NATIONAL DEFENCE UNIVERSITY - KENYA

NATIONAL DEFENCE COLLEGE

EFFECTS OF CLIMATE VARIABILITY ON INTER-COMMUNAL CONFLICT PATTERNS: A CASE OF NORTHERN KENYA

COL G M BEBORA - ND201/0027/2023

NDC Cse 26 - 2023/2024

DR. MICHAEL SITAWA

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DIPLOMA IN NATIONAL SECURITY AND STRATEGY

FEBRUARY, 2023

DECLARATION

Student's Declaration

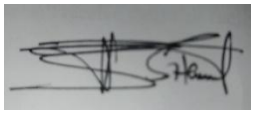
This study has been conducted independently, and I am extremely grateful to all those who have, in one way or another, contributed and provided assistance during the research.

I want to acknowledge that this project has not been presented in any similar or distinct format to this educational institution or any other institution, either for academic purposes or otherwise.

Signature……..... Date……

Supervisor's Declaration

This project has been submitted for review with my approval as University Supervisor.

Signature  Date…….....

Department…….....

DEDICATION

I wish to dedicate this research project to the Almighty God, my family and my college mates.

ACKNOWLEDGEMENT

Heartfelt gratitude is extended to the Almighty God for the gift of life and a clear mind, enabling the successful completion of this study. I would like to express my sincere appreciation to everyone who contributed to the success of this research. A special acknowledgment goes to **Dr. Michael Sitawa**, my Supervisor, for his valuable advice, keen interest, timely criticisms, corrections and encouragement. My deepest thanks to my family also for their unwavering support and encouragement throughout my academic journey. May God bless all those who played a role in making my study a success, even if not mentioned personally.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

ACLED: Armed Conflict Location and Event Data Project

ASALs: Arid and Semi-Arid Lands

CEWARN: Conflict Early Warning Network

ENSO: El Nino-Southern Oscillation.

GoK: Government of Kenya

IPCC: Intergovernmental Panel on Climate Change

SALW: Small Arms and Light Weapons

SIDS: Small Island Developing States

UNFCCC: United Nations Framework Convention on Climate Change

UNISDR: United Nations Office for Disaster Risk Reduction

DEFINITION OF TERMS

Climate Variability: Refers to the climatic patterns' natural variances and swings throughout a range of timescales. It incorporates both transient and permanent temperature changes, precipitation, air pressure and other climatic factors.

Climate: Refers to a region's long-term patterns of temperature, humidity, wind, precipitation and other meteorological factors over an extended period of time. It shows the normal weather that a place has experienced over a number of decades, along with all of its variations and extremes.

Conflict: Refers to a contention or struggle that arises between people groups or nations because of divergent interests, ideals, objectives or other circumstances. It can take many different shapes and happen at varying scales, from small-scale domestic disputes to major international battles.

Drought: Is an unusually long period of abnormally low precipitation, resulting in scarce supply of water for various activities and ecosystems. It is a natural phenomenon characterized by an extended deficiency in rainfall or other forms of precipitation relative to statistical multi-year averages for a region.

Evapotranspiration: The process via which water evaporates from soil, other surfaces and transpires from plants to enters the atmosphere.

Inter-Communal Conflict Patterns: Refer to recurring and observable dynamics of conflict between different communities or groups within a geographical area. These conflicts typically involve social, economic, political or environmental factors that lead to tensions and hostilities between communities.

Shrinking Grazing Lands: Refer to a reduction or decrease in the available areas of land suitable for grazing livestock. This phenomenon is often associated with environmental changes, land-use practices or climatic factors that negatively impact the size and quality of areas where animals can graze on vegetation.

Temperature: Refers to the degree of hotness or coldness of a substance, object or the surrounding environment, typically measured in degrees on a scale such as Celsius (°C) or Fahrenheit (°F).

Water Sources: Refer to locations or outlets where water is obtained for various purposes, such as drinking, irrigation, industrial processes or domestic use. These sources can be natural or human-made and play a crucial role in sustaining life and supporting various activities.

ABSTRACT

Climate variability has emerged as a critical factor influencing the socio-environmental dynamics of regions worldwide, with profound implications for vulnerable communities. In particular, the arid and semi-arid regions of Northern Kenya have witnessed significant shifts in climate patterns, characterized by irregular rainfall, prolonged droughts and rising temperatures. The general objective of this study was to assess the effects of climate variability on inter-communal conflict patterns: a case of Northern Kenya. The specific objectives of the Study were; to assess the effects of increased temperatures and drought in relation to inter-communal conflict patterns in Turkana County, Northern Kenya, to analyse the extent shrinking grazing lands affect inter-communal conflict patterns in Turkana County, Northern Kenya and to evaluate the effect of decreased water sources on inter-communal conflict patterns in Turkana County, Northern Kenya. The study was based on classical theories. The research design, study population, sample, data collection, data analysis and ethical issues were among the research designs used in this study. Given the complexity of the issue and the need to understand the nuances of climate-related conflicts in Northern Kenya, an exploratory research design was suitable. The study specifically concentrated with the key counties and regions within Northern Kenya that are commonly associated with climate-related conflicts, to include; Turkana County, Marsabit County, Isiolo County, Samburu County, Wajir County and Garissa County. This study targeted Government Reports and Publications, Scholarly articles, research papers, theses and dissertations, NGO and International Organization Reports containing data on climate patterns, resource management, conflict incidents and government responses. The study was a desk-top research and the collected data was purely secondary and qualitative. The study employed desktop qualitative data analysis techniques, such as thematic coding, to analyse the data. This study ensured that the secondary data accessed do not contain personally identifiable information or confidential data. The findings indicate that increased temperatures and drought have contributed to inter-communal conflict patterns in Turkana County, Northern Kenya. Additionally, the study confirms that the reduction in grazing lands is impacting inter-communal conflict patterns in the region. Diminished water sources were also identified as a factor affecting inter-communal conflict patterns in Turkana County. The impact of climate variability, and by extension, climate change further complicates food production processes, including the loss of pasture. These radical changes are causing tensions, survival anxieties, population displacements and migrations. The study recommends that local development programs should be strategically oriented towards long-term resilience to mitigate the adverse effects of climate change and variability on the Turkana community. In Turkana County, conflict-sensitive adaptation requires diversifying livelihoods, such as introducing more sedentary farming, reducing the number of animals, preserving the environment and increasing the availability of water sources. The researcher recommends in-depth case studies focusing on specific regions within Northern Kenya to explore the localized dynamics of climate variability and its impact on inter-communal conflicts.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Climate variability has emerged as a critical factor influencing the socio-environmental dynamics of regions worldwide, with profound implications for vulnerable communities. In particular, the arid and semi-arid regions of Northern Kenya have witnessed significant shifts in climate patterns, characterized by irregular rainfall, prolonged droughts and rising temperatures. As these climatic changes unfold, they intertwine with pre-existing social, economic and political conditions, creating a complex web of challenges that impact various facets of community life. This study focuses on unraveling the effects of climate variability on inter-communal conflict patterns in Northern Kenya, seeking to understand how climatic shifts contribute to tensions among communities in the region. This chapter introduces the study background, problem statement, research objectives, research questions, justification and significance of the study, the scope and limitations.

1.1 Study Background

Climate change is expected to worsen human livelihoods, socioeconomic status and conflict levels and patterns over time, particularly in contexts of pre-existing tensions, inequality and other vulnerabilities (Mobjörk et al., 2020). As a result, vulnerable communities and those who are disproportionately affected bear the greatest burden. Impacts of climatic changes are being felt both locally and globally (Serdeczny et.al., 2017; Legg, 2021; İsmail, 2022). In Syria, a severe and prolonged drought from 2006 to 2011 contributed to agricultural failure, rural-to-urban migration and social unrest. The resulting displacement and unrest, compounded by other political and socioeconomic factors, played a role in the escalation of the Syrian conflict. In

Rohingya (Southeast Asia), a refugee crisis in Myanmar was exacerbated by climate-related factors. In 2017, Ahmed et.al., (2021) states that Cyclone Mora displaced thousands of Rohingyans, pushing them into already overcrowded refugee camps in Bangladesh. The interplay of climate impacts, displacement and underlying ethnic tensions further strained the region.

Yemen, one of the most water-scarce countries in the world, has experienced water shortages exacerbated by climate change (Varisco, 2019). This, coupled with a history of political instability and social grievances, has contributed to the ongoing conflict in the country. In South American regions like the Amazon, Mariano-Neto (2022) established that in the rainforest, climate change-induced deforestation has led to land disputes between indigenous communities and loggers or agribusiness interests. Conflicts arise over access to and control of resources, as well as environmental degradation. In some areas of South Asia, Rasul (2021) noted that melting glaciers due to climate change have affected water availability for agriculture, irrigation and human consumption. This has the potential to exacerbate existing ethnic tensions, particularly in areas where water resources are shared across borders.

Africa continues to face serious insecurities and instability due to increasing and morphing contemporary security threats (ACLED, 2020). High poverty rates, susceptibility and extremely inadequate risk management systems on the continent make Africans especially vulnerable to climate-related risks such as periodic drought and food insecurity. Concerns regarding the frequency, severity and size of catastrophes brought on by extreme weather and climate are growing, with floods emerging as the most common type of disaster in recent years (CRED, 2022). More people are impacted by floods than by any other geophysical hazard and they are responsible for 31% of all natural hazards' global economic losses (UNISDR, 2015a, 2015b).

Some of these conflicts are interlinked with climate change. For instance, the Lake Chad Basin, which encompasses Nigeria, Chad, Niger and Cameroon, has experienced a prolonged drought and the shrinking of Lake Chad due to climate change (Ehiane & Moyo, 2022). The region has also faced increased competition for water and land resources (Onamuti, Okogbue & Orimoloye, 2017). This environmental stress, combined with existing political and ethnic tensions, has contributed to conflicts between pastoralists and farming communities over access to dwindling water and grazing resources.

According to Islam (2023) the Darfur conflict, which began in the early 2000s, is often attributed to a complex interplay of factors, including environmental degradation and climate change. Raleigh and Urdal (2017) state that, drought and desertification in the region have resulted in scarcity of resources, leading to conflicts between sedentary farmers and nomadic herders over land and water. As per Lenshie (2022), Nigeria has witnessed clashes between Fulani herders and Hausa farmers, particularly in the Middle Belt region. Climate change-induced desertification and the shrinking of grazing lands have forced Fulani herders to migrate southwards, leading to conflicts with farming communities over land use and resource access. The Tuareg rebellion in Mali, which has been ongoing for decades, has roots in a combination of political, economic and environmental factors.

The Eastern Africa region has had its fair share of national security threats and emergency-related incidents (Gesami, 2022). At least 1,200 people died in the area in 2019 as a result of landslides, cyclones and flooding, and 33 million people-more than half of them being children-were considered to be in danger of food insecurity. In 2020, at least 1.6 million Somalis, Sudanese and Ethiopians were forced to evacuate their homes due to intense flooding (Awedoba et.al., 2022). Due to the climate-related disaster in 2019, at least 33 million people in the region-

or 10% of the entire population across ten countries-experienced emergency levels of food insecurity or worse (Save the Children, 2019). Benjaminsen (2016) found that climate change has contributed to environmental stress in the Sahel region, impacting agriculture and livelihoods. These challenges have added to the existing grievances of the Tuareg population, leading to tensions and conflicts with the government. Both Ethiopia and South Sudan have experienced internal conflicts influenced by climate change (Ahmed et.al., 2021). Prolonged droughts and environmental degradation have heightened competition for resources, resulting in communal conflicts over water and grazing lands. The Tana River Basin in eastern Kenya has witnessed conflicts between pastoralists and farming communities (Kipkemoi, et.al., 2017). Climate variability (which refers to the natural variations and fluctuations in climate patterns over different timescales) has impacted agricultural productivity, water availability and grazing lands, leading to disputes over land and water resources. During periods of water scarcity, tensions escalate between these communities, often leading to violent confrontations. A study by Mohamed et.al, (2020) found that the Isiolo and Meru communities in central Kenya have experienced recurring conflicts over land and grazing resources. Climate variability, including changing rainfall patterns, increased temperatures and prolonged droughts, has contributed to shifts in vegetation cover and availability of pastureland. As pastoralists from different communities move their herds in search of grazing lands, conflicts can arise over territorial rights and resource access.

