It encompasses safeguarding individuals or groups from various uncertainties. Soroos (1997) defines security as the confidence individuals have in their ongoing access to essential resources needed for survival and well-being. Since the late 1980s and into the 1990s, the concept of national security has broadened to encompass not just the protection of human rights but also economic and social welfare, as well as political stability (Müller et al., 2007). This broader perspective also incorporates the mitigation of environmental threats and focuses on safeguarding a nation's interests, including the

fundamental survival and well-being of its citizens. In this comprehensive view, national security is essential for creating conditions where social, political, and economic aspects of life can thrive (Hutchful & Fayemi, 2004). As a result, nearly every nation develops a national security strategy, increasingly integrating issues like climate change into these policies.

With this expanded perspective on national security that includes environmental considerations, the security implications of climate change have garnered significant attention in academic research. This increased focus aligns with the growing awareness of climate change's tangible impacts. Numerous global studies highlight that climate change is a long-term threat with serious implications for quality of life, posing major challenges for individuals, communities, nations, and the global community as a whole (Scheffran & Battaglini, 2011).

Research shows that climate-induced events can lead to the degradation or destruction of both social and physical infrastructure, worsen social and economic instability due to competition over scarce resources, and trigger large-scale human migrations. These factors can undermine development and political stability, increasing the likelihood of conflicts (Ibarraran et al., 2009). Such challenges contribute to a global crisis that threatens human survival by impacting health, natural resources, and water availability, with particularly severe effects on vulnerable populations already facing internal instability and economic fragility (Omann et al., 2009).

Climate change has had widespread effects worldwide, increasingly threatening the security of billions by causing more frequent natural disasters, poverty, and conflicts. The International Panel on Climate Change (IPCC, 2014) identifies climate change as one of the most significant threats to global security and peace, noting that its impact is expected to intensify. Variables related to climate change, such as global warming, have already

significantly affected natural resource availability and heightened communities' vulnerability to conflict (IPCC, 2013).

Case studies illustrate the global impact of climate change. In Asia, countries like Pakistan have faced severe floods in the past two decades, including during 2010-2011 and 2014, linked to climate change. These floods have caused extensive damage to infrastructure, homes, and agriculture, displacing millions. In Europe, Portugal and Australia have experienced repeated wildfires, devastated wildlife and affecting thousands of people and livelihoods (IPCC, 2014). In Africa, climate change amplifies existing problems such as widespread poverty, conflicts, livestock diseases, and land degradation. The rapid growth in population has intensified the strain on crucial resources like food, land, water, and forage, thereby increasing the potential for conflicts (Davidson et al., 2003).

In Sub-Saharan Africa (SSA), climate change has intensified existing issues, including civil wars, ethnic violence, terrorism, and forced displacement, partly due to the region's fragility marked by poverty, violence, injustice, and social insecurity. Over 95% of livelihood activities in SSA occur on land, with many agricultural activities dependent on rainfall (Chilinjika & Gumede, 2021). Unpredictable rain patterns due to climate change have disrupted rain-fed agriculture, leading to poor yields. In Eastern Africa, limited adaptive capacity exacerbates the impact of climate change, with increased rainfall variability challenging agriculture and pastoralism. Recent frequent droughts have affected food and human security in Ethiopia, Somalia, Uganda, and South Sudan (UNOCHA, 2018).

In Kenya, climate change has similarly impacted the country, leading to severe recurrent droughts and reduced natural resources, such as drinking water and pasture. Melting ice cover on Mt. Kenya has accelerated over the past two decades due to rising temperatures. The situation is compounded by other factors, including diseases like HIV/AIDS, inadequate infrastructure (GoK, 2013), and marginalization of parts of the population. Climate change

has worsened poverty, affecting a large portion of the population (Ogega, 2018) and increasing the likelihood of resource-based conflicts.

In Kenya, the regions most affected by climate change are the pastoralist and agro-pastoralist areas within the Arid and Semi-Arid Lands (ASAL) in the north. Many residents in these regions live in poverty and rely on sporadic food aid and safety net programs. Although pastoralists in ASAL have traditionally employed methods to adapt to harsh environmental conditions, the increasing frequency of climate change impacts is presenting new challenges that complicate these adaptation strategies (Ericksen et al., 2013). This study explores the implications of climate change for national security in Kenya, particularly focusing on Marsabit County .

### 1.2 Statement of the Problem

Climate change has significantly impacted populations worldwide, with remote and impoverished areas facing the greatest challenges in adapting to increasingly erratic weather patterns. In Kenya, pastoralist communities in Marsabit County, located in the arid and semi-arid regions of northern Kenya, are among those most affected. These communities have long dealt with issues such as limited pasture and water resources, frequent conflicts over resources, proliferation of small arms, and marginalization. The situation has been further exacerbated by the influx of pastoralists from Ethiopia and neighboring regions also affected by climate change (Mastrorillo et al., 2016).

The serious impact of climate change on Marsabit County has led security and humanitarian organizations to advocate for targeted adaptation and mitigation strategies. Without effective interventions, the local population continues to endure the adverse effects of recurrent droughts and floods. Although the broader effects of climate change on pastoralist communities are recognized, existing research often remains general and lacks a detailed analysis of its security implications at the local level in Marsabit County (Kassas, 2014).

Moreover, there is a gap in evidence regarding how climate change influences the vulnerability of pastoralists and the effectiveness of local adaptation and mitigation strategies. This research aims to fill these gaps by exploring the security implications of climate change in Marsabit County and assessing the available adaptation and mitigation strategies within both the local context and the broader Kenyan framework.

## 1.3 Objectives

### 1.3.1 General objective

The main objective of the study is to examine the implications of climate change on security in Marsabit County.

### 1.3.2 Specific Objectives

i. Assess the perceptions of the locals in Marsabit County on climate change and factors contributing to it.
ii. Examine the implication of climate change on security in Marsabit County
iii. Assess climate change mitigation and adaptation strategies available to the locals of Marsabit County

**Research Questions**

i. How do the locals of Marsabit County perceive climate change?
ii. How has climate change impacted on security in Marsabit County?
iii. What are the climate change adaptation and mitigation options available to locals of Marsabit County?

## 1.5 Justification for the Study

Many studies on climate change impacts have concentrated on areas like natural resources, health, agriculture, and rangeland ecosystems, often employing impact models. However, security analyses have received less attention. The Intergovernmental Panel on Climate

Change (IPCC, 2014) suggests that vulnerability studies in Africa should adopt an integrated assessment approach at the local level to account for specific contextual factors.

For pastoralist communities in Marsabit County, understanding the effects of climate change and developing tailored mitigation and adaptation measures is essential. These measures must address local geographical conditions to ensure effective solutions for human and food security. While existing research often examines climate change impacts on a regional or national scale, detailed micro-level analyses of specific communities are scarce. Marshall et al. (2014) emphasize that such micro-level studies are often overshadowed by broader ecosystem-scale research, which can limit the effectiveness of targeted responses like those for food security.

Additionally, there is a notable shortage of scientific data and analyses regarding household-level climate change mitigation and adaptation strategies in Kenya's Arid and Semi-Arid Lands (ASALs). This research seeks to address these gaps by investigating the specific security implications of climate change in Marsabit County and assessing relevant mitigation strategies. The goal is to improve the understanding of the impacts at the local level.

### 1.6 Significance of the Study

This study holds both academic and policy significance. From an academic perspective, it aims to address gaps in the existing literature concerning the implications of climate change on national security at a micro-level, particularly in pastoralist areas like Marsabit County. Additionally, it seeks to contribute to the understanding of adaptation and mitigation strategies tailored to the unique conditions faced by pastoralist communities. By focusing on these specific aspects, the study enhances theoretical and practical insights into how climate change affects local security and provides evidence-based recommendations for effective responses in similar contexts.

Other than its academic significance, the findings of the study have the potential to have policy formulation importance. The knowledge generated is valuable to policy makers in making objective and sound decisions leading to progressive policies regarding climate change mitigation strategies in Marsabit County and Kenya at large. Furthermore, the findings is useful to the county and national security actors in designing conflict prevention and intervention measures that encourage responsible utilisation of natural resources in Marsabit County. This is important given the decline in these resources as a result of climate change.

**Assumptions of the Study**

This study assumes that there are factors contributing to climate change in Marsabit County; climate change has had far-reaching implications on national security at the micro-level in Marsabit County and Kenya at large; and finally, climate change adaptation and mitigation mechanisms in Marsabit County face several challenges. The study further assumes that the information provided by the respondents is accurate leading to reliable conclusions about the topic under study.

## 1.8 Scope and Limitations of the Study

The study acknowledges the effect of climate change on security in ASAL areas and beyond. Therefore, it focuses on the implications of these impacts in Marsabit County. The research was carried out within the Sub-counties of North Horr, Saku, Laisamis and Saku. Generally, the county has become a stage of conflict and other forms of insecurity in the last two decades with climate change believed to contribute immensely to this problem. The study period ranges from 2010 to 2022. This study period is selected because it was in 2010 that Kenya's current constitution was promulgated establishing forty seven counties with Marsabit emerging as one of them. 2022 was a year that witnessed a severe wave of inter-communal resource based conflicts attributed to the effects of climate change in the county.

While conducting the study, several challenges are expected. They include difficulty in conducting face to face interviews since the researcher is confined to college with limited movement in the study area. The second challenge concerns insecurity. Though the researcher engaged a research assistant to help with data collection for the study, he faces the challenge of insecurity since Marsabit is an insecure county with periodic violence witnessed. To address these challenges, the researcher largely relied on secondary sources of data to augment primary data. Moreover, the researcher made security arrangements including hiring a local guard to accompany the research assistant while collecting data in the study area. Technology was used to bridge the distance between the researcher and the respondents, during which the researcher conducted phone interviews and email questionnaires to selected respondents.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

The implications of climate change are being felt around the globe, raising new national security threats to many countries. This is largely because climate change exacerbates poverty and contributes to conflicts. This chapter reviews empirical literature on the implications of climate change to security in Marsabit County. The aim was to establish gaps that were then be filled during this study. The chapter is organized based on the specific objectives of the study.