Njoka et.al., (2016) established that Lamu County in coastal Kenya has also experienced tensions between agricultural and pastoralist communities due to climate-related pressures. Changes in weather patterns and rises in sea-levels impact both fishing activities and agricultural practices. As communities compete for limited resources, conflicts can arise over fishing grounds and arable land. The Mandera Triangle, where the borders of Kenya, Ethiopia and Somalia converge,

is affected by climate variability, including droughts and food insecurity (Haider, 2020). Scarce resources, combined with porous borders, have resulted in pastoralist and ethnic conflicts between communities from the three countries, leading to violence and displacement.

Northern Kenya, especially Turkana county, experiences significant climate variability due to its geographical location and proximity to the equator (Alahacoon et.al., 2021). The region lies within the arid and semi-arid lands (ASALs) of Kenya, characterized by low and erratic rainfall, high temperatures and scarce water resources. Climate variability and its impact on inter-communal conflicts in northern Kenya is a pressing issue with real and immediate consequences for the affected communities. In order to effectively mitigate and prevent conflicts in the region, it is imperative that solutions for understanding the complicated relationship between climate variability and conflict patterns be developed.

1.2 Problem Statement

Turkana County's resource-based conflicts, influenced by climate variability, are a complex interplay of environmental stressors, socio-economic vulnerabilities and traditional conflict triggers, raising questions about their frequency, intensity and patterns. The year 2017 saw erratic rainfall patterns and decreased crop yields in Turkana County (Agesa et.al., 2019). Climate-induced agricultural decline impacted livelihoods, strained resources and led to conflicts over access to resources, disrupting daily life and escalating tensions between ethnic groups. In 2019, Hodbod et.al., (2019) established that there was a combination of reduced agricultural productivity due to changing rainfall patterns and a depletion of fish stocks in Lake Turkana which contributed to heightened food insecurity in the region. Local communities struggled with staple food scarcity, leading to increased intergroup conflicts and straining relationships due to competition for resources and climate change impacts. In 2020 Cianconi, Betrò & Janiri (2020)

discovered that there were Migration and Border Disputes. Climate stressors led to migration, causing conflicts between migrating and settled communities over resource access and territorial boundaries, highlighting the strain on fragile relationships caused by climate-induced migration. According to Imana & Zenda (2023), in 2021, drought conditions in Turkana County significantly reduced the availability of grazing lands for livestock. The negative consequences of climate variability and change can heighten the likelihood of violent conflicts among communities whose livelihoods depend on climate-sensitive activities such as agriculture, pastoralism and fishing. Deteriorating living conditions exacerbate social, economic and political grievances by further marginalizing these vulnerable groups. When alternative livelihood options are lacking, there is an increased risk that people may resort to violence to defend or gain access to natural resources. A comprehensive investigation into climate variability's effects on conflict patterns in the northern part of Kenya is needed to develop targeted mitigation and adaptation strategies. The above past studies in Kenya reach varying conclusions about the role of environmental factors as conflict drivers in Kenya. As a result, the goal of this research is to achieve harmony.

1.3 Research Questions

The study was guided by the following study questions:

i. What are the effects of increased temperature and drought in relation to inter-communal conflict patterns in Turkana County, Northern Kenya?
ii. How do the shrinking grazing lands affect inter-communal conflict patterns in Turkana County, Northern Kenya?
iii. What is the impact of decreased water sources on inter-communal conflict patterns in Turkana County, Northern Kenya?

1.4 Objectives of the Study

The general objective of this study was to assess the effects of climate variability on inter-communal conflict patterns: a case of Northern Kenya.

The specific objectives of the study are:

i. To assess the effects of increased temperature and drought in relation to inter-communal conflict patterns in Turkana County, Northern Kenya.
ii. To analyse the extent shrinking grazing lands affect inter-communal conflict patterns in Turkana County, Northern Kenya.
iii. To evaluate the effect of decreased water sources on inter-communal conflict patterns in Turkana County, Northern Kenya.

1.5 Justification of the Study

A significant majority of individuals residing in northern Kenya experience extreme poverty, to illustrate, approximately 87.5 % of the population is considered to be living in conditions of absolute poverty (Tole, 2018). In regions like Turkana County, more than half of the population relies heavily on food assistance and safety programs every year (Ratemo, et.al., 2020). The people already struggling with poverty in these remote areas face an additional challenge in the form of increasingly erratic weather patterns, a result of climate variations and changes. Conflicts cases are rampant in the areas especially between communities over resources.

The prolonged conflict between the Turkana and other ethnic groups along their borders has led to numerous detrimental consequences. These include a significant loss of lives, substantial livestock casualties, the displacement of residents, strained relations between communities, disruptions to both socio-economic activities and ways of life, damage to infrastructure including educational institutions and an overall setback in developmental efforts (Sax et.al., 2022). As a

result of this conflict, many agro-pastoral communities often find themselves unable to access ample pasture, water sources and productive agricultural lands due to the conflict's ongoing impact.

According to The Armed Conflict Location & Event Data Project (ACLED) data, when comparing the same period in 2022 to 2023, pastoralist militia activities have been trending upward. According to ACLED's data, there were 69 incidents of violence by pastoralist militias between January 1 and March 24, 2023, which is 77% more than there were between October 10 and December 31, 2022. These clashes involving pastoralist militias contribute to nearly 30% of the overall violence incidents in Kenya during the first quarter of 2023. At least 73 deaths have been reported as a result of these incidents. At least six people, including four police officers, were killed when suspected Pokot pastoralist militias ambushed a group in one of the deadliest attacks on security personnel that year. The event happened on February 10 in the Kaakong district of Turkana County along the Kitale-Lodwar route. Furthermore, 12 other individuals sustained injuries, including seven police officers.

The link between climate variability and changes and some of the violent incidents has not yet conclusively been established but many cases of conflicts have been witnessed in the region. Nonetheless, there is limited available information regarding how these climate shifts cause conflicts between the communities who compete for the same scares resources as well as the inter-communal mitigation measures in place in Turkana County, Northern Kenya. Impact models have been utilized, along with limited socioeconomic analyses, to investigate the effects of climate variability and change on various sectors like water resources, agriculture, health and rangelands ecosystems but do not link it with the ever increasing conflicts (Wassie, 2020; Guye, Legesse & Mohammed, 2023; Hirwa et.al., 2022). There is a global suggestion for Africa to

adopt an integrated assessment strategy for vulnerability studies. This approach should focus on smaller, more localized scales to better consider the impact of local conditions, as emphasized by the Inter-governmental Panel on Climate Change (IPCC) in 2014.

In light of this gap, the purpose of this research is to offer greater clarity on the effects of climate variability on inter-communal conflict patterns with specific reference to Northern Kenya. Consequently, this current study contributes by shedding light on how climate variability and inter-communal conflicts may be related. It will investigate inter-communal mitigation measures in place in Turkana County. This analysis holds significant importance for refining effective strategies to solve inter-communal conflicts to future instances of extreme climate events. It also serves to update existing scientific understanding, public awareness and policy discussions concerning climate change.

1.6 Significance of the Study

Inter-communal conflicts in Turkana County, Northern Kenya cause loss of lives, displacement and livelihood disruptions. Understanding climate variability's role in these conflicts can reduce suffering and improve the well-being of the local populace, as this may better prepare these communities for this eventuality. Addressing root causes of such conflicts can build resilient communities, promote sustainable development and address environmental changes like desertification and land degradation hence the significance of this study.

Policy Formulation

The study's findings can inform policymakers and government agencies, including law enforcement agencies, about the underlying causes of inter-communal conflicts in Turkana

County. It can influence the development of policies that incorporate techniques for managing sustainable resources, procedures for resolving disputes and adaptation to climate change.

Understanding how climate variability affects conflict patterns can help local communities develop better coping strategies and adaptive measures to withstand the impacts of climate change and reduce conflicts. Insights gained from the study can support peacebuilding initiatives by addressing the environmental and climatic factors that contribute to conflicts. The study's findings can be relevant beyond Kenya's borders, contributing to global discussions on climate-induced conflicts and fostering international cooperation in addressing the shared challenges of climate change.

Academic and Research Contributions

By adding to the body of knowledge on climate change, conflict studies and environmental security already held by NDC and the academic community, the study advances our comprehension of the intricate relationships that exist between inter-communal conflicts and climate variability.

1.7 Assumptions of the Study

The study assumes a causal relationship between climate variability and inter-communal conflict patterns. It assumes that changes in climate patterns can directly or indirectly influence conflict dynamics in Turkana County, Northern Kenya. The study also assumes that the data sources used for climate data, conflict incidents and other variables are accurate, reliable and representative of the actual situation in the region. The study may assume that findings from the study area can be generalized to other regions with similar characteristics, although each context may have unique factors influencing conflict dynamics.

1.8 Scope of the Study

The scope helps ensure that the study remains feasible, manageable and relevant to the research objectives. This study focused on Turkana County in Northern Kenya and its immediate environs, specifically the arid and semi-arid regions where inter-communal conflicts are prevalent. It may narrow down the investigation to specific areas or communities within this region, mainly in the areas of Marich Pass, Turkwell and Kainuk areas where the Turkana community border with the Pokots. The study was carried out between August 2023 to February 2024. The study only examined relevant climate variables, such as rainfall patterns, shrinking grazing and agricultural lands, temperature trends and frequency of extreme weather events. It may also consider factors like drought severity and length. The study covered the various forms of inter-communal conflicts, including resource-based conflicts, livestock raiding incidents and disputes over land and water resources. It also investigated trends in conflict intensity and frequency.

1.9 Limitations of the Study

The study was limited to Turkana County, Northern Kenya and its immediate environs. Due to time constrain the study relied on secondary data. Availability and reliability of data on climate variability and conflict incidents was limited, especially in remote and conflict-affected areas. Historical climate data had gaps and conflict data did not capture all incidents due to underreporting or data collection challenges.

Establishing direct causality between climate variability and inter-communal conflicts was challenging since conflicts often have multifaceted causes and climate factors might interact with various social, political and economic drivers. The study's findings will not be fully generalizable to other regions or contexts, as the drivers of conflicts and responses to climate variability can

differ significantly between regions. Conducting research in conflict-affected regions required sensitivity to the safety and well-being of participants.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents literature review on the topic 'effects of climate variability on inter-communal conflict patterns: a case of northern Kenya'. It is broken down into the following subtopics: empirical review, theoretical review and conceptual framework.

2.1 Empirical review

This section presents the empirical review on studies touching on the effects of increased temperature and drought in relation to inter-communal conflict patterns; the extent shrinking grazing lands affect inter-communal conflict patterns and the impact of decreased water sources on inter-communal conflict patterns.