## 2.1 Empirical Literature Review

This section presents a review of empirical literature relevant to the study's variables, focusing on scholarly works that align with the research objectives. The review includes an analysis of literature on the perceptions and understanding of climate change, its impact on security, and the strategies for climate change mitigation and adaptation .

### 2.1.1 What is Climate Change?

Climate change refers to substantial and enduring shifts in climate patterns that occur over extended periods, affecting variables like wind patterns, temperature, and precipitation (Srivastava & Rai, 2012). The primary driver of climate change is the emission of greenhouse gases (GHGs), which lead to rising atmospheric temperatures and contribute to global warming. Key GHGs include carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons (NEMA, 2013) .

Both natural variations in sunlight and human activities contribute to climate change, with human activities significantly increasing GHG emissions. In developed countries, fossil fuel

use is a major contributor, while in Africa, practices such as biomass burning, deforestation, and agriculture also contribute to GHG emissions (Kumssa & Jones, 2010).

Recent data shows that global temperatures are rising at an unprecedented rate, the fastest in the past 10,000 years. From 1901 to 2016, global temperatures increased by about 1.8°F (1.0°C), with a significant rise occurring since 1986 (National Climate Assessment, 2018). The IPCC's 2021 report indicates that global warming is accelerating faster than previously expected, with some damage potentially being irreversible (IPCC, 2021). This temperature increase leads to severe effects, such as rising ocean temperatures, shrinking ice caps, rising sea levels, and more frequent extreme weather events (Human Rights Watch, 2015).

Long-term climate changes observed include shifts in precipitation patterns, wind patterns, and increases in extreme weather events like heavy precipitation and heatwaves (O'Brien & Leichenko, 2000). These changes disrupt natural cycles and processes, impacting ecosystems and contributing to environmental degradation, including soil depletion, reduced water availability, and biodiversity loss (Institute for Economics and Peace, 2020).

Climate change has significant implications for human welfare, particularly in vulnerable regions. In Africa, climate change exacerbates issues such as poverty, displacement, and hunger, and contributes to environmental crises and conflicts (Nolon, 2009; IPCC, 2014). East Africa is notably affected due to limited development and high population density, with climate change threatening socio-economic progress (WWF, 2006; Davidson, 2003).

In Kenya, the Arid and Semi-Arid Lands (ASALs) are heavily impacted due to their low adaptive capacity, with about 70% of rural populations living in extreme poverty (OECD, 2001). Despite contributing minimally to global emissions, these communities face significant climate change impacts (World Bank, 2021). This study explored local perceptions of climate change in Marsabit, focusing on understanding its causes and effects at the community level.

### 2.1.2 Implications of Climate change on Security

The concept of security in modern terms focuses on each's individual security within a society. It includes both being and feeling secure, and it emphasizes the connection between human and national security, rights, and development. The concept moves away from the traditional "state-approach" to security, which focused mainly on territorial security, to a focus on people's security. Security as understood therefore implies freedom from fair and from want, which means that security for individuals must include health security, food security, economic security, community security, political security, personal security and environmental security (Beswick and Jackson, 2015, pp.11-12).

Climate change is one of the defining security threats of this century. With climate change, global, national and human security as well as world peace and sustainable development are under immense threat. This is due to not just terrorism, civil war, disease outbreaks and economic meltdown but also as a result of the persistent lack of respect to the nature and complete negligence of responsibilities towards conservation of nature (Schilling, Scheffran & Weinzierl, 2012).

The peace and security implications of climate change are increasingly recognized as global impacts unfold. Research indicates that environmental stress significantly contributes to societal insecurity and can trigger violent conflicts (Gleditsch, 1998). Climate change intensifies environmental stressors, which can escalate into armed conflicts as resources become scarcer and competition increases (Swain et al., 2011).

According to Kabubo-Mariara, and Kabara (2015, p. 6) increased scarcity of resources due to changes in climate leads to increased social tensions. This then triggers conflict in several places of the world. Environmental conflicts have become a major threat to security on local, regional, national, and global levels. Such conflicts have many impacts on the parties involved as they impact economic development, productivity, or cause physical harm to

people and the natural environment. Urmilla Bob and Salome Bronkhorst (2010, p.10) argue that change in the environment and conflict impacts the health and livelihoods of the people involved and create higher levels of inequality and poverty.

Climate-induced events not only increase environmental stress but can also damage or destroy social and physical infrastructure, lead to economic and social declines due to resource scarcity, prompt large-scale human migration, and disrupt political and developmental stability (Ibarraran et al., 2009). These challenges can evolve into a worsening crisis that threatens human survival, affecting health, natural resources, and water availability. This is especially concerning for populations already vulnerable due to internal instability and economic weakness (Omann et al., 2009).

One of the significant risks posed by climate change is the potential for large-scale population displacement. Numerous examples today highlight the devastating impact that climate-related migration can have on peace, security, and stability in various regions. A well-known instance is the conflict in Sudan's Darfur region, which began due to climate- and drought-induced migration that triggered competition for scarce resources, eventually escalating into a full-scale war. Similarly, the civil war in Syria, which began in 2011, had its roots partly in a severe drought from 2006 to 2010, contributing to migration, civil unrest, and ultimately violent conflict (Kelly et al., 2015).

The connection between climate change and security is increasingly evident, particularly in how it affects water supplies and leads to heightened intra- and inter-state conflicts over water resources. While water disputes have existed historically, climate change has intensified and made these conflicts more frequent. A 2012 report by the Office of the U.S. Director of National Intelligence projected that by 2040, regions such as North Africa, South Asia, and the Middle East would face severe challenges related to water shortages, poor water quality, and flooding, mainly due to the mismanagement of key river basins. These issues are

expected to diminish flood resilience, threaten food security, and elevate public health risks (Office of the U.S. Director of National Intelligence, 2012). Moreover, King and Julia (2017) noted that severe water scarcity could lead to the strategic use of water as a weapon, particularly in regions like South Asia, the Middle East, and Africa, where conflicts may arise as groups manipulate water resources for coercive or tactical purposes (King & Julia, 2017).

Further research suggests that the impacts of climate change, coupled with societal responses, can weaken community stability, institutional effectiveness, and overall societal resilience (Kate, 2020). As climate change effects widen and affect larger areas, societies' capacities to manage these consequences decline, creating a cycle of economic deterioration, environmental degradation, social unrest, and political instability. These combined factors pose security threats and exacerbate conflicts, which, in areas heavily impacted by climate change, can escalate into violence. Such conflicts can spill over into neighboring countries through ethnic ties, refugee movements, arms transfers, or resource competition, destabilizing entire regions and overburdening global and regional governance systems. This escalation may lead to state failure, the breakdown of social order, and increased violence (Broder, 2009).

Thomas Homer-Dixon (1994) emphasizes that climate change contributes to conflict and instability through mechanisms such as resource scarcity conflicts, identity or ethnic conflicts driven by mass migration, and conflicts stemming from relative deprivation due to significant resource disparities. Similarly, Brown et al. (2007) argue that climate change heightens the risk of violent conflict, particularly in states with weak institutions, low social capital, and poor governance. Climate-induced challenges, including the growing scarcity of energy, food, and water, can exacerbate local grievances and fuel conflicts (Busby, 2007).

The relationship between climate change and insecurity is complex and bidirectional. Climate change can exacerbate conflicts by increasing competition for limited resources and

heightening social tensions, while conflicts can, in turn, deepen vulnerabilities to climate change. For instance, ongoing conflicts can disrupt social infrastructure, reduce adaptive capacity, and degrade environmental resources, making communities even more susceptible to the negative impacts of climate change. This reciprocal relationship underscores the intricate interplay between environmental stress and social instability. Vulnerability, therefore, serves as a key factor in understanding the link between violent conflict and climate change. Identifying vulnerable populations, the specific threats they face, and the reasons for their vulnerability is crucial. For example, people reliant on renewable natural resources for their livelihoods, such as pastoralists and farmers in Africa, are particularly vulnerable (Schilling, Scheffran & Weinzierl, 2012).

In East Africa, the security risks linked to climate change are compounded by factors such as inadequate freshwater supplies, rapid population growth, insufficient health services, strained agricultural resources, economic decline, and weak political institutions. Unlike wealthier nations, which possess more resources to mitigate climate impacts, the fragile and weak states in East Africa are highly vulnerable and often face increased risks of conflict due to these stresses (Kate, 2020).

In Kenya, research on the link between climate change and conflict generally finds an indirect connection, suggesting that resource scarcity driven by climate change increases the likelihood of violence (Triche, 2014). Studies by Mmboroki, Wandagi, and Oriaso (2018) reveal that climate change exacerbates existing tensions over natural resources, making resource-based conflicts more intense. Similarly, Stacey and Wachira (2020) argue that deteriorating livelihood conditions due to climate change heighten the probability of violence among communities.

Regarding pastoralist communities in ASAl areas of the country, literature reveals that the communities in these rangelands choose movements away from high stressed environment to

areas less affected to deal with climate issues. This mobility has negative effects on areas of new settlements including cattle rustling. Through for many generations, pastoralist communities in ASAL have been practicing cattle rustling (Oba, 1992, p.7), such theft of livestock has increased and become more violent as dangerous weapons are being used in recent years. Historically, there was a relationship of reciprocity within pastoralist communities in East Africa. Also, grazing lands could only be used during certain months of the year. Due to this, institutional arrangements were made to be able to share the grazing lands at different times. However, these mechanisms of reciprocity have over the years been interrupted by several environmental factors. Today, the conflicts in region have become multi-dimensional. For instance, the conflict between the Pokot and Turkana communities are often based on access to resources. These two communities are located in semi-arid lands where rainfall has increasingly become scarce, and water holes fewer and drier. Today, the previous positive reciprocity between pastoralist communities in Kenya has turned into negative reciprocity (Triche, 2014, p.87). Being an area that already experience, conflict, drought and disease, climate change is overwhelming Turkana, Pokot and other pastoralist communities in ASAL areas of the country (Blackwell, 2010). This has an impact on security at different levels including personal, communal, national and even regional.