2.1.1 The Effects of Increased Temperature and Drought in Relation to Inter-Communal Conflict Patterns

There is ample proof that the temperature of the planet Earth is rising significantly (Chiang, Mazdiyasni & AghaKouchak, 2018). Globally, the surface temperature has increased by roughly 0.78°C since the 19th century, according to Stocker et al., (2013), estimates range from 0.72 to 0.85°C. On the other hand, according to the United Nations Framework Convention on Climate Change, precipitation patterns have showed a minor global yearly increase with an uncertain rising trend of roughly 1.1 mm per decade over the 20th century (UNFCCC, 2007). Asadieh and Krakauer (2015) discovered that there is increased rainfall in the mid-latitudes to high latitudes. The increase in extreme weather occurrences like hurricanes, floods and droughts in recent years has drawn a lot of attention to these changes. According to a 2007 report by the

Intergovernmental Panel on Climate Change (IPCC), Earth is currently at its warmest point in a millennium and as the globe continues to warm, precipitation events are expected to significantly intensify. The global mean surface temperature is expected to rise by 1.5°C to 6°C by 2100, along with changes in precipitation patterns and a rise in the frequency of extreme weather events, according to the IPCC's fourth assessment report from 2007. In the Horn of Africa, the climate shifted from 5% to 20% by 2020 and is expected to go to over 20% by 2050 (Coates et.al., 2020), with significant implications for crop and pasture productivity. According to Massoud et.al., (2020) these trends, due to their direct impact on natural resources, are likely to adversely affect the majority of rural households that depend on agriculture and livestock for their livelihoods. Prolonged dry periods can also trigger conflicts over resource scarcity, particularly in pastoral areas where grazing resources are shared among various communities.

According to Kaufman et.al. (2020), 2016 was the warmest year ever recorded, with an average surface temperature that was roughly 1.1°C higher than that of the late 19th century. The bulk of this warming has occurred during the last 35 years, with 16 of the 17 warmest years happening since 2001. In the Arctic, the rising temperatures have been especially apparent. In the winter of 2016–17, Arctic temperatures rose by up to 25°C over the average (Chiang et.al., 2021). During the winter of 2016 -17, the polar Arctic ice cap's extent also set a new record low. In 2016, there was a rise in the frequency and severity of extreme weather occurrences. These took the form of heatwaves in some areas and heavy rain and flooding in others. Throughout 2016, abnormally extended droughts also hit California in the United States, northwest China and East Africa (Parkinson, 2019). People's health and way of life are usually severely impacted by these events and climate variability.

Zipper and Kucharik (2016) established that increased temperatures and prolonged droughts are closely linked to water scarcity and decreased agricultural output. In regions where communities heavily depend on these resources for their livelihoods, competition for dwindling supplies becomes more intense (Parkinson, 2019). This competition can escalate into disputes over access to water sources, cultivable land and grazing areas. Feldt et.al., (2020) posited that increasing temperatures and extended droughts disrupt traditional ways of life, particularly in agriculture, pastoralism and fisheries. As communities lose their primary sources of income and sustenance, frustration and desperation can grow, potentially sparking conflicts over the remaining resources. Droughts and heatwaves force people to leave their homes in search of food, water and better living conditions, resulting in internal displacement (Genyi, 2017). The arrival of displaced populations in new areas strains local resources and increases tensions with host communities, which can potentially lead to conflicts. Climate-induced displacement may also lead communities to migrate to regions where they have not historically resided, resulting in ethnic or cultural differences. According to Kaufman et.al., (2020) when combined with resource scarcity, these differences may ignite inter-communal conflicts. Prolonged droughts weaken the social cohesion within communities by causing economic hardships, food insecurity and internal disputes. These vulnerabilities can be exploited by militant groups or criminal organizations, further destabilizing regions and increasing the likelihood of violent conflicts. Climate-induced conflicts often transcend national borders, affecting multiple regions.

Although a direct causation link has not been firmly established between rising temperatures, prolonged droughts and conflicts, there are instances where conflicts coincided with periods of increased temperatures and extended dry spells. In 2017, in India's Muzaffarnagar district, communal tensions flared up alongside drought conditions (Narrain, 2018). The scarcity of water resources exacerbated competition between different communities, leading to communal clashes

(Ranjan & Gorai, 2022). Similarly, the southern state of Tamil Nadu faced a severe water crisis in 2018 due to drought conditions and depleted groundwater levels (Mishra et.al., 2021). This crisis triggered conflicts between communities vying for access to water sources, especially in urban areas. In 2019, the Bundelkhand Region in Madhya Pradesh and Uttar Pradesh experienced recurrent droughts, resulting in heightened tensions among communities due to water scarcity (Pandey et.al., 2021). Pandey et.al., (2021) further state that disputes over water access and agriculture escalated, leading to conflicts. In 2020, parts of Rajasthan grappled with extreme water scarcity and drought. Competing demands for water resources, including agriculture and domestic use, intensified inter-communal tensions and conflicts. In 2021, drought conditions in parts of Maharashtra worsened conflicts over water resources among communities. Localized disputes and protests emerged over access to water for irrigation and daily necessities. In 2022, Karnataka faced drought conditions that exacerbated tensions between communities relying on shared water sources. Conflicts arose over the allocation of water for agricultural purposes (Sanga & Koli, 2023).

A study by Selby et.al., (2017) revealed that the Syrian civil war, which commenced in 2011, has been partially linked to the consequences of climate change-induced drought. This study further established that a severe and protracted drought that impacted Syria's agricultural heartland resulted in the displacement of hundreds of thousands of rural farmers, who sought refuge in urban areas. This displacement, coupled with economic strain and social unrest, played a role in fuelling the conflict. The Syrian civil war's onset in 2011 was driven by a multitude of intricate factors, but the preceding drought and its repercussions cannot be underestimated. Many rural communities that had endured the drought found themselves marginalized and susceptible, making them targets for recruitment by various armed groups. The displacement of people and the competition for resources added to inter-communal tensions. In another study Muttarak

(2019) found that between 2014 and 2015, Syria continued to confront issues related to water scarcity, drought and disruptions in agriculture. These factors compounded the already dire humanitarian crisis and contributed to localized conflicts related to access to water resources. In 2018, certain regions of Syria experienced another drought, with the area around Damascus being particularly affected (Hoffmann et.al., 2020). Water scarcity, in conjunction with economic hardships and political instability, contributed to social unrest and localized clashes regarding water resources. Presently, ongoing water scarcity and drought conditions, combined with the enduring aftermath of the civil war, persist in fomenting inter-communal conflicts in various parts of Syria. The competition for limited water resources remains a pressing and contentious issue.

In a similar manner, a study by Herzberg (2019) noted that Yemen has also faced extreme water scarcity and droughts in recent years. The competition for water resources in a country already grappling with political instability has led to localized conflicts and displacement. The years 2018 and 2019 witnessed prolonged droughts in Yemen, further worsening water scarcity and agricultural challenges. According to Alipour (2019), in some cases, conflicts erupted between communities over access to water wells and agricultural lands, exacerbating the overall instability caused by the ongoing civil war. Yemen continued to face the effects of drought and increased temperatures in 2020 and 2021 (Brown et. al., 2021). According to this study, communities struggled with reduced access to clean water and agricultural resources, intensifying competition for these vital resources and leading to localized conflicts. In 2022, the Yemeni crisis persisted, with environmental stressors like drought contributing to the humanitarian disaster. The combination of resource scarcity and conflict dynamics has made it difficult for communities to cope, further heightening inter-communal tensions (Poornima & Ramesh, 2023).

Africa is not an exception, Liebig et.al., (2022) argues that since 1980s to date, prolonged drought and desertification in the Darfur region of Sudan has displaced pastoralist communities. Ongoing political instability and civil war in South Sudan coincided with climate-related challenges, including drought and food insecurity (Bello & Kazibwe, 2022). These environmental stressors intensified resource competition and played a role in the protracted conflict between government forces and opposition groups. Kenya's climate exhibits a diverse range, from humid tropical conditions along the coast to arid regions further inland, with temperature variations linked to changes in altitude. The country's temperatures have risen by 1°C over the previous 50 years, according to a 2009 report from the Government of Kenya (GoK). This warming trend is predicted to continue, with the Intergovernmental Panel on Climate Change (IPCC) predicting that temperatures could rise by nearly 3°C by 2050. March, April and May are the months when the temperature rises the most, resulting in hot days and nights during this time.

Kamunywe (2022) reports that temperatures in the northern regions of Kenya are often high, with highs of up to 35°C. However, in recent years, there has been a concerning escalation in the violence associated with cattle raiding in Kenya. This violence has become more sophisticated, indiscriminate and destructive, contributing to other existing ethnic conflicts particularly in Northern Kenya (Littman, 2018). This study seeks to investigate the direct effects of increased temperature and drought in relation to inter-communal conflict patterns in northern Kenya. Many existing studies on climate change, drought and conflict rely on global or national data. Like many other regions, Northern Kenya has distinct characteristics and local factors that influence the link between conflicts and climate stressors. It is critical to collect data specifically from these communities in order to accurately understand the situation. Furthermore, climate patterns and their impact on conflicts vary over time. This research looked into whether there are seasonal

or cyclical patterns in the region's climate-induced conflicts, which is important for developing effective mitigation and adaptation strategies.

2.1.2 The Shrinking Grazing Lands and Inter-Communal Conflict Patterns

Globally, regionally and locally, the reduction in grazing lands has been linked to patterns of inter-communal conflict (Cao et.al., 2022). The diminishing availability of grazing lands often results in resource scarcities such as limited access to water and suitable pastures for livestock. This scarcity sets the stage for competition among pastoralist communities, potentially escalating into conflicts over the limited resources. According to Matveeva (2017), as grazing lands continue to shrink, pastoralist communities may find themselves compelled to migrate to new areas in search of adequate pastures and water sources for their livestock. This displacement frequently leads to conflicts, whether with host communities or other migrating pastoralist groups, especially when resources are already in short supply (Chinasho, Yaya & Tessema, 2017). Peteros, et.al., (2022) found that the decrease in grazing lands also translates to losses in livestock due to insufficient food and water, causing economic hardships and triggering tensions and conflicts within pastoralist communities. Individuals and families grapple with the loss of their primary source of income and sustenance. Nicholas (2018) also noted that the competition for shrinking grazing lands results in inter-communal tensions, disputes and clashes, particularly in regions where multiple ethnic or tribal groups coexist. Historical grievances or boundary disputes can exacerbate these conflicts further. Additionally, the shrinking of grazing lands has significant humanitarian consequences, including food insecurity and malnutrition among affected communities. This exacerbates social and economic grievances, adding to the complexities of conflict dynamics (Cao et.al., 2022).

Shrestha (2022) did a study in Afghanistan and also found that there has been a notable reduction in grazing lands, particularly in the northern and western regions. This reduction has led to resource competition between pastoralist communities, such as the Kuchi nomads and sedentary communities as well as other nomadic groups. These competitions have often escalated into conflicts over access to pastures and water sources. For instance, in 2018, Ghor Province in western Afghanistan witnessed severe conflicts between Kuchi nomadic pastoralists and settled agricultural communities, resulting in violent clashes over pastures and water resources. Similarly, Shahfahad et.al., (2022) found that in 2019, Faryab Province in the North experienced inter-communal conflicts between ethnic Uzbek and Turkmen communities, primarily driven by disputes related to shrinking grazing lands and resource scarcity due to drought. These conflicts resulted in casualties and population displacement. Herat Province in the West faced resource-related conflicts in 2020, as competition for dwindling grazing lands and access to water sources led to clashes between Kuchi nomads and settled communities. These conflicts disrupted local livelihoods and posed humanitarian challenges. In 2021, Badghis Province in the Northwest witnessed escalating conflicts due to the shrinking grazing lands caused by drought conditions, intensifying competition between pastoralist and sedentary communities. These conflicts had devastating impacts on local populations and agricultural activities (Shahfahad et.al., 2022). Lastly, in 2022, Balkh Province in the North experienced conflicts between ethnic Hazara and Pashtun communities over grazing lands and water resources. The scarcity of pastures and prolonged drought heightened tensions, resulting in violent incidents and population displacement.

In countries like Niger and Mali, recurring droughts and desertification have led to a reduction in available grazing lands (Ochungo, 2022). According to Erondu and Nwakanma (2018), Nigeria, with its substantial Fulani population accounting for 4% of the nation, is particularly impacted by

these challenges. Additionally, ongoing national security issues are affecting pastoral livelihoods and contributing to violent conflicts related to land disputes, ethnic differences, religious disparities and political tensions. In 2018, there were notable inter-communal conflicts in various Nigerian states, particularly in the Middle Belt region, which persisted into 2019 (Olagunju, 2021). These conflicts resulted in clashes, displacement of communities and loss of lives in different parts of the country. In 2021, the competition for dwindling grazing lands and access to water sources remained a significant driver of these conflicts. The situation was further complicated by ethno-religious dynamics and insecurity in specific areas such as Nasarawa and Taraba (Ani, Anyika & Mutambara, 2022).

It is widely recognized that shrinking grazing lands pose a significant problem, particularly in Sub-Saharan Africa, hindering sustainable development (Omisore, 2018). Jayne, et. al. (2019) discovered that land degradation is a complex issue that varies by location and over time. It threatens land productivity, especially in arid regions and increases vulnerability to climatic hazards, such as droughts. Without sustainable land and soil resource management, global sustainable development and environmental sustainability goals are unlikely to be achieved (Jayne, et. al., 2019). In northern Tanzania, Ndesanjo et .al., (2023) found that Maasai pastoralist communities have also experienced a reduction in grazing lands due to factors like land encroachment, wildlife conservation policies and shifting rainfall patterns. Conflict has arisen between Maasai herders and neighbouring ethnic groups and government authorities over land rights and resource access. Since 2017, there have been reports of conflicts over grazing lands and water resources in some areas of Tanzania, including parts of Arusha and Manyara regions. These conflicts are driven by land encroachment, changing land use patterns and resource scarcity. The displacement of pastoralist communities, disputes over land and competition for resources have contributed to tensions in these regions (Ndesanjo et. al., 2023).

In recent years, Eastern Africa has witnessed a growing scarcity of grazing resources due to the shrinking of land sizes, primarily driven by population growth. This situation has the potential to lead to interstate conflicts as pastoralist communities move across the region in search of pasture and water. The lack of well-defined state boundaries, which are often unmarked, pose a challenge for government authorities and other organizations in tracking the movements of grazers (Omisore, 2018). Several regions in Ethiopia, including Afar, Somali and parts of Oromia, have faced a reduction in grazing lands in 2022 due to climate change-related factors (Nicholas, 2018). This has resulted in resource scarcity for pastoralist communities, leading to conflicts among different ethnic groups over access to water and pasture. These conflicts have resulted in displacement and instability (Awedoba, et. al., 2022). When pasture is scarce, Ethiopian herders frequently cross into northern Kenya in search of water and pasture, especially during droughts. This frequently results in rivalry for resources, which breeds conflict and results in fatalities. Furthermore, the absence of pasture has been linked to livestock rustling and banditry, which has exacerbated cross-border conflicts between populations in southern Ethiopia and northern Kenya (Benjaminsen, 2016).

As indicated by Owino et al. in (2019) in Kenya, the reduction in grazing areas has had significant economic implications at the national level, resulting in an annual economic loss of USD 390 million or 3% of Kenya's GDP. Furthermore, it threatens the livelihoods of millions of rural residents who rely entirely on the products and services provided by the ecosystem. However, the connection between the shrinking grazing areas and the increasing incidence of conflicts in Northern Kenya has not been fully established. Hence, this research aimed to look into the direct effects of reduced grazing lands in relation to inter-communal conflict patterns in northern Kenya. There has been a lot written about shrinking grazing lands and inter-communal conflict patterns. While it is widely accepted that resource scarcity, including grazing lands,

causes conflicts, more detailed research is needed to determine how and to what extent shrinking grazing lands cause conflicts in the Northern Kenya region. The goal of this study was to identify the mechanisms underlying this relationship. This research also investigated how these communities and local authorities address and resolve grazing land conflicts.

2.1.3 The Decreased Water Sources and Inter-Communal Conflict Patterns

Water insecurity is becoming an increasingly pressing global issue, with projections suggesting that water scarcity might soon affect half of the world's population. This problem is compounded by factors such as inequality, ineffective governance and water-related challenges that contribute to conflicts at various levels, both between countries and within communities. Previous studies, such as Böhmelt et al. (2014), Wischnath & Buhaug (2014) and Von et al. (2016), have frequently relied on precipitation data to estimate the repercussions of water shortage when investigating the impact of climate-related drought on agriculture. Water insecurity arises from various sources, such as improper water management techniques and pollution. This may entail restricting vulnerable communities' access to water while allowing overuse by businesses, the energy industry and the agricultural sector. Furthermore, changes in rainfall patterns and the disappearance of wetlands are two consequences of climate change on water resources. Extreme weather disasters such as floods and protracted droughts pose serious problems for governments, communities and relief workers. They exacerbate pre-existing weaknesses, draw attention to inadequacy and threaten peace and stability in the process. Numerous demands and stresses on water resources not only jeopardize livelihoods but also deepen existing rifts and spark new disputes around water resources (Hoffmann, Šedová & Vinke, 2021).

According to a study by Daoudy, Sowers and Weinthal (2022), there are notable differences in access to water resources in the Middle East and Africa between different areas and nations. For

example, rain-fed agriculture encounters many difficulties since precipitation is unpredictable in terms of both quantity and timing. In order to address these problems, water management policies have recommended installing irrigation systems. According to Al-Ansari et. al., (2019) the Tigris and Euphrates rivers, which Turkey, Syria and Iraq share as vital water sources, are a prime example of unequal access to water. Due to Turkey's upstream dam and irrigation projects, there is less water flowing downstream, which is causing problems with water scarcity in Syria and Iraq (Daoudy, Sowers & Weinthal, 2022). These tensions related to water resources have contributed to broader geopolitical conflicts in the region. In a similar vein, Israel, Jordan, Palestine and Syria all share the Jordan River basin. Access to water resources, particularly in the arid West Bank region, has been a significant point of contention between Israel and its neighbouring countries. The limited access to water for Palestinian communities has further exacerbated the dynamics of conflict within the Israeli-Palestinian conflict (İsmail, 2022).

In 2021, Gerten found that Yemen is grappling with a severe water crisis marked by the depletion of groundwater and unequal access to water resources. This crisis has exacerbated internal conflicts within the country, with competition over scarce water resources contributing to both local and regional conflicts, including the Yemeni civil war. There are sizable farming, fishing and cattle-raising settlements in Mali's Inner Niger Delta, nevertheless, tensions and disagreements over water access have arisen as a result of shifting and more unpredictable weather patterns (Poornima & Ramesh, 2023). These conflicts have been exploited by politicized armed groups, adding to the region's instability. Political unrest, insufficient resource management and water shortages interact in a complicated way in Central Mali, which provides an environment that is conducive to armed conflict. As noted by Varin (2020), the rivalry for the remaining water resources in the Lake Chad Basin, which includes Chad, Cameroon, Niger and Nigeria, has intensified as a result of Lake Chad's shrinkage brought on by climate change and

unsustainable water use. This competition has led to conflicts, particularly in Nigeria's northeastern region, where the Boko Haram insurgency has been partly driven by resource scarcity. Northern and central Nigeria, also, despite receiving relatively high annual rainfall, faces water shortages due to factors like delayed rainy seasons and significant evaporation rates (Kamunywe, 2022). As a result, efforts to secure water year-round have led to increased use of irrigation canals, dams and boreholes. However, these responses often involve diverting more water from wetlands and intensively extracting groundwater, exacerbating the situation.

In another study Krampe et. al. (2020) found that in the Horn of Africa, access to water resources, including rivers and groundwater, has been a source of conflict, especially in regions with pastoralist communities. Ethnically and politically motivated disputes over water sources have been documented in countries like Ethiopia, Kenya and Somalia.

In northern Kenya, while fishing villages have experienced significant decreases in fish stocks, pastoralist communities have been compelled by protracted droughts to travel farther in search of pasture area and water sources for their cattle. This has revealed ineffective processes and organizations for resolving these issues and raised competition for limited water resources, ultimately resulting in intercommunal conflicts. The scarcity of comprehensive and up-to-date data on water sources and inter-communal conflicts is one of the primary empirical gaps in this region. The number of research studies and reports that provide a detailed analysis of these aspects is limited, making it challenging to achieve a thorough grasp of the circumstances. Hence this study sought to fill the gap.

2.2 Theoretical review

Classical theories have posited that conflicts arise when the demand for resources surpasses their limited supply. These theories also contend that conflicts stemming from natural resource issues

due to population growth and dwindling resources serve as traditional mechanisms to restore equilibrium between resource demand and supply (as discussed by Price in 1998). According to these theories, a reduced availability of natural resources like water, food and land will eventually outstrip human consumption needs, resulting in adverse social consequences such as warfare, disease outbreaks, disasters and population displacement. Ultimately, these outcomes lead to poverty and catastrophe (Brian, 2005).

Conversely, economic theories argue in favour of establishing market systems to balance the supply and demand of resources. While it is uncommon for natural resource scenarios to have highly equitable distribution systems, fair access for everyone can promote balanced and dynamic societies, as suggested by Clark (1973). This perspective suggests that as a resource becomes scarcer, it prompts those dependent on it to change their consumption patterns. This discourages overconsumption and waste and compels them to explore alternatives and substitutions for survival.

Critics of classical theorists have countered that as a resource becomes scarcer, there is greater motivation for the population to continue exploiting it to take advantage of higher prices and generate profits. This can ultimately lead to the resource's extinction or devastation, as proposed by Clark (1973). The scarcity or extinction of a sought-after resource can, in turn, lead to numerous conflicts over natural resources. A prime example of this is the poaching of endangered wildlife for the purpose of obtaining trophies for sale, which has pushed certain species like rhinoceroses, elephants and Columbus monkeys to the brink of extinction, as noted by Davidson (1999). The economic theory, sometimes referred to as the Marxist theory, has been associated with political conflicts where affluent societies, often referred to as the 'haves,' rise to

dominance in politics due to their vast wealth, leading to their control over the politics of less privileged societies, known as the 'have-nots,' as discussed by Trainer (1998).

According to the resource scarcity theory, there is an argument that the scarcity of resources raises the probability of violence, as supported by studies conducted by Njiru in 2012, Mwiturubani & Van Wyk, (2010), Omolo (2010) and Temesgen et.al., (2010). Furthermore, Campbell et al. (2009) assert that a number of causes, including climate change, contribute to the shortage of natural resources, which in turn is one of many reasons that contribute to conflicts. Increased rainfall in Northern Kenya may be advantageous to pastoralist tribes since it will make more water and pasture available for their animals. However, it is not solely the amount of rainfall that matters but also the timing of these rainfall events. The risk of both floods and droughts is increased by heavy rainfall followed by protracted dry spells, particularly when accompanied with a notable warming trend, as highlighted in reports by Shalom-SCCRR (2019) and research by Williams & Funk (2011).

2.3 Conceptual framework

Independent variable; will be climate variability. It is measured in terms of temperature and drought, shrinking grazing lands and decreased water sources. Dependent variable; will be intercommunal conflicts in northern Kenya. It is measured in terms of inter-communal clashes, displacement of communities as well as death and injury related cases. Moderating variables include; Government intervention, community-based initiatives and International organizations' roles.