The literature on the relationship between climate change and security reviewed here brings out the link between the two concepts. The literature however fails to mention how the relationship takes place in the case of Marsabit County. This study intends to examine this relationship.

### 2.1.3 Climate change mitigation and adaptation strategies

Climate change represents a significant global security challenge that requires a coordinated international response. Various measures have been implemented to tackle this issue:

In 2015, the global community made a substantial advancement by adopting the Paris Agreement during the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP 21). This Agreement, which is binding on all participating nations, seeks to strengthen the global response to climate change by aiming to limit the increase in global temperatures to well below 2°C above pre-industrial levels, while also aligning financial flows with a low-carbon, climate-resilient trajectory (GOK, 2017).

Additionally, the 2030 Agenda for Sustainable Development, also adopted in 2015, provides a universal framework for sustainable development. This framework includes initiatives aimed at protecting the planet, eradicating poverty, promoting prosperity and peace, and addressing climate change. There is a strong connection between the Paris Agreement and the Sustainable Development Goals (SDGs), particularly SDG 13, which calls for urgent action to combat climate change and its effects. This underscores the cross-sectoral nature of climate change and highlights its threat to sustainable peace (GoK, 2017).

At the regional level, Africa's Agenda 2063, adopted in May 2013, promotes inclusive growth and sustainable development, with an emphasis on implementing climate and environmental programs at the national level. One of the objectives of the First Ten-Year Implementation Plan is to create "environmentally sustainable and climate-resilient economies and communities." The East African Community (EAC) also addresses climate change through its Climate Change Policy, Strategy, and Masterplan, acknowledging it as a significant emerging issue affecting regional security (Schultink, 2018). As Opiyo et al. (2015) pointed out, effective adaptation to climate change is essential for East African communities to mitigate the adverse impacts of extreme climate events .

At the national level, Kenya has made notable progress in climate change mitigation. In December 2016, Kenya ratified the Paris Agreement, reaffirming its commitment to international climate objectives. The Climate Change Act of 2016 further emphasizes the complementary roles of national and county governments in combating climate change. The Act aims to integrate climate change considerations into all levels of governance and to strengthen cooperative climate governance between national and county authorities. It recognizes the localized nature of climate impacts, enabling county governments to better identify and address these challenges (Climate Change Act, 2016).

In Kenya's drylands, pastoralist communities have historically relied on indigenous strategies to adapt to the harsh environmental conditions of their region. However, the increasing frequency and intensity of extreme weather events are presenting new challenges that strain these traditional adaptation methods (Ericksen et al., 2013). Climate change is intensifying these issues by exposing pastoralists, their livestock, and local ecosystems to frequent flooding and prolonged droughts. Since the 1990s, famine has become increasingly prevalent, significantly undermining food security across northern Kenya (Kenya Human Rights Watch, 2011).

Birch and Grahn (2007) highlight that, without effective adaptation and mitigation measures, the suffering caused by climate variability continues to afflict the pastoral communities in these areas. Their study, "Pastoralism: Managing Multiple Stressors and the Threat of Climate Variability and Change," underscores the critical need for targeted interventions to address the compounding effects of climate change on these vulnerable populations (Birch & Grahn, 2007).

Dryland communities, especially pastoralists, are particularly vulnerable to climate change due to their limited adaptability and heavy reliance on natural resources and livestock for their

livelihoods (Opiyo et al., 2015, p. 179).Other socio-economic, ecological, and political factors that explain their vulnerability are insufficient income sources, political marginalization, poor marketing opportunities for livestock, malfunction of traditional governance institutions, and unclear property rights regimes (Opiyo et al., 2015, p.179).

To address part of these challenges, several measures have been taken to help most affected communities to cope and adapt to climate change. Adapting to climate change depends on several general and specific factors such as knowledge, income, institutions, health, education and technology (Schilling, Scheffran and Weinzierl, 2012, p.8). Adaption strategies can reduce vulnerability and exposure to climate change (Burungu, 2016, p.9). It is a process where the changes are first recognized, before a decision to adapt or not need to be made (Kabubo-Mariara, Mulwa, and Di Falco, 2017, p.7).

In September 2021, the President of Kenya declared a drought a national disaster, as the situation had severely affected 23 arid and semi-arid lands (ASALs) across the country by July of the same year (Business Daily, 2022). These ASALs are particularly vulnerable to dry conditions and have experienced three severe droughts in the past 12 years: the droughts of 2010–2011, 2016–2017, and the most recent and severe one spanning 2020–2022. The latest drought has been the most intense and prolonged, extending over four consecutive below-average rainy seasons (OCHA, 2022).

By October–December 2022, it was estimated that 4.4 million people across these 23 counties would experience acute food insecurity at crisis levels or worse (IPCC, 2022). Specifically, in October 2022, the National Drought Management Agency (NDMA) categorized Turkana and Marsabit counties as being in the Alarm phase of drought (NDMA, 2022). These counties were expected to experience extremely critical levels of malnutrition from August to October and required urgent food aid. Despite ongoing humanitarian efforts, the response has been

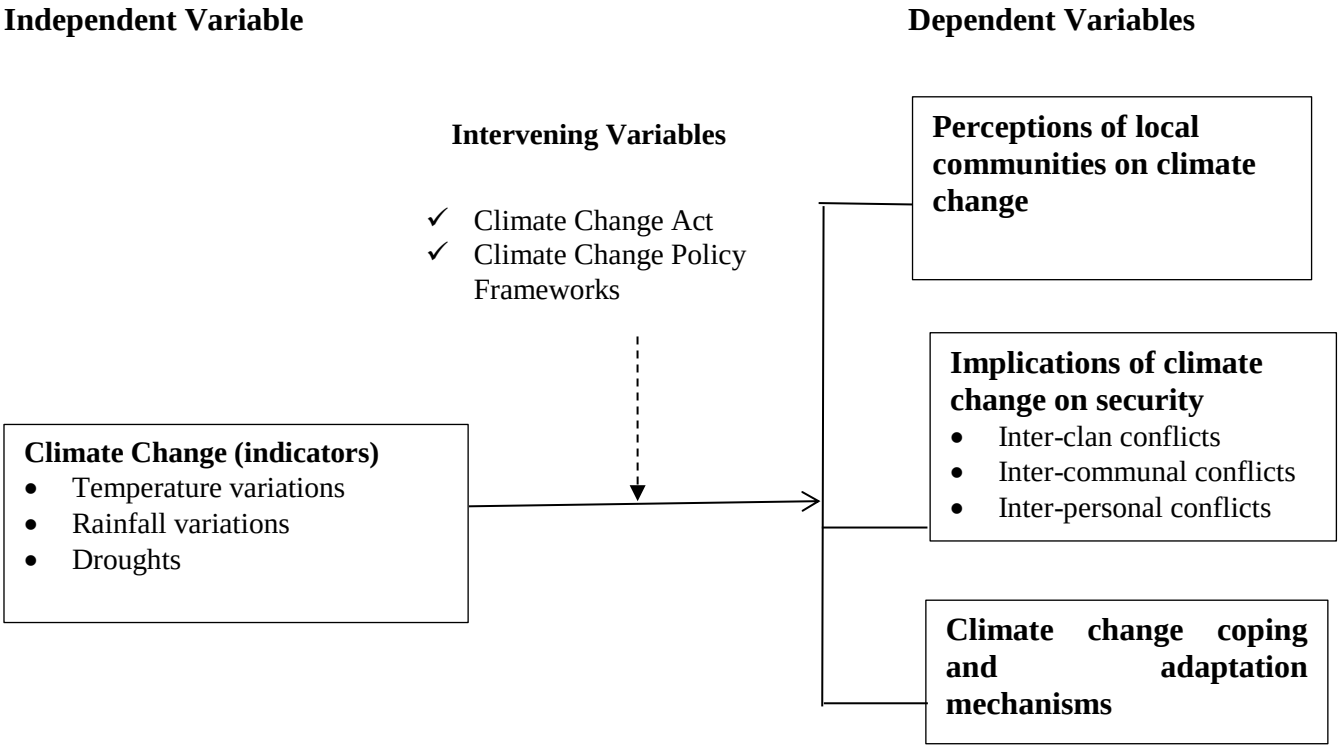
insufficient due to limited resources, leaving the needs of the affected populations unmet (OCHA, 2022).

The severe impacts of climate change have forced many households in these areas to adopt coping strategies, such as relocating near trading centers and water points to access essential resources and relief aid. However, these strategies may not be sustainable in the long term and could jeopardize the survival of pastoral communities (Morton, 2010). This study aims to build on existing literature by examining the specific challenges faced by the people of Marsabit in their efforts to cope with and adapt to climate change in the county.

## 2.2 Conceptual Framework

The conceptual framework for this study illustrates how climate change (independent variable) impacts various dependent variables: locals' perceptions of climate change, its implications for security, and climate change adaptation strategies. The National Climate Change Act and the National Climate Change Policy Frameworks serve as intervening variables, influencing these relationships. For instance, the Act and Policy Frameworks shape how communities perceive climate change and implement adaptation strategies, thereby affecting the broader implications for security. Figure 2.1 visually represents these relationships, highlighting how the independent variable (climate change) interacts with the dependent variables through the mediating effect of policy and legislation.

**Fig 2.1: Conceptual framework**




Source: Researcher, 2023

## 2.3 Chapter Summary

This chapter reviewed literature on climate change including what climate change broadly is and its general effects. The chapter also examined the implications of climate change on security. Finally, the chapter analysed literature on mitigation, adaptation and coping mechanisms to climate change. The review was done at levels starting with international, then regional and lastly local national issues were examined. The next chapter looks at the methodology for the study.

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This chapter outlines the research design and methodologies employed in this study. It provides a comprehensive overview of the methods used to investigate the research questions, including the target population, study area, sample size, and sampling procedures. Additionally, it details the data collection and analysis procedures, along with the ethical considerations adhered to throughout the study. This structured approach ensures that the research is conducted systematically and ethically, providing valid and reliable results.

## 3.1 Research Design

Creswell and Creswell (2018) describe research designs as the strategies and processes used to gather and analyze data pertaining to the variables identified in a research problem. Kothari (2004) highlights that a carefully constructed research design facilitates the smooth execution of research activities, thereby increasing efficiency. This study adopted a mixed-methods research design, combining both quantitative and qualitative approaches to deliver a thorough analysis of the research problem .

The qualitative method was used to obtain useful information from the respondents with relatively less education (who have not acquired an education beyond primary school level) since the method allows such respondents to express themselves in a language they are comfortable in. Quantitative method was used to collect data from diverse research respondents in the study area including members of national government administrative officers (NGAO), national and county government employees, development and humanitarian agencies in the county, Non-Governmental Organizations (NGOs) among others. The researcher used both quantitative and qualitative data to provide a comprehensive analysis of

the research findings.

### 3.2 Area of Study

The research was carried out within the four Sub-Counties of Marsabit County of Kenya including North Horr, Moyale, Laisamis and Saku. These sub-counties face constant resource related insecurity associated with climate change. This study attempts to establish the implications of climate change on insecurity experienced in the county, along with the coping and adaptation mechanisms used to address the problem.

### 3.3. Target Population

Arid and Semi-Arid areas (ASAL) like Marsabit County have a significant number of pastoralist households which enable investigating and assessing the implications of climate change on security among pastoralists. This study focused on this group along with national government and county officials. In addition to these, other groups of interest to the study include communal members from the different ethnic groups in the county, local elders, youth and women groups, officials from NGAO, including Chiefs and Assistant Chiefs, police, religious leaders and representatives of humanitarian and development agencies working in the county. The target population consists of individuals with knowledge on the implications of climate change on security in Marsabit County.

### 3.4 Determination of Sample size

The sample size represents a subset of the larger population. To determine the study's minimum sample size, the researcher utilized Yamane's formula, which provides a method for calculating sample sizes in research.The formula is discussed below:

$$n = \frac{N}{1 + N^{*}(e)^{2}}$$

N - is the target population

n - is the sample size

e - is the marginal error always less than 5%

Hussey and Hussey (1997) note that no survey can guarantee 100% accuracy, with error margins typically around 5% and confidence levels exceeding 95%. Based on the 2019 census, the population of Marsabit County is 459,785. The proposed sample for the study based on Yamane's formula was:

$$n = \frac{459,785}{1 + 459{,}785\ (0.05)^2}$$

$$n = \frac{459{,}785}{1 + 1{,}149}$$

n = 400

Hence, the sample size is 400

Using Yamane's formula with a 95% confidence level and a 5% margin of error, a population of 459,785 yields a sample size of 400. Random sampling was applied to allocate these 400 units among the identified population segments, ensuring each had an equal chance of selection. The sample distribution is detailed in the table below.

**Table 3.1: Sample Size Distribution**

| Category | Sample (n) |
|---|---|
| Women leaders | 17 |
| Youth leaders | 28 |
| NGAO | 41 |
| Religious leaders | 32 |
| Local elders | 40 |
| Community representatives | 188 |
| Police | 29 |
| NGOs /development agencies | 25 |
| **Total** | **400** |

### 3.5 Sampling Procedure

Kothari (2004) describes sampling as the process of gathering information about an entire population by examining only a portion of it. In this study, both probability and non-probability sampling techniques was employed to select participants. The probability sampling method to be used is simple random sampling, while the non-probability methods included snowball and purposive sampling.

Simple random sampling was used to select members of the public, communal elders, youth/women/religious leaders with knowledge on implication of climate change on security in the county. This method fits this category of respondents because their records can easily be traced from various sources in the county, hence ease of sampling. Purposive sampling was used to select government employees in the security sector such as NGAO, police, county government officials and members of development agencies.

### 3.6 Data Collection instruments

Data collection instruments are tools and techniques used to gather and measure information from various sources, providing a comprehensive understanding of the study area (Patten & Newhart, 2018). To ensure the accuracy of data for subsequent analysis, effective data collection methods are essential. This study used a mixed-methods approach to collect both qualitative and quantitative data. Qualitative data was gathered through face-to-face interviews using tools like interview schedules, while quantitative data was collected using questionnaires. Detailed descriptions of these instruments are provided in the following sections.

#### 3.6.1 Questionnaires

Babbie (2013) described questionnaires as instruments designed to help collect information that is useful to a researcher. Questionnaires allow researchers to get information on different variables of the subject of study. The advantage of questionnaires is that they allow respondents to express their opinion while safeguarding their anonymity, as names are optional for the respondents (Babbie, 2013). For this study, the questionnaire wereadministered to 348 participants. The questionnaires were arranged according to research objectives where Section A addressed demographic information of the participants; Section B sort information on the perceptions of the locals in Marsabit County on climate change; section C explored the implications of climate change on security in the county; while section D explored the climate change coping and adaptation approaches used in the study area.

#### 3.6.2 Interviews

Interviews mostly involved questions asked directly. The researcher and research assistant travelled to the field to conduct face to face interviews. The research used structured interviews which involve a set of predetermined questions. The researcher chose this method in order to provide comparability of responses from the different respondents in the study.

Interviews targeted 52 participants.

### 3.7 Validity and Reliability

Validity refers to the level of confidence that a particular finding accurately represents what it is intended to demonstrate (Selvam, 2013). Creswell and Creswell (2018) define validity as the extent to which a test instrument accurately measures what it is intended to measure. Given the researcher's background in northern Kenya and understanding of the impacts of climate change on security in the region, there is high confidence that the selected instruments provided accurate and reliable information.

Reliability, on the other hand, is the degree of confidence that a particular empirical finding can be consistently reproduced (Bryman & Cramer, 2009). To assess the reliability of the data collection instruments, such as questionnaires and interview schedules, this study was conducted a pilot study in Laikipia County. Laikipia County has many similar characteristics to Marsabit County, the primary study area. The results from the pilot study allowed the researcher to identify and correct any issues in the research instruments.

### 3.8 Data Collection Procedures

This study utilized both primary and secondary data sources. Primary data was collected directly from participants through surveys and interviews, while secondary data was sourced from existing literature, reports, and databases relevant to the research topic.

#### 3.8.1 Primary Data

Primary data offers direct insights from the source and is collected through organized and well-defined methods to ensure accuracy and relevance. In this study, interviews and questionnaires was employed to gather both quantitative and qualitative data from respondents, providing a detailed and current understanding of the research topic.

#### 3.8.2 Secondary Data

Secondary data was obtained from publications, books, journals and dissertations relevant to the study. This data was useful in the interpretation of primary data. In modern research, secondary data has the advantage of being easily accessed via internet sources and libraries. For this study, the cross-sectional review method was used to establish implications of climate change on security along with the mitigation strategies adopted in Marsabit County.

### 3.9 Methods of Data Analysis

The study applied a mixed methods approach to data analysis. Creswell and Plano (2007) describe mixed methods data analysis as involving either concurrent or sequential procedures. Concurrent data analysis entails separately collecting both quantitative and qualitative data before combining them (Creswell & Plano, 2007). In this research, concurrent data analysis was used: quantitative data was analyzed using measures of central tendency and summarized through frequencies, with descriptive statistics employed to outline the characteristics of the study variables. Qualitative data was categorized into themes derived from the data collected, which was then used to explore the relationships among key variables. The final result integrated both data types and was presented through various formats, such as tables, pie

charts, and histograms, with explanatory discussions provided for each graphical representation.

### 3.10 Ethical Considerations

The researcher has developed this research following the National Defence University's guidelines and requirements. Confidentiality of the respondents was observed through keeping individual sources of information anonymous. The necessary government permits was sought before researcher proceeds to the field. Furthermore, written consent of respondents was being sought during the research process.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## 4.0 Presentation of the data guided by the objectives

This chapter gives a detailed presentation of findings arrived at after the analysis and interpretation of data. The data has been presented according to the objectives of the study. The variables include the perceptions of climate change by the residents of Marsabit County, impact of climate change on security in the county, and climate change adaptation and mitigation strategies adopted by residents in the study area. The analysed findings were then summarized and presented in tables and graphs.

## 4.1 Discussion guided by the results

The research instruments were administered to the target population as indicated in chapter three. The study targeted 400 participants out of which 348 were chosen for questionnaires and 52 for interviews. The result of the questionnaire response rate is presented in Table 4.1.

**Table 4.1 Questionnaire Return Rate**

| **Item** | **No.** | **Percentage** |
|---|---|---|
| Returned questionnaires | 331 | 95 |
| Unreturned questionnaires | 17 | 5 |
| **Total** | **348** | **100** |

As shown in Table 4.1, out of the 348 questionnaires distributed, 331 were completed and returned, resulting in a response rate of 95%. Selvam (2010) suggests that a response rate of 50% is adequate, 60% is good, and above 70% is considered very good. Therefore, based on Table 4.1 and Selvam's (2010) criteria, the response rate for this study is classified as very good.