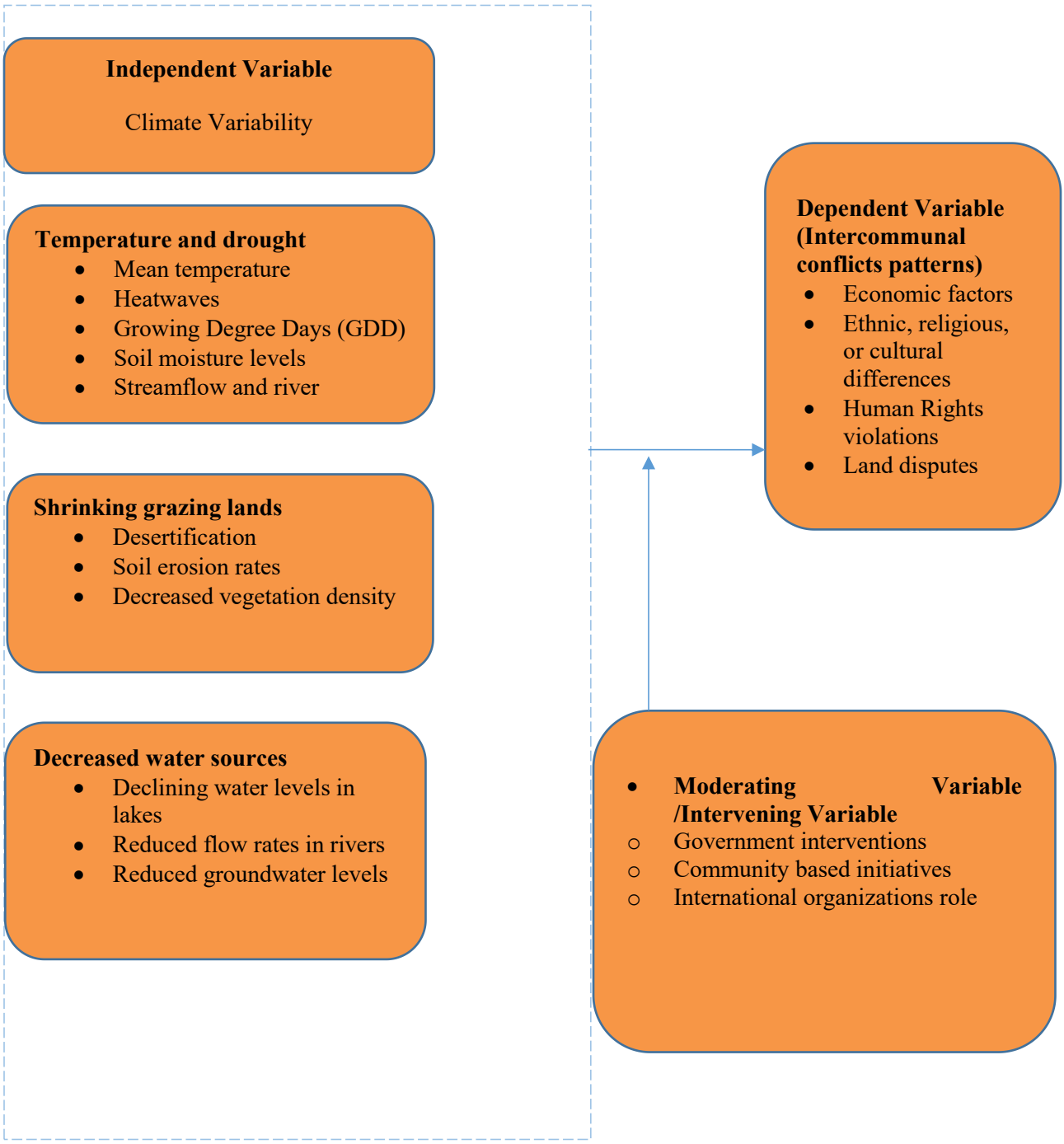


Figure 2.1: Conceptual Framework

Source: Author (2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The research methodologies are highlighted in this section. Research methodology is the planning, carrying out and evaluating of a research in a methodical and structured manner. It encompasses the principles, procedures and techniques employed by researchers to gather and interpret information in order to answer research questions or test hypotheses. The framework for a study's design, conduct, data collection and analysis techniques are described in the methodology. In this study the research methodologies included are the research design, the study population, the sample, data collection, data analysis and ethical considerations.

3.1 Research Design

As per Asenahabi (2019) research design refers to the overall plan, structure and strategy that researchers use to investigate a specific research question or problem. It directs the gathering, processing and interpretation of data and acts as a roadmap for carrying out a study. Given the complexity of the issue and the need to understand the nuances of climate-related conflicts in Northern Kenya, an exploratory research design is suitable. This exploratory research's main goal was to have a thorough grasp of how climate variability influences inter-communal conflict patterns in Northern Kenya. This design allowed the researcher to explore and generate hypotheses about the relationship between climate and conflict.

3.2 Area of Study

The area of study is the Northern Kenya region. Northern Kenya encompasses a significant portion of Kenya's geography and includes multiple counties and sub-counties. It is a region

characterized by a semi-arid to arid climate and it is often affected by climate variability and related environmental challenges. The study specifically concentrated within the key counties and regions within Northern Kenya that are commonly associated with climate-related conflicts, which include: Turkana County, Marsabit County, Isiolo County, Samburu County, Wajir County and Garissa County.

3.3 The Target Population

According to Casteel and Bridier (2021) the target population, in the context of research and data collection, refers to the particular group of people, things or components that a researcher wants to investigate or learn more about in order to answer a research question or meet research goals. This population is defined based on the characteristics and criteria relevant to the research topic and objectives.

In this case, the target population was derived from existing secondary data related to climate variability and inter-communal conflicts in Northern Kenya, particularly Turkana County, with minimal reference to other surrounding counties. The study focused on Northern Kenya, encompassing specific regions, counties or districts affected by climate variability and inter-communal conflicts. These regions include counties, apart from Turkana, such as Marsabit, Turkana, Isiolo, Samburu, Wajir, Laikipia, Mandera as well as Garissa Counties. In this study, Government Reports and Publications, Scholarly articles, research papers, theses and dissertations, NGO and International Organizations' Reports containing data on climate patterns, resource management, conflict incidents and government responses were examined.

3.4 Data Collection Methods

Data collection methods relate to the procedures and methods utilized to collect data, facts or statistics for the purpose of analysis, research or decision-making. The type of data needed, the

goals of the research and the nature of the study all influence the data collection method chosen. This study was a desk-top research and the collected data was purely secondary and qualitative. This study collected and reviewed existing reports, documents and academic studies related to climate variability, conflict patterns and historical context in Northern Kenya.

3.5 Data Analysis

Data analysis is the procedure for looking through, sanitizing, converting and analyzing data in order to find relevant information, support findings and make decisions. It uses a variety of approaches and strategies to interpret data, find trends and derive insightful conclusions. The study employed desktop qualitative data analysis techniques, such as thematic coding, to analyse the data.

3.6. Ethical Considerations

This study ensured that the secondary data accessed do not contain personally identifiable information or confidential data. The researcher was aware of data ownership and usage rights. This study only used secondary data for purposes consistent with the data owner's permissions or terms of use. The researcher secured the required authorizations if the data are subject to restrictions. The accuracy and dependability of the secondary data used was also confirmed by the researcher. To acknowledge the original data providers, if at all possible, the researcher cited the sources and gave due credit. The researcher safeguarded any sensitive information included in the data against illegal access, disclosure or alteration. For academic purposes, the researcher used secure transmission and storage techniques. The researcher maintained academic integrity by properly citing and referencing the secondary data sources in the research. Plagiarism was avoided at all costs.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.0 Introduction

The Turkana, a Nilotic ethnic group, holds a predominant position in the study area located in northwest Kenya. Media coverage of Turkana frequently emphasizes aspects of the region's extreme poverty, starvation, drought and deadly conflicts. The portrayal of Turkana pastoralists in these narratives often depicts them as vulnerable, backward and victims of circumstances including climate change and variability. The projected impact of climate change on East Africa, leading to a warmer and more variable climate, further influences conflict dynamics among pastoral groups. Historically, Kenya's government has demonstrated little interest in resolving violent conflicts or promoting the development of Turkana and northern Kenya as a whole. The challenges of low income, difficulty in taxing mobile pastoralists, poor accessibility and insecurity in the region have aggravated the political and economic marginalization of the Turkana community. Field research studies previously conducted among Turkana pastoralists reveal a prevailing sense of being "on their own" or simply "forgotten" for an extended period. This chapter presents the study's findings in relation to its objectives.

Turkana County Profile

Covering an expanse of 68,233 km2 of land and 2,279 km2 of water, as indicated by KNBS (2019b) and the Turkana County Government (2013), Turkana County is the second-largest county in Kenya. This county is located in the northwestern part of Kenya, at a height of 1,138 meters above sea level. Notably, the largest permanent desert lake in the world, Lake Turkana, is situated East of the county at an elevation of 360 meters above sea level (Ojwang et al., 2016). Turkana County is bordered to the East by Marsabit County, to the Southeast by Samburu

County, and to the South by West Pokot and Baringo Counties. Its international borders are with Ethiopia to the Northeast, South Sudan to the North and Uganda to the West. (Turkana County Government, 2013). Geographically, Turkana County spans between longitudes 34° 30’ and 36° 40’ East and latitudes 1° 30’ and 5° 30’ North.

Characterized by mostly arid conditions and a warm to hot climate, Turkana County exhibits variations in humidity and temperature across distinct agro ecological zones. The southern regions have a mean temperature of 30.5°C and range in temperature from 20°C to 41°C, making them semi-arid to semi-humid (Turkana County Government, 2018).

The county is home to prominent topographical characteristics such mountain ranges, low-lying plains and rivers. Three major rivers that originate in Mt. Elgon, southern Ethiopia and the Amasya Hills respectively, flow into Lake Turkana; Turkwel, Omo and Kerio Rivers. During the dry season, mountain ranges including Songot, Mogila, Kalapata, Silale, Loriu, Kailongol, Loima and Lorengippi facilitate a variety of activities like the production of wood and charcoal, honey and grazing. After the rainy season, the wide plains, which receive the least amount of rainfall (180 mm annually), support grass and dwarf shrubs (Turkana County Government, 2018).

Two distinct rainy seasons occur in Turkana County, resulting in an average of 200 mm of precipitation annually; the long wet season, which spans from April to July, and the short rainy season, which spans from October to November. September, February and January are the driest months. Merely 30% of the county's soil is appropriate for cultivation due to excessive evapotranspiration, high temperatures and little rainfall. Unpredictable and irregular rainfall patterns are accompanied by sporadic strong storms and flash floods (NDMA, 2016).

In Turkana County, agriculture is the main source of income for households, employing over 45% of the workforce and accounting for over 74% of family income. The community is

vulnerable to the effects of climate change and unpredictability because of its reliance on pastoralism and rain-fed agriculture. Significant effects of the climate include increased daytime temperatures, extended dry spells, decreasing farming areas and unpredictable and intense rainfall. Climate risks, including droughts, floods and heavy rainfall, pose a serious danger to the county's agricultural industry.

Drought and heat stress become the main problems, causing animal malnutrition, pasture loss, dwindling water supplies and disputes amongst pastoralists. On the other hand, flooding occurs when heavy rains fall in some areas. Conservation agriculture, rainwater gathering, conserving fodder, cultivating early-maturing, drought-tolerant crops and breeding valuable animal breeds that are resistant to drought are examples of on-farm adaptation techniques.

Climate Variability and Violent Conflicts

Several characteristics specific to conflicts involving pastoralists and agro-pastoralists can be identified, gaining access to essential natural resources, including pasture and water, is the main priority. These resources are fundamental to the economies and livelihoods of both pastoralist and agricultural communities. Access to pasture is a common source of conflict between pastoralist tribes and permanent farmers. Tensions rise when pastoralists introduce their animals into areas designated as private property, such as wildlife reserves or cattle ranches. Similar problems arise when multiple pastoralist groups gather in one area resulting in their animals grazing on the same pasture. The complexity is further intensified by differing perceptions of property rights, with pastoralists viewing them as flexible and negotiable rather than fixed and exclusive.

Accessing water also becomes a source of tension between pastoralists and settled farmers when fences block access, cattle destroy crops and over use of water resources depletes them. Pastoralist groups are not exempt from disputes among themselves over water access or control.

Conflicts over natural resources are directly related to scarcity, which happens when there is not enough of a resource to meet the demand. Scarcity is caused by causes like increased numbers of livestock, expanding privately owned land, environmental degradation, or, as this case emphasizes, climate change and variability. On the other hand, decreased supply also results from these factors. However, the research highlighted the intricate connection between violence and the paucity of natural resources. The management of natural resources and the conflicts around their scarcity is the primary determinant. Reciprocal grazing rights are one example of traditional institutions and mechanisms that have historically helped settle disputes between communities around access to pasture and water. These processes and institutions can often mediate disputes peacefully.

4.1 The Effects of Increased Temperature and Drought in Relation to Inter-Communal Conflict Patterns in Turkana County, Northern Kenya

Over the last 50 years, temperatures in Kenya have increased by 1°C, and projections indicate a further acceleration in warming, with temperatures expected to rise by nearly 3°C by 2050. Many people believe that Kenya's recent severe drought is an indication of the planet's changing climate. Since drought is a regular and transient feature of arid regions rather than an anomaly brought on by climate change, it is not a recent phenomenon in East Africa. However, it seems that East Africa's drought cycle is drastically altering and getting shorter. Rainfall failures used to happen around every nine or ten years, but recently the cycle has shortened to just five years

or less. It seems that the area experiences drought conditions every two to three years at the moment.

Figure 1: Women and children in Turkana County, northern Kenya, during a recent drought (2020), on the parched plains near the Mogila mountains*. (Credit: IRIN/Gwenn Dubourthoumieu).*

Source: **HTTP://www.thenewhumanitarian.org/photo.**

The plight of the Turkana people in Kenya serves as an example of how marginalized groups are already feeling the effects of climate change, especially in nations with scarce natural resources and delicate ecosystems. These people travel around in search of food and water for their animals as well as for themselves.

Northern Kenya has traditionally been characterized by high temperatures, creating an extremely dry environment. Turkana County, specifically, experiences a consistently hot and arid climate with elevated temperatures throughout the year. Rainfall is both scarce and irregular, rendering the area susceptible to frequent droughts. The county regularly contends with extended periods

of drought, leading to challenges such as water scarcity and food insecurity. These drought conditions significantly impact local communities, affecting both pastoralism and agriculture.

The limited rainfall and arid climate pose substantial hurdles for agriculture, exacerbating issues of food insecurity. Drought conditions further intensify challenges related to water scarcity, affecting both human and livestock populations. Rates of evapotranspiration often surpass annual rainfall, with certain areas experiencing rates up to ten times that of rainfall. This high evapotranspiration contributes to the low agricultural potential of arid and semi-arid land (ASAL) areas, emphasizing the prevalent reliance on pastoralism in the region.

Increased demand on water resources due to rising temperatures and erratic rainy seasons has resulted in fewer grazing areas during the dry season, smaller herds of cattle and more competition for grazing lands. Pastoralists, sharing their experiences with Human Rights Watch, observed that the longer and more frequent droughts have made it harder to obtain drinkable water, making every day survival a constant battle. Women and girls often traverse extensive distances to search for water in dry riverbeds, while many children suffer from illness due to inadequate access to sufficient food and clean water within their families.

Figure 2: On March 21, 2017, a Turkana woman gathers firewood close to Lokitaung in northern Kenya, where the livestock population was severely affected by the drought. TONYKARUMBA/AFP.

SOURCE: HTTPS://FOREIGNPOLICY.COM/2020/10/26.

In this region, conflicts unfold amid a backdrop of resource scarcity, ethnic diversity and a historical narrative interwoven with colonial legacies. These conflicts are intricate, involving both tensions rooted in resource scarcity and complexities arising from ethnic diversity. Resource-based conflicts emerge in the competition for water, a precious commodity in this arid region. During periods of drought, pastoralist communities compete for limited water resources to sustain their herds and fulfill domestic needs. The nomadic lifestyle, inherent to many communities, often leads to clashes over access to grazing lands during dry spells, exposing the vulnerability of livelihoods intricately tied to the natural rhythm of the land.

Nomadic traditions, while adaptive, occasionally result in friction and are integral to the region's historical narrative. The political and economic marginalization of specific communities contributes to a volatile mix of grievances, while the proliferation of arms amplifies the intensity of conflicts.

Affected by many shocks since 2016, the people of Turkana and the neighboring Marsabit counties deal with droughts punctuated by floods and landslides brought on by intense rains. These natural disasters severely deplete the affected communities' coping systems and reduce their ability to recover (WFP 20/01/2022; IDMC 22/05/2018). Up to one million hectares of agricultural and pastureland in northern Kenya were destroyed by a desert locust outbreak between December 2019 and February 2022, drastically impairing the lives of farmers and pastoralists (IPC 09/11/2020). Overgrazing and deforestation have heightened the risk of flooding during heavy rainfall, leading to rising water levels in Lake Turkana. Communities along the riverside have been forced to relocate as a result, and as the water level rises, they will likely be displaced again.

Boreholes that supplied water to Lodwar town have been ruined and buried by rising lake levels in Turkana. Because of this, people in communities like Namakat are forced to utilize contaminated river water for household necessities, putting their health at risk. Furthermore, some water sources that survived damage became contaminated, which led to the spread of waterborne illnesses like cholera, typhoid and diarrhea. In addition, two irrigation projects by the river that provided livelihoods for nearly 12,000 people were flooded (BBC 18/10/2022; GOK/UNDP 07/2021).

Figure 3: Turkana youth in northern Kenya, close to the border with South Sudan. In East Africa's pastoralist tribes, small arms like AK-47s, are commonplace due to the region's increasingly severe and unpredictable droughts, which have exacerbated conflicts.

Source: HTTP://www.thenewhumanitarian.org/photo.

Cattle rustling and intercommunal clashes, ongoing for over a century in northern Kenya, have intensified in Turkana County, with armed clashes, attacks, abductions and looting on the rise in 2022 compared to 2020 and 2021 (ACLED accessed 10/11/2022). The worsening drought has fueled increased intercommunal tensions and resource-based clashes over scarce pasture and water in Turkana and Marsabit counties. Some attacks originate from communities in

neighboring countries (KNA 18/02/2022; VOA 05/05/2022). By September, fighting had broken out in regions close to the borders with Ethiopia and Uganda, including Kibish ward in Turkana North subcounty and Kalobeyei, Letea and Lokiriama/Lorengipi wards in Turkana West subcounty (NDMA 30/09/2022). High levels of insecurity are a result of banditry, cattle rustling and the proliferation of illicit firearms in both counties.

Figure 4: 18 February 2020: Turkana men with AK-47 rifles standing close to a water pump in Oropoi, northwest Kenya. Pastoralist conflicts including competition for resources, cattle rustling and weapons are common and a growing source of concern in the area.

Source: Https://www.thenewhumanitarian.org/photo.

The ease of smuggling weapons into Marsabit County and by extension, into Turkana County, is made possible by the close proximity to Ethiopia and the porous nature of the international boundary (PD 05/10/2022; the Star 06/11/2022; VOA 05/05/2022). In certain areas of Laisamis, North Horr, Saku, Turkana East and Turkana South sub counties, heightened insecurity due to

banditry and cattle rustling has been observed. This insecurity characterized by cattle rustling and overall instability cause loss of both lives and livestock. The population's access to vital health services is hampered by the disruption of market functions and pasture access (UNICEF 31/08/2022; NDMA 30/09/2022; KFSSG/Marsabit CSG 07/2022).

Resource-based conflicts resulting from long-standing rivalries between communities and rivalry for resources have affected the humanitarian response in Turkana. These confrontations in Turkana frequently take place close to the international borders with South Sudan and Uganda (KFSSG 01/09/2022). They cause casualties, interrupt livelihood operations and destroy vital infrastructure. In Turkana County, insecurity has also impeded humanitarian aid, especially impacting health and nutrition initiatives (IPC 28/09/2022).

A study by Ouda (2017) revealed that climate variability can contribute to violent conflicts in various ways. According to one interviewee, the Turkana people, primarily pastoralists, place immense value on their livestock. Any interference with their livestock, especially during prolonged droughts, can escalate the possibility of conflict. The nomadic lifestyle, traditionally moving in search of grazing land during droughts, has become more challenging as droughts last longer and available grazing land diminishes. This heightened competition for limited resources increases the potential for conflicts.

The sentiments expressed by the respondents in the above study suggest a general acknowledgment that climate variability, through various factors like slow economic growth and resource scarcity, may lead to violence. The competition for water resources, exacerbated by prolonged droughts and increased temperatures, has sparked communal tensions. Communities, such as the Turkana and Pokot, engage in conflicts over grazing land and water for their livestock. However, it was also noted that prolonged drought, a consequence of climate change,

does not inherently, by itself, cause violence. Turkana, being a semi-arid region, is accustomed to dry periods and residents have developed coping mechanisms.

The study further demonstrated that the drought, high temperatures and insufficient rainfall had caused the water level of Lake Turkana and the River Turkwel to drop, two major water sources in the region. The reduction in freshwater flow from the Omo River has not only impacted livelihoods but also increased the salinity of Lake Turkana. Tensions arise due to the scarcity of freshwater, leading communities to compete for the limited available resources.

4.2 The Shrinking Grazing Lands Effect on Inter-Communal Conflict Patterns in Turkana County, Northern Kenya.

In northern Kenya, Turkana County in particular, the likelihood of conflict and insecurity has considerably increased due to growing competition for grazing pastures and water. Frequent and fatal conflicts over grazing land exacerbate the food scarcity and diseases that the Turkana people suffer from as a result of climate variability. Climate change has been a longstanding phenomenon in Africa, particularly evident in droughts and floods and its impact has become worse and increasing in Turkana. Weather forecasts predict that climate variability is a persistent challenge, maintaining the fragility of the Horn of Africa, especially in Turkana County, which depends mostly on rain for sedentary agriculture and pastoralism. The Turkana County conditions reflect broader challenges experienced across the region.

Resource scarcity, slow economic development, political instability, the spread of small arms and ethnic conflicts are the main causes of conflict in Kenya's northern region. This study identifies climate change-induced resource scarcity, particularly diminishing grazing lands, as the initial tier of variables causing violent disputes in the region. The reduction in the resource base triggers a desperate struggle for survival, leading communities to employ sophisticated

weapons to protect their livestock and defend their grazing areas. Over time, the study reveals that conflicting land uses by other communities and changing climatic conditions have prevented Turkana pastoralists from accessing pasture. Conflict is certain to arise because of the pastoral economy in northern Kenya, which is severely threatened by the ongoing lack of pasture and water.

Figure 5: Baragoi, Kenya, February 14, 2017, armed Turkana tribesmen surround a borehole to defend their cattle from rival Pokot and Samburu tribesmen.