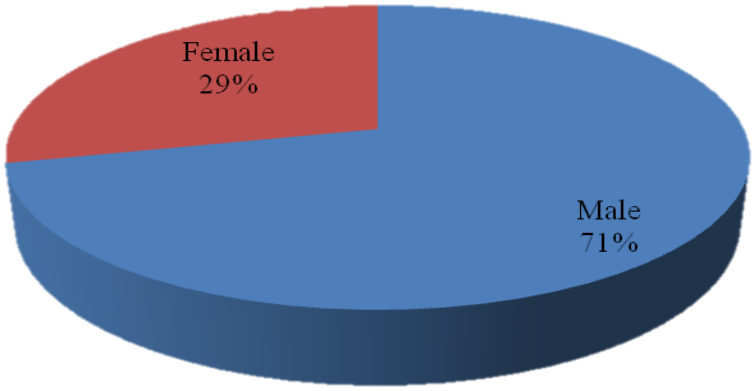
### 4.2 Demographic Information

This study sought for information on demographic background of the respondents such as age, gender and level of education, nature of occupation and length of stay/service in Marsabit County. The intention was to capture participants' experiences and assess their understanding of the challenges of climate change and the mitigation mechanisms used in the study area.

#### 4.2.1 Gender of the Participants

This study collected data on the gender of respondents. The information gathered was analyzed statistically, and the results are summarized in Figure 4.1.

**Figure 4.1: Gender of the Participants**




Source: *Researcher, 2023*

The findings in Figure 4.1 indicate that male respondents were 235 which represent 71% of the total sample, while the female accounted for 96 (29%) respondents. Therefore, the majority of respondents were male. The result in Figure 4.1 shows that data and views presented in this study are from both male and female respondents, though male respondents were a majority. Several factors could explain the large difference between female and male participation though, the patriarchal nature of pastoral communities in Marsabit County could be the main reason.

### 4.2.2 Level of Education of Participants

This study sought for information about the respondents' level of education. Data obtained from the field were then analyzed and the result summarized in Table 4.2.

**Table 4.2 Level of Education**

| Qualification | Frequency | Percentage |
|---|---|---|
| Primary Level | 66 | 20 |
| Secondary Level | 149 | 45 |
| College/University Level | 116 | 35 |
| **Total** | **331** | **100** |

Table 4.2 indicates that 66 (20%) participants were primary school leavers, mostly engaged in cattle herding, small-scale business and boda boda and taxi business. The secondary leavers constitute 149 participants which represent 45%, while 116 respondents representing 35% of the sample had attended various colleges or universities. Therefore, it can be argued that most of the respondents had a secondary school or college education. This means that the responses of the participants in this study were well-informed as a result of their good educational background.

The findings in Table 4.2 indicate that the pastoralists of Marsabit County have gradually embraced education over the years, leading to the high number of educated respondents. The findings in Table 4.2 supports those by King and McGrath (2002) which indicate that in the current environment, education is a major factor that impact people's lives positively.

### 4.2.3 Age of the Participants

The study also sought for information on the age bracket of the respondents. Data collected concerning the age of the respondents was analysed and the results presented in Table 4.3.

**Table 4.3 Age of the participants**

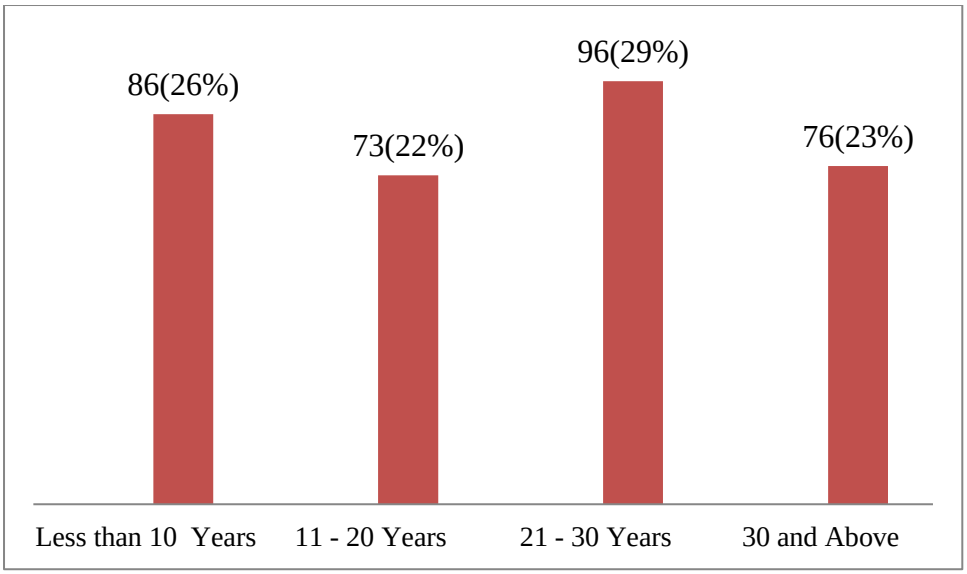
| Item | No. | Percentage |
|---|---|---|
| 18 – 34 Years | 67 | 21 |
| 35-44 Years | 146 | 44 |
| 45 -54 Years | 93 | 28 |
| 55 Years and Above | 23 | 7 |
| **Total** | **331** | **100** |

The findings from Table 4.3 indicate that 146 (44%) of the respondents were aged between 35 and 44 years; 93 (28%) of the respondents were aged between 45 and 54 years; 23(7%) of the respondents were aged 55 years and over, while 67 (21%) were aged between 18-34 years. From the table, it can be deduced that participants of youthful age formed the majority of the respondents. Possibly, the high literacy rates and understanding of climate change in the county and beyond among this group may explain their high number of participations in the study because they were knowledgeable about what was needed.

### 4.2.4 Length of Stay/service in Marsabit County

This study also sought information on the respondents' duration of stay in Marsabit County. Data obtained from the field on this question was analysed and the results presented in Figure 4.2.

**Graph 4.1 Duration of Stay in Marsabit County**




Source: *Researcher, 2023*

The findings depicted in Figure 4.2, indicate that 96 of the respondents representing 29% had lived in the study area for 21 to 30 years, while 76 participants representing 23% had lived in the area for over 30 years. A gradual increase in the population of the area was realized and 73 respondents representing 22% had lived in the area for a period of 11 to 20 years. Finally, 86 respondents representing 26% have lived in the area for less than 10 years. These findings indicate that there is constant migration of individuals from other counties into Marsabit County either for work or stay. The findings of a study by Gilbert (2013) which found out that there are constant migrations into and out of pastoralist areas in Kenya, tend to support the findings of this study.

### 4.2.5 Nature of Occupation

The study was also interested in finding out the respondents' occupation. The nature of occupation reveals the economic activities in the area and their relation to climate change and insecurity, and hence provides a basis for climate change mitigation in the county. The responses to this question were analysed and presented in Table 4.4.

**Table 4.4 Nature of occupation in Marsabit County**

| Item | Frequency | Percentage |
|---|---|---|
| Pastoralists | 205 | 62 |
| Humanitarian Agency Staff | 37 | 11 |
| Business | 46 | 14 |
| Public Officials | 43 | 13 |
| **Total** | **331** | **100** |

The findings from Table 4.4 indicate that 205 respondents which represent 62% are pastoralists while 37 participants representing 11% are employees of NGO and humanitarian agencies in the area; 46 respondents (14%) were business personalities operating hotels, shops, or tourist products, while 43 respondents representing 13% were public employees employed by the county and national governments including Police, NGAO, Agriculture and livestock service providers among others. From Table 4.4, it is revealed that a majority of the residents in Marsabit County are pastoralists dependent on livestock for livelihood.

The findings in Table 4.4 concurs with the study by Gilbert (2013) who observed that dry lands are characterized by low rainfall and high evaporation rates which make pastoralism the most viable socio-economic activity. Furthermore, findings from a World Bank study on "The Economics of Resilience in the Dry Lands in Africa" point out that competition for natural resources has intensified in the dry-lands in recent years leading to the adoption of non-pastoralist economic activities including business (World Bank, 2017). This explains the emergence of other non-traditional occupations in the previously pure-pastoralist county.

### 4.3 Discussion of the findings

This section presents the findings of the study analysed according to the objectives. The findings provide information on the perceptions of the locals in Marsabit County on climate change, the implication of climate change on security in the study area as established during the research process, and the climate change mitigation and adaptation strategies used in the county.

#### 4.3.1 Perceptions of the locals in Marsabit County on climate change

Data collected reveal that a majority of the residents of Marsabit County are knowledgeable about the changing climatic conditions which have affected their lives and livelihoods. Respondents from the four Sub-counties of North Horr, Saku, Laisamis and Saku, under examination, agreed that in the recent years, particularly from 1990s, rainfall and temperatures in the county have become increasingly irregular and unpredictable. 188 (57%) of the respondents indicated that though rainfall seasons were distinct in the past, they have currently become more unpredictable.

Temperatures were also noted to have increased. 121 (37%) observed that they have felt an increase in temperature which they claimed has significantly affected the availability of water. However, 22 (6%) of the respondents acknowledged that they had no perception of climate change and its effects in the county. This group was made up of business people who had emigrated into the county and are therefore not in a position to compare past experiences and current conditions to tell weather changes in climate have been witnessed. The perceptions of climate change by residents of Marsabit County are presented in graph 4.2.

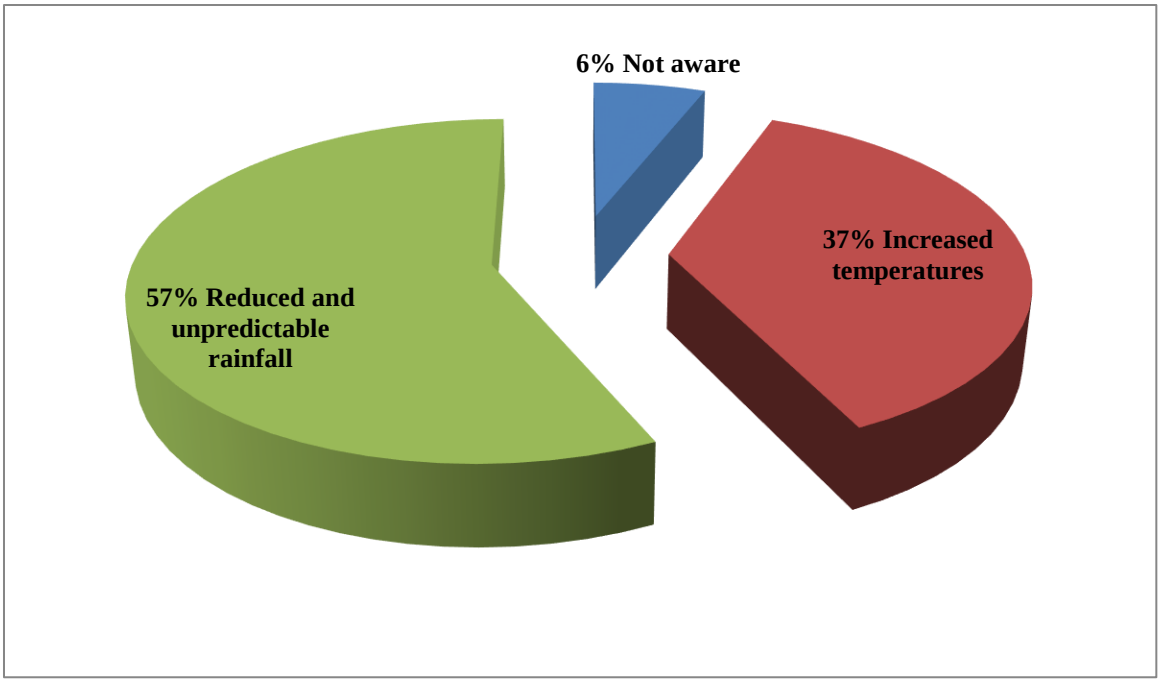



**Fig 4.2: How residents of Marsabit County Perceive Climate Change**

The results of how the people of Marsabit County perceive climate change are in line with research conducted in other African countries, such as Ethiopia, where farmers have expressed similar concerns about decreased rainfall and altered patterns of precipitation (Mengistu, et al., 2011). In contrast, Deressa et al. (2011) found that over the previous ten years, the average minimum and maximum temperatures in the neighbouring Southern Ethiopia had increased by roughly 0.25 and 0.1, respectively, while the rainfall patterns had fluctuated over the previous fifty years. Moreover, farmers in Southern Africa described decreased rainfall, floods, and droughts as stresses linked to climate change (Mubaya, 2012). Therefore, this study interpreted the significance that local inhabitants placed on their perceptions of climate change as emphasizing the importance of variability to their livelihoods and security in general.

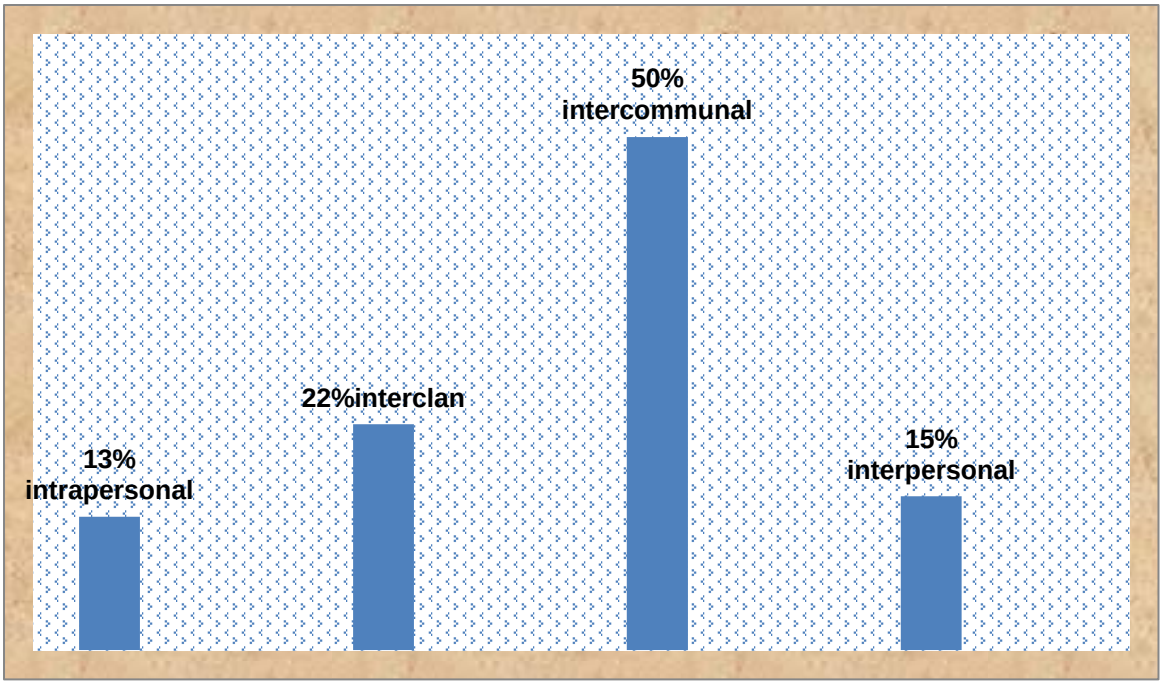
The interviewees stated that in Marsabit County, the long rains fall between April and June, and the short rains fall midway in August through November. According to the respondents, rainfall has decreased from prior years (before to the year 2000) in terms of both quantity and

quality. Temperature, precipitation, and pattern variations all have an impact on soil quality, which is important for sustaining life (Kotir, 2011). These results demonstrate that residents of Marsabit possess a thorough understanding of their environment, as evidenced by their capacity to identify their climate as either "constant" or "changing," depending on their own subjective assessment.

### 4.2.2 Implications of climate change on security in Marsabit County

The research sought to find out how climate change has influenced conflict and insecurity in Marsabit County by looking at the nature of climate change-based conflicts in the county. Regarding the nature of conflicts exacerbated by climate change in the county, 43(13%) of the respondents indicated that climate change has resulted in increased intra-personal conflicts which create trauma and increase cases of suicide. Loss of livelihoods due to increasing droughts was mentioned as a major cause of this type of conflict. 72 (22%) of the respondents argued that they mostly experienced inter-clan conflicts caused by competition over the decreasing water and pasture resources. 165(50%) of the participants noted that inter-communal conflicts were the most prevalent type of climate change-induced conflicts experienced in the county.

The respondents indicated that climate change has reduced available natural resources, making the majority pastoralists to encroach on one another’s grazing areas. Since pastoralism is largely a communal affair, the resulting competition and conflicts often take the form of one community attacking or counter-attacking another. 50(15%) of the respondents agreed that there are interpersonal conflicts manifested in the form of crimes, where individual herders invading farms belong to cultivators to feed their animals. This happens mostly when the droughts extend for long periods. The data from the field regarding this issue was analysed and presented in Graph 4.2.




Source, author, 2023

**Graph 4.2: Nature of climate change-affected conflicts in Marsabit County**

Despite the difference in their nature, the study established that all conflicts in the county result in death of human and livestock, injuries and destruction of property. This creates grievances that lead to future attacks and counter attacks creating a cycle of conflict in the county.

Data collected from interviewees showed that competition over common resources such pasture and water for human and livestock often escalate to violence. This is especially the case where climate change reduces the availability or access to those resources. In this fragile environment, the reduction of resource-availability makes it difficult to resolve or manage completion leading to outbreak of conflicts. This situation has resulted in conflicts between different pastoralist clans or communities living in the county. The interviewees indicated that pastoralists in the county have a history of adapting to changes in weather by moving their livestock according to seasons. However with climate change, the unpredictability of rainfall and the long periods of droughts experienced regularly make it impossible for the pastoralists

to retain dry season pastures. This leads to violence at different levels as pastoralists from different clans and communities crowd same grazing areas.

These findings corroborate those by Broder (2009) which illustrates that climate change leads to economic decline, environmental degradation, social instability and unrests that translate to security threat and sources of conflicts. According to Broder (2009), impacts of climate change, along with the societal responses undermine the functioning of communities, the effectiveness of institutions and the stability of societal structures leading to outbreak of conflicts and other forms of insecurities among pastoralists.