Source: https://www.voanews.com.

The northern region of Kenya stands out as the most marginalized and underdeveloped area in the country, lacking essential services and receiving a disproportionately smaller share of national resources compared to other regions. Most of this immense area is made up of arid regions with little rainfall, consistently high temperatures and insecure access to critical livelihood resources, such as land. Arid districts primarily rely on pastoralism as the dominant livelihood, distinguished by the movement of livestock and common management of natural resources. Unfortunately, in recent decades, pastoralist communities have experienced increasing

marginalization from political and economic resources. One reason for this marginalization is because state institutions in rural areas may not be as effective or have the necessary resources. It also emphasizes how underrepresented pastoralist communities are in politics in general and in government.

Figure 6: Armed cattle raiders in northern Kenya.

Source: HTTP://www.hindustantimes.com/photos.

The pastoralist way of life in northern Kenya is frequently linked to violent confrontations. Pastoralist groups and farmers have been engaged in increasingly violent battles over limited pasture and water access and pastoralist groups' cattle-raiding practices have devastated communities locked in violent and counter violent cycles. Much of northern Kenya was not immediately affected by the 2008 post-election violence, despite the fact that several pastoralist clans close to the Rift Valley were implicated. But over time, endemic violence and persistent instability in pastoralist areas have proven more deadly and devastating than occasional outbreaks of election-related violence in other parts of the nation. While disputes in northern Kenya are politicized, pastoralist complaints have not yet become entwined in national ethno-

political rivalries to the extent observed in other parts of the country. Politicians vying for votes often drag antagonistic pastoralist tribes into local political disputes, escalating the violence.

There are a number of traits that distinguish pastoralist and agro-pastoralist conflicts, most centered on the availability of natural resources, especially water and pasture, which are essential to the livelihoods of both pastoralists and farmers. Conflicts between pastoralist tribes and permanent farmers are frequently the result of competition for grazing areas. This typically increases when pastoralists seeking grazing land invade areas inhabited by resident groups or other migratory communities of a similar nature, competing for the same finite and currently scarce resources. When livestock destroy crops, fences impede access or excessive use of water resources depletes supplies, tensions between pastoralists and settled farmers can also arise. Conflicts between various pastoralist communities also arise when it comes to control of, or access to, water sources.

Figure 7: Armed Turkana youth in northern Kenya, close to the border with South Sudan.

Source:Https://www.thenewhumanitarian.org/photo/20090715104112094 7/turkana-youths-northern-kenya-near-sudanese-border-small-arms-such-ak-47.

Scarcity is the result of a resource's supply not being able to keep up with its demand and it is strongly related to these battles over natural resources. Scarcity can be caused by factors such as expanding privately owned property, climate change, environmental degradation or increased demand, such as growing numbers of cattle or lower supply. However, this study highlights the indirect relationship that exists between conflict and the paucity of natural resources. Decisions are largely influenced by how natural resources are managed and how conflicts arise around their scarcity. Peaceful mediation between communities, facilitated by traditional institutions and mechanisms like reciprocal grazing rights, can effectively address access to both pasture and water.

However, competition for and scarcity of natural resources, albeit being significant, are not the main causes of conflict in northern Kenya. The region faces marginalization in various interrelated ways. Its isolation, both geographically and due to inadequate infrastructure, especially roads, is compounded by ineffective security provision, making many roads unsafe as a result of the possibility of bandit attacks. This area's limited integration into the national economy and political landscape further exacerbates its challenges. Ethnic identities and divisions also contribute to and intensify conflicts, with historical feuds and group identities interacting in pastoralist communities to create cycles of violence and retaliations that deepen ingrained ethnic hatreds.

Figure 8: Turkana men in northwest Kenya, close to Lokichoggio. In the dry regions of northern Kenya, pastoralists frequently carry small arms.

Source:HTTP://www.thenewhumanitarian.org/report/94555/kenya-deaths-displacement-isiolo-fighting.

The predominant form of violent conflict among pastoralist groups is cattle-raiding, linked to resource restocking after periods of drought but deeply tied to pastoralist identity and cultural practices. Traditional roles, such as young warrior initiation, may contribute to cattle-raiding as part of their transition to manhood. Dowry payments often involve cattle, adding another dimension to cattle-raiding. Cultural factors, including the social status associated with cattle ownership, also play a significant role. However, economic drivers have increasingly become significant, with cattle-raiding evolving into a more commercialized phenomenon, sometimes termed 'cattle-rustling.' Young men, funded and directed by external actors, often conduct raids without community elders' approval. This commercially driven form of cattle-raiding is motivated by local political figures looking to profit from criminal networks or elections.

The spread of small arms and light weapons (SALW) has made cattle-raiding in northern Kenya more violent. Given as compensation for livestock that have been stolen, SALW are prized

possessions and sources of pride for young men. Porous borders and the easy availability of arms, both from external sources and domestic origins, have intensified violent conflicts.

Figure 9: Turkana herders protecting their livestock. PHOTO/FILE.

Source:HTTP://nation.africa/kenya/counties/turkana/two-killed-in-attack-by-cattle-rustlers-985260.

As one group acquires more arms, others in turn also escalate their armaments to protect their communities and livestock. This transformation from low-intensity cattle-raiding to large-scale violent clashes has resulted in significant casualties. Despite being largely unreported, estimates from the Conflict Early Warning Network (CEWARN) suggest that about 300,000 livestock were rustled on the Kenyan side of the Sudan-Kenya-Somalia triangle between 1996 and 2002, resulting in the loss of 1,200 lives. This situation is exacerbated as pastrolists in the area are compelled to travel farther in pursuit of rapidly diminishing grazing areas.

4.3 The Impact of Decreased Water Sources on Inter-Communal Conflict Patterns in Turkana County, Northern Kenya

The intricate relationship between water and conflict manifests in various ways in Turkana County. Water, primarily utilized for domestic and agricultural purposes, faces challenges due to weak governance and inadequate management of water sources. This has led to heightened

competition over the limited water and pasture resources, contributing to conflicts and violence among the local population.

The scarcity of water and pasture, particularly during drought periods, triggers increased migration patterns among pastoralist communities across the borders of Kenya, Ethiopia and South Sudan. This heightened mobility brings these communities into closer contact, intensifying competition for the scarce resources essential for their livestock. Consequently, a heightened awareness of territorial ownership emerges, leading to an upswing in inter-communal conflicts, especially related to boundary disputes (Paulson, 2021). Notably, conflicts among fishermen in Kalokol, near Lake Turkana, have been documented, encompassing disputes around protected areas and around the lake's shoreline, especially along the boundaries of Marsabit and Turkana counties.

The region is consistently under water stress, with mainly seasonal rivers traversing through the county. Survey results indicate that a majority of households, were compelled to trek more than 15 km in search of water.

Figure 10: Locals of Turkana County in search of water.

Source:HTTP://www.citizen.digital/news/students-trek-for-several-kilometres-in-search-of-water-in-turkana-county-n286048.

However, the recent discovery of an underground water source is perceived by respondents in the survey as a potential solution to alleviate the chronic water shortage in the area. Studies, such as Opiyo et al. (2011), highlight the critical role of water in pastoral production systems in the Arid and Semi-Arid Lands (ASALs).

Droughts, as reported by respondents, have had widespread consequences, including a decline in crop yield, an increase in food prices, loss of income and a reduction in pasture availability and access. In general, the recurrent impacts of drought exacerbate the numerous existing challenges in pastoral areas (Kates, 2000). As mentioned earlier, it can often be intricate to pinpoint drought alone as the sole direct driver of the reported changes. Migration, a natural adaptation to the evolving landscape influenced by climate-induced challenges, becomes a two-sided phenomenon.

As communities traverse the harsh terrain in search of water and grazing, a clash arises between the mobile and the settled. Territorial disputes surface and tensions intensify, leaving conflict imprints on the nomadic trails.

Figure 11: Armed Turkana youth dancing.

Source:HTTP://www.google.com/url?sa=i&url=HTTP%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3Dv6wncOZpg6A&psig=AOvVaw0xgoI3qEXPJexlUuvXTv7D&ust=1707221492881000&source=images&cd=vfe&opi=89978449&ved=2ahUKEwi_663mlZSEAxU3zQIHHbN0D7UQjhx6BAgAEBc.

These conflicts are not isolated incidents, they weave into the intricate fabric of life in Turkana County. Each skirmish carries the reverberations of historical legacies, environmental fragility and the complex interplay between communities navigating the challenges of a changing climate. To fully grasp the dynamics at play, one must consider not only the scarcity of resources, especially water, but also the rich cultural histories and social intricacies that shape responses to adversity. The report, titled "Gauging Fear and Insecurity: Perspectives on Armed Violence in Eastern Equatoria and Turkana North," highlighted the challenges faced by these communities, including inadequate basic services, unreliable water supplies, ineffective leadership, economic downturn, inadequate responses to drought, pervasive poverty and extremely limited access to health and education. Consequently, the prevalence of firearms and their misuse has intensified the practice of cattle rustling within pastoralist communities.

Figure 12: Local herders near Lotikipi in search of water and pasture. Photograph: RTI

Source:https://www.theguardian.com/global-development/2015/jan/15/kenya-water-turkana-aquifer-kakuma.

As water sources in the county continue to diminish as a result of climate variability, communities are forced to move around more frequently, for longer distances and to previously non-traditional grazing areas, in search of this rare commodity. This, invariably, increases the

potential for conflict with resident communities in those areas or other migratory communities also in search for water.

Figure 13: A carcass of a cow. A local herder lost over 300 heads of cattle died as a result of drought in 2022 in Turkana County. Photo: Kenneth Odiwuor/IOM 2022.

Source: https://eastandhornofafrica.iom.int/stories/desperate-water-communities-kenyas-rural-areas-forced-move

This is the longest drought Mohammed, a local pastoralist who lost over 300 cattle, has ever seen in his lifetime. "Every family here has incurred livestock losses, with some more severely affected than others. We are left with nothing. Even those that remain are too weakened to offer assistance," laments Mohammed.

Due to the necessity of farming and pastoralist groups sharing limited water supplies, the drought has increased the likelihood of inter-communal conflict. The communities in turn engage in disputes and conflicts arise over control and access to these vital water points. The struggle for water intensify existing ethnic or communal tensions, leading to violent clashes and disputes over water-related resources. As a result, the scarcity of water has been noted as a contributing factor to inter-communal conflicts in Turkana and similar regions.

In Kenya, it is widely recognized that pastoralist communities often seek pasture, water and grasslands for their livestock, going to great lengths to ensure the well-being of their animals.

This practice, driven by the livestock-centric nature of pastoralism, leads herders to venture extensively in search of suitable resources. This pattern is evident, for example, in the recurrent incursions into Laikipia during the dry months from January to April, resulting in conflicts each time such invasions occur. Conflicts in Laikipia County have been largely caused by the Samburus and Turkanas from both Isiolo and Samburu counties, as well as the Pokots and Tugens from Baringo County.

4.4 Climate Change Governance Strategies and Challenges

It would be an understatement to say that little, or very little, has been done to lessen climate change's consequences in Africa. Nonetheless, a number of strategies have been used in these initiatives. These strategies encompass behavioral changes, including using clean energy for cooking in homes, choosing environmentally friendly transportation options, implementing diets with low embodied energy and using energy-efficient equipment and lightbulbs. The Kenya Platform for Climate Governance has inaugurated a new initiative in Turkana County to advocate for climate change concerns affecting the local population. At a public forum in Lokichar town, over 100 participants expressed their commitment to champion fair and just climate laws aligned with national aspirations.