### 4.2.3 Adaptation Strategies used in Marsabit County

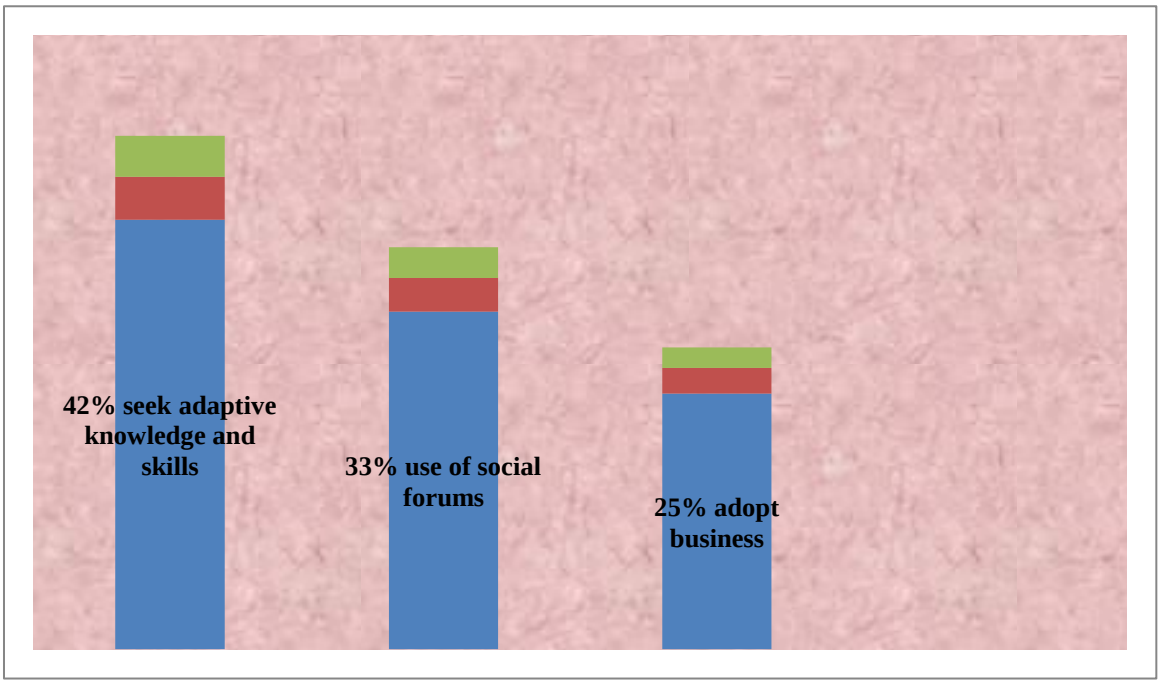
The final objective of the study sought to establish the climate change mitigation and adaptation mechanisms adopted by different categories of residents of Marsabit County. The researcher focused on strategies adopted by Marsabit women and girls on one side, and men and boys on the other.

Findings from a women's focus group discussion in Saku revealed that women in the Marsabit community are more susceptible to the effects of climate change than men. Despite these challenges, women have organized themselves to address climate change and sustain their livelihoods. Data collected showed that 83 respondents (25%) reported that women in the county have engaged in small-scale businesses such as charcoal burning, poultry keeping, bead making, water fetching for payment, and goat selling to support their families. These activities provide income to meet essential needs like food, medical expenses, and school fees, and sometimes serve as collateral for small loans from local community banks.

Charcoal burning, a common practice during dry periods, is used both for sale and household consumption. Women use dead wood for this purpose in an effort to conserve the environment. However, this practice paradoxically contributes to climate change due to the

greenhouse gases emitted during charcoal production. When dead wood is scarce, women resort to cutting down trees, further exacerbating global warming. This highlights a lack of knowledge about conservation among some women.

Additionally, 109 respondents (33%) identified women's social groups as forums for discussing climate change impacts and livelihood challenges. These groups, which include income-generating and merry-go-rounds, help foster community support and empowerment. Some women have benefited economically and socially from these networks. Furthermore, 139 respondents (42%) reported that women seek skills and knowledge from others in the community, such as traditional bead and ornament makers who teach others. The mechanisms used by women in Marsabit to adapt to climate change are detailed in graph 4.3.

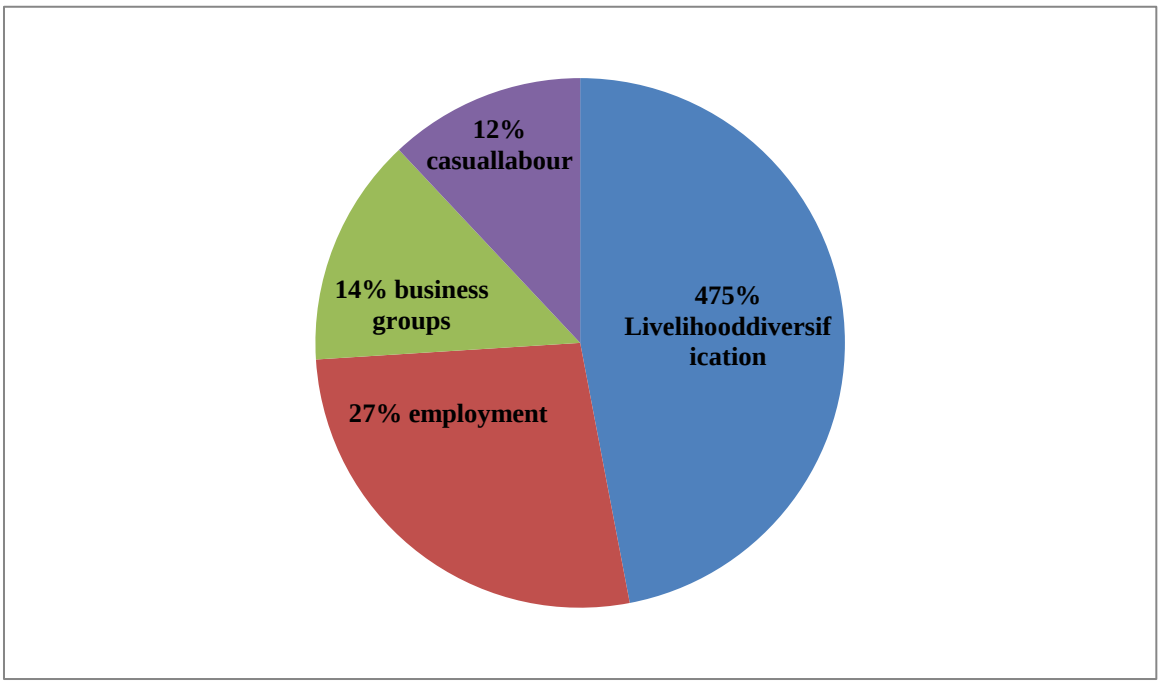



**Graph 4.3: Strategies used by women and girls to adapt to climate change in Marsabit County**

The study established that the impacts of climate change on young men in the county are also present. The responsibilities of young men towards livestock including watering the animals, driving them to grazing areas, monitoring their health and providing security for the livestock

have been strained by prolonged droughts. With the frequent and prolonged droughts, the livestock numbers have reduced drastically over time. These reductions has directly affected the young men, especially their future which is dependent on livestock to pay dowry. This has necessitated development of adaptation strategies.

According to 155 (47%) of the respondents, adaptation strategies in the county in this group include livelihood diversification or the total change of livelihoods. Men now keep poultry, goats and camels as a form of diversification. This is to support the poorly performing cattle business. Based on 89 (27%) of the respondents, some men have recently opted to do away with pastoralism and moved to urban centres to look for employment as security guards in factories and residential properties. 40 (12%) of the respondents indicated that some men have ventured to other livelihood activities such as brick making and casual labourer. 46 (14%) observed that even with the minimum skills they have, some have formed small groups through which they engage in small scale business like buying and selling of livestock which they sale-off to the local market before droughts. These findings are presented in graph 4.3.




Source, author 2023

**Graph 4.3: Adaptation strategies used by men and boys in Marsabit County**

The findings indicate that men and women of Marsabit County face challenges of climate change and hence try to survive by creating adaptation strategies crafted along their gender lines.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.0 Introduction

This chapter summarizes the findings, presents conclusions and recommendations and provides suggestions for further research on the implications of climate change on security in Marsabit County of Kenya.

## 5.1 Summary of the findings

The purpose of this study was to establish the implication of climate change on security in Marsabit County. The study was guided by three research objectives. The first objective sought to assess the perceptions of the locals in Marsabit County on climate change; research objective two sought to examine the implication of climate change on security in Marsabit County; research objective three sought to determine climate change adaptation strategies used by the locals of Marsabit County. The study adopted a mixed methods design comprising both qualitative and quantitative research approaches. The sample comprised of 400 respondents, among them, national government and county officials, humanitarian and aid agencies, communal members from the different ethnic groups in the county, local elders, youth and women groups and representatives of development agencies working in the county.

### Objective One: Perceptions of Marsabit County residents on climate change

From the study, it was revealed that most of the locals of Marsabit County were aware of existence of climate change and its impacts. From the collected data, 311 respondents representing 94% of the sample acknowledged that they were knowledgeable about climate change and its impacts in the county. Their views were that climate change manifested itself in the form of reduced rainfall, long periods of droughts and increased temperatures which have greatly affected economic activities. Most herders in the county rely on rain-based

pastoralism. This reliance leaves them vulnerable to climate change particularly long droughts. The increased droughts and reduced rainfall have led to a decline in water for livestock and pastures affecting most herders.

The respondents indicated that due to effects of climate change, livelihood production in the four Sub-Counties of Marsabit has greatly declined. This supports the findings of Agricultural Sector Development Support Programme (ASDSP) which indicate that 80 per cent of households in pastoralist areas do not have sufficient food due to climate change. Moreover government of Kenya reports based on studies conducted in 2013 and 2014 established that approximately 94% female - 89% of male - and 78% youth-led households in this region face food insecurity (GoK, 2014a) leading to high poverty rates and dependence on relief aid.

Despite the obvious impact of climate change as indicated by most of the respondents, 20(6%) of respondents indicated that they were not aware of the challenges of climate change in the county. This group was made up of immigrants from other counties employed in tourist hotels in the county. This could explain why they were not aware of the influence of climate change which has greatly affected local livelihoods.

These findings concur with those by Heltberg, Siegel and Jorgensen, (2009) which established that effects of climate change such as droughts have devastated most of Kenya's arid and semi-arid lands hindering livelihood activities and intensifying poverty and suffering.

**Objective Two: Implications of climate change on security in Marsabit County**

The study established that climate change has impacted the peace and security of residents of Marsabit County. From the data, it was determined that extreme weather conditions including droughts, that lead to the decline in availability of resources such as pasture and water, affects the livelihoods of vulnerable households, enhancing migrations, and straining the capacity of clans and communities in the county to peacefully address conflicts. This creates factors that

motivate beak out of violence leading to increased insecurity. The causal relationship between climate change and insecurity in Marsabit County was identified and supported by 298(90%) of the respondents. The respondents pointed out that the effects of climate change on security in the area vary though most can be clustered into different pathways: adverse effects on livelihoods, the effects of climate impacts on resource competition, and human mobility, and the implications of climate change on the unstable and weak local governance and conflict resolution structures.

33(10%) of the respondents however could not link climate change to conflict and insecurity in the county. Their views were that conflict and insecurity have traditionally existed among cattle-rearing communities and therefore assuming that climate change is responsible for the rampant insecurity in Marsabit County is not true. They determined that other factors especially negative ethnicity, politics, politics and boundary issues played a greater role in creating insecurity in the area compared to climatic change. These views concurs with those by Peter Gleick (2017) who determined that the relationship between climate change and insecurity is largely probabilistic with no standard evidence to assume that climate change leads to conflict. Therefore, it cannot be proven that a given conflict would not have occurred in the absence of climate change.

**Objective Three: Climate Change Adaptation Strategies used in Marsabit County**

On this objective, the study established that all genders and categories of people in Marsabit County are affected by climate change. To reduce the impact of climate change, different strategies have been adopted. A greater percentage of the population 153 (46%) coped by adopting new economic activities where women for stance, have adopted small scale businesses. Men have also entered business where they trade in small animals like goats and

sheep. The proceeds from these activities are used to buy food, pay school fees for children, settle hospital bills and the remainder reinvested back into the business.

83(25%) of the respondents determined that the challenges of climate change have forced former pastoralists to seek employment in nearby towns. Those with relatives in distant cities have also moved there to seek employment in private security firms and in cultural institutions like museums. This has helped reduce pressure on pastoralist resources in the county. 89(27%) of the respondents indicated that formation of social groups by both men and women is a preferred option for most locals looking for ways to adapt to climate change. Through these associations, residents share ideas on how to adapt and hold merry-go-rounds, especially for women, which help in raising money used in times of need. Money acquired from these activities help in buying food during droughts and famine.

6(2%) indicated that they had no idea how local residents were adapting to climate change. A majority of these people also indicated that they were not aware of the existence of climate change in the county which helps explain their lack of knowledge of adaptation strategies used in the county.

Despite the existing efforts to adapt to climate change, the research established that several factors including poverty, cultural practices and illiteracy played a huge role in hindering effective and sustainable adaptation to climate change in the county.

### 5.2 Conclusion derived from the Summary

The study established that in Marsabit County, the majority of residents perceive climate change through several indicators including reduced and unpredictable rainfall, frequent droughts and increased temperatures. These factors have led to a reduction in pastoralist livelihoods as increasing droughts have led to a decline in the availability of pasture and water for both livestock and people. This is more so because most herders rely on rain which has

become unreliable. Dependence on rain has led to livestock losses. Due to climate change, nomadic pastoralism has become unsustainable as the long dry spells often result in the drying up of water points and pastures leading to death of many livestock. Generally, due to climate change, herders experience reduced amount of rainfall, reduced amount of vegetation, reduced pastures, reduced availability of water, increased frequency of droughts, increased livestock and human diseases which have pushed livelihood activities to the edge, pushing more people into poverty.

Concerning the impact of climate change on security in the county, the study established that climate change has become one of the most serious multipliers of insecurity and conflict in Marsabit County. The frequent droughts and change in rain patterns and quantity as a result of climate change combine with other local factors to increase the risk of violent conflicts in the county. The major finding here is that climate change has reduced available natural resources, in the process increasing competition, migration and lawlessness which have exacerbated conflict. The conflict experienced take different forms including inter-clan, intercommunal and interpersonal forms. The outcome of the conflicts has been death and destruction of property.

To adapt to climate change and its impacts, this research established that locals have adopted different strategies which include embracing business, employment, casual labour, and formation of social groups which help in raising money needed to buy basic needs when the conditions get difficult.

### 5.3 Recommendations of the study

The study recommends the following to help strengthen the adaptive capacity of residents of Marsabit County to climate change and its effects:

a. More research to be conducted to gather data on climate change in arid and semi-arid areas with the aim of establishing useful adaptation mechanisms and the challenges facing the successful implementation of different adaptation strategies. Analysis based on field-based data acquired from this research can help in development and implementation of applicable and useful climate change adaptation strategies in Marsabit County and beyond.

b. Embrace agroforestry as an effective coping strategy for residents of Marsabit County. The county government, local and international actors, as well as the national government need to encourage local farmers to embrace agroforestry. Considering that agroforestry entails intentional integration of shrubs and trees into crops and animal farming systems, the adoption of this system of mixed farming in areas where water is available lead to production of food while rehabilitating the degraded land. Moreover, the inter-cropped trees were important in rehabilitating grasslands and enhancing production of pasture for livestock.

### 5.4 Suggestion for Further Research

Similar research should be carried out in other counties with similar characteristics to Marsabit for the purpose of comparison and to allow for generalization of findings on implications of climate change to security.

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## APPENDIX I: QUESTIONNAIRE

**Introduction**

I am Abdul Aziz Mohammed conducting a research on the Implications of Climate change on Security in Marsabit County. The study is conducted as part of the requirement for the award of Diploma at National Defence University -Kenya. You are invited to provide your views.

Any information provided was confidential and was only used for academic purpose.

**Section A: Demographic Information**

Please answer the following questions (tick where necessary)

1. Gender (Please tick one)

| | |
|---|---|
| Male | [] |
| Female | [] |

2. Age bracket (Please tick one)

| | |
|---|---|
| 18-27 Years | [] |
| 28-37 Years | [] |
| 38-47 Years | [] |
| 48-57 Years | [] |
| 58-67 Years | [] |
| 68 and above | [] |

3. Level of Education (Please tick your highest education level)

| | |
|---|---|
| Never gone to school | [] |
| Primary School Level | [] |
| Secondary School Level | [] |
| Higher than Secondary School Level | [] |
| Tertiary Education Level | [] |

| | |
|---|---|
| University Degree and above | [] |

4. How long have you lived/worked in Marsabit County? (Please tick one)

| | |
|---|---|
| Less than 1 Year | [] |
| 1-10 Years | [] |
| 11-20 years | [] |
| 21-30 years | [] |
| 31-40 years | [] |
| 41-50 years | [] |
| Over 51 years | [] |

5. What is your economic activity? (Please tick one)

| | |
|---|---|
| Local pastoralist | [] |
| National government employee | [] |
| Humanitarian worker | [] |
| Police | [] |
| NGAO | [] |
| NGO/Development agency staff | [] |
| County government employee | [] |
| Any other (please indicate) | |

**Section B: Perceptions of Local people on Climate Change**

Answer each question appropriately

1. Do you understanding what climate change is?

Kindly explain..……..

……

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……

2. In your opinion, what causes climate change?

……

……

……

3. Do you thing that the locals of Marsabit contribute to the problem of climate change? Please explain your answer.

……

……

……

4. Does climate change have implications in the county?

a. Yes [] b. No []

If Yes, kindly explain how,

……

……

……

**Section C: Implications of Climate Change on Security in Marsabit County**

Tick the appropriate answer

1. Do you think that climate change has affected the security in Marsabit County?

a. Yes [] b. No[]

If yes, please explain,

……

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……

2. In your opinion, how does climate change affect intercommunal relations in the County?

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……

3. Does the effect of climate change on livelihoods and natural resources affect security in the county?

a. Yes [] b. No[]

If Yes, kindly explain how

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……

4. What type of climate change related conflict take place most in the county?

a) Interpersonal []

b) Inter-clan []

c) Inter-communal []

d) Any other (please indicate) ……. ……

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5. Does the climate change impact on security affect livelihood and economic activities in the county?

a. Yes [] b. No []

If yes, please explain

how,……..…….

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**Section D: Climate Change Adaptation Strategies in Marsabit County**

1. Do you feel that the effects of climate change can effectively be mitigated?

a. Yes [] b. No []

Please explain how your answer,……

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……
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……
……
…….

2. What agency is at the forefront in the fight against climate change in Marsabit County?

a) National government through its ministries []
b) County government []
c) Individual actors []
d) International organizations []
e) Any other (please indicate)

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…

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3. Do you feel that enough is being done to help the locals of Marsabit County to cope with climate change?

a. Yes []  b. No []

Please explain your answer,……..……..

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……

4. What are the common measures taken by locals of Marsabit County to adapt to climate change?

a) Regularly migrate with their herds to other counties []
b) Reduce the number of their herds []
c) Adopt technology in their activities []
d) Adopt mixed farming and other economic activities []
e) Any other (please indicate) ……

5. Have the coping measures adopted by the locals been effective?

a. Yes []  b. No []

Please explain your answer,……..……

……

……

……

……

……

6. What challenges do coping and adaptation strategies against climate change face in Marsabit County?

a) Financial limitations []
b) Lack of goodwill []
c) Poor coordination []
d) Ignorance by local populations []
e) Any other (kindly indicate)

……..……

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7. What measures do you think should be taken to strengthen the fight against effects of climate change in Marsabit County?

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## APPENDIX 2: INTERVIEW GUIDE

1. Do you consider climate change to be a reality?
2. Do you agree that climate change has effects in Marsabit County?
3. What would you consider as the main causes of climate change?
4. How does climate change affect security in Marsabit County?
5. Does the lack of security affect economic activities in Marsabit County?
6. What type of climate change related conflicts are present in Marsabit County??
7. What efforts are being made to mitigate the effects of climate change in the county?
8. Who are the actors in the fight against climate change in Marsabit County?
9. What challenges is the fight against climate change in Marsabit County facing?
10. How can the challenges facing climate change mitigation strategies and actions in Marsabit County be addressed?

## APPENDIX 3: SIMILARITY REPORT

IMPLICATIONS OF CLIMATE CHANGE ON NATIONAL SECURITY IN KENYA: A CASE STUDY OF MARSABIT COUNTY COL A A MOHAMMED

ORIGINALITY REPORT

| 14% | 12% | 9% | 4% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
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