Multi-Level Governance and Coordination under Kenya's National Climate Change Act: The Climate Change Act, enacted in May 2016, serves as the primary framework for regulating climate change in Kenya. Notably, Kenya is among the few countries globally that directly address climate change through legislation (Bellali et al., 2018). The main objectives of the law is to foster climate action at the county level and enhance accountability in climate-related initiatives.

A distinctive feature of this law is its provision allowing citizens to hold both private and public entities accountable if they impede attempts to lessen the effects of climate change (Bellali et al., 2018). A multi-level climate governance system was also introduced by the legislation and is still being developed.

Key initiatives under the National Climate Change Act (2016) framework include the establishment of the Climate Change Directorate (CCD), the National Climate Change Council, and the National Climate Change Fund. Additionally, efforts have been directed towards creating the Kenya Climate Change Knowledge Portal (KCCKP), the National Climate Change Registry and the Climate Change Resource Centre.

Improving countys' resilience, encouraging cooperation between counties and the central government and advancing social cohesiveness within communities have all benefited greatly from the Climate Change Act. The establishment and implementation of this act is considered a commendable practice due to its robust multi-level governance structure, strong political support, innovative nature and emphasis on citizen participation.

The Kenya Climate Smart Agriculture Strategy (2017-2026): defines Climate-Smart Agriculture (CSA) as a sustainable strategy that supports national food security and development goals while aiming to boost resilience, boost productivity and cut or eliminate greenhouse gas emissions (FAO, 2010). This definition establishes a global framework for investments in agricultural innovations that bring together the agriculture, development and climate change communities, addressing food security and climate challenges while promoting sustainable development across economic, social and environmental dimensions.

The main goal of the Kenya Climate Smart Agriculture Strategy (KCSAS) is to reduce greenhouse gas emissions while improving agricultural systems' resilience and ability to adapt to

climate change. The three main goals of Kenya's CSA are to: reduce or eliminate greenhouse gas emissions whenever practical, adapt to and strengthen resilience against climate change and sustainably boost agricultural output and earnings. It is anticipated that the planned measures will improve food and nutritional security, which will eventually improve livelihoods.

Ward Climate Change Action Plan: In alignment with both national and county climate change policies and action plans, the Turkana North and Kibish Sub-County Climate Change Action Plan has the objective of "establishing mechanisms and measures to achieve low-carbon, climate-resilient development, with a focus on prioritizing adaptation in Turkana North and Kibish". At the sub-county and ward levels, this action plan provides a framework to guide climate change actions. Through the implementation of the Sub-County/Wards Climate Change Action Plan for the period 2023-2027, various stakeholders, including sub-county offices, the private sector, International Non-Governmental Organizations (INGOs), Non-Governmental Organizations (NGOs), Faith-Based Organizations (FBOs), Civil Society Organizations (CSOs) and other actors, will adopt pathways for low-carbon, climate-resilient development. The Turkana North and Kibish regions' local communities are to benefit from these pathways by having more resilience and ability for adaptation. A low-carbon, climate-resilient development route is envisioned in the plan, with the aim of improving the adaptability and resilience of local communities in the Turkana North and Kibish regions.

Challenges

However, despite these efforts, numerous challenges hinder the effectiveness of climate change governance strategies. One notable hurdle lies in the realm of policy implementation. Despite the formulation of comprehensive climate change policies in Kenya, their translation into tangible actions on the ground often encounters obstacles. The lack of coordination among different

government agencies and levels contributes to gaps in the execution of climate-related initiatives. Inadequate funding and resources, in addition, pose another significant challenge. The ambitious nature of many climate projects requires substantial financial support and the dearth of funding can impede the development and execution of strategies aimed at climate adaptation and mitigation.

Technological gaps, limited public awareness and engagement also emerge as critical factors. Climate change governance relies heavily on public understanding and participation. Limited awareness about climate issues and their implications can lead to insufficient public support for policies and initiatives. Engaging communities in the decision-making process becomes crucial for the successful governance of climate change. Technological and knowledge gaps in Kenya further complicate the implementation of climate-smart solutions. Disparities in access to advanced technologies and the capacity to implement them can vary widely across regions and communities.

At the global level, coordination and cooperation present challenges. Climate change is a global issue that demands international collaboration. Disagreements and a lack of consensus between nations, especially regarding contributions to emissions reduction and resource distribution, can strain global efforts to combat climate change. The role of political will and leadership cannot be understated. Effective climate governance hinges on strong political commitment and instances where political priorities do not align with climate action goals can result in a lack of dedication to necessary measures.

The implementation of climate change governance strategies in Turkana County faces a myriad of challenges unique to the region's context. Turkana County has limited resources, both in terms of finances and human capacity, hindering the effective execution of comprehensive climate

resilience initiatives and community outreach efforts. The inherent mobility of communities complicates the establishment of permanent infrastructure, necessitating adaptive strategies that align with nomadic patterns. Extreme weather events, in addition, damage infrastructure disrupting essential services and hindering overall development efforts. Educational barriers, such as limited access to climate change education and awareness programs, hinder the adoption of sustainable practices.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents summary a of the findings, the conclusion and recommendations based on the study findings.

5.1 Summary of the Findings

The findings indicate that increased temperatures and drought have contributed to inter-communal conflict patterns in Turkana County, Northern Kenya. Additionally, the study confirms that the reduction in grazing lands is impacting inter-communal conflict patterns in the region. Diminished water sources were also identified as a factor affecting inter-communal conflict patterns in Turkana County. The effects of climate variability and, consequently, climate change - such as the disappearance of pastures - make food production processes even more difficult.

Sea level rise is predicted to have a substantial impact on water bodies in the Turkana County area, including shared pans and boreholes. Tensions, fears of a hostile environment, demographic shifts and migrations are all results of these drastic changes. Violent conflicts could be sparked by the depletion of renewable resources, a tendency that has been noted since the mid-1990s.

It has been shown that there are three ways in which the lack of vital resources, such water and arable land, can result in violent conflict. The first route entails a fall in the economy or the deterioration of natural resources, which causes disputes as the basis of resources gets smaller. Frustration and a sense of dispossession can be cultivated by competition for limited resources and declining living conditions. Moreover, attempts by social elites to manipulate the allocation of resources to their advantage are likely to result in violent conflict. Abrupt changes in rainfall

patterns could lead to inadequate yields and scarcity of grazing land, so undermining economic activities that mainly rely on agriculture.

Sub-Saharan Africa, which includes Kenya in general and Turkana County in particular, is mostly dependent on range lands for grazing and rain-fed agriculture for revenue and food production. The loss of livelihoods and a decline in job prospects in an industry that boosts the economy might lead to violent disputes. The second avenue is the fragility of political institutions, wherein a lack of resources could cause citizens to lose faith in their government's capacity to meet their fundamental needs. The third avenue is migration, with individuals leaving inhospitable areas in search of "greener pastures" elsewhere, this may spark conflict between natives and immigrants. Additionally, immigration may make it more difficult for the host community to provide the necessities of life, increasing the likelihood of violent conflict and providing an environment that is conducive to the recruitment of radicalized youth for violent behavior.

5.3 Conclusion

Although there is a general tendency for climate variability to increase the likelihood of conflict, particularly in locations where natural resources are few, such as the Horn of Africa, the impact varies greatly and the state's capacity to adapt and manage the situation is the main mediating factor. This mostly depends on the institutional structures in place before to the start of the conflict. Due to a lack of environmental resources and fierce rivalry for community survival, climate variability indirectly exacerbates conflicts in Turkana County.

Certainly, the adoption of a resilient climate change governance framework that harmonizes several policy frameworks at local, regional and worldwide scales will considerably reduce the

occurrence of violent conflicts in Turkana and other vulnerable areas, like other Horn of Africa's pastoral regions.

On the other hand, because so many nations see the benefits of working together to address these issues, climate change has actually increased international cooperation. Partnerships at the regional and sub-regional levels have been formed to address climate change issues collectively. By tackling peace and security challenges in these forums, such cooperation has also assisted peace-building initiatives. Rivers, lakes, pasture and grazing areas are examples of shared resources across border communities that are essential to peacebuilding. Therefore, better management of water sources, grazing lands and livestock in Turkana County is essential to reduce environmental degradation and conflict.

5.4 Recommendations

The strategic orientation of local development projects towards long-term resilience is necessary in order to offset the negative impacts of climate variability and change on the Turkana community. The findings witnessed can serve as a valuable guide for local decision-makers in the county, helping them understand the local-scale temperature and rainfall changes to enable better planning for a shifting climate.

While the causes of variations in trend and means for seasonal temperature trends were not examined in this study, it suggests the need for further investigation, potentially using an appropriate model. More investigation is needed into the local elements affecting the climate, the causes of variations in monthly mean temperatures, the real impacts of ENSO on rainfall totals and the Indian Ocean's influence over northern Kenya. Additionally, future studies should Examine the effects of degradation of the climate, shifting land use patterns and global warming on the area's micro-temperature patterns.

The study recommends the creation of an information system to objectively increase the Turkana community's resistance to the effects of climate variability and change by giving them early warning indicators.

In Turkana County, conflict-sensitive adaptation requires diversifying livelihoods, such as introducing more sedentary farming, reducing the sizes of herds, preserving the environment and increasing the availability of water sources. Regulating migration as a coping mechanism can help reduce conflicts over resources. To improve overall resilience, the county government ought to recognize and support the pastoral community's traditional coping strategies.

To the Government of Kenya

Ensure that the ongoing development of the National Adaptation Plan aligns with Kenya's commitments under the UNFCCC and international human rights law, specifically addressing the protection of rights related to food, security, water and health. The strategy should contain implementation measures to lessen the disproportionate burden on vulnerable groups, such as women, children, those with disabilities, marginalized communities, indigenous people and the plan should detail the projected implications of climate change on these specific rights.

Advocate for non-discrimination to be a fundamental national principle embedded in all national policies, strategies, plans of action and other measures related to climate change so as to ensure that no regions in the country are left behind. Recommend to the Ethiopian government to begin independent, peer-reviewed impact studies as soon as possible in order to examine the combined effects on populations downstream from Lake Turkana of the Gibe III Dam and irrigated commercial agriculture. Take the appropriate action to lessen any severe damages that are discovered in order to protect the welfare of the impacted people.

Look into sustainable ways of harnessing the waters of Lake Turkana to supply domestic use water as well as water for irrigation to the communities within the immediate environs of the lake.

To the Turkana County Government

The County Government needs to engage in consultations with communities significantly impacted by major environmental changes and climate variations before executing climate change adaptation plans. Ensuring the active and meaningful participation of marginalized groups, such as women, people with disabilities and indigenous people, is vital. Additionally, the Turkana County Integrated Development Plan ought to include a climate change adaptation strategy. With the use of such a strategy, the government will be able to carry out its mandate to ensure the efficient execution of these policies and progressively realize the rights of everyone to food, security, water, and health without many problems.

Recommendations for further research

In future the researcher recommends in-depth case studies focusing on specific regions within Northern Kenya to explore the localized dynamics of climate variability and its impact on inter-communal conflicts.

References

Agesa, B. L., Onyango, C. M., Kathumo, V. M., Onwonga, R. N., & Karuku, G. N. (2019). Climate change effects on crop production in Yatta sub-county: farmer perceptions and adaptation strategies. *African Journal of Food, Agriculture, Nutrition and Development*, *19*(1), 14010-14042.

Ahmed, A., Mohamed, N. S., Siddig, E. E., Algaily, T., Sulaiman, S., & Ali, Y. (2021). The impacts of climate change on displaced populations: a call for action. The Journal of Climate Change and Health, 3, 100057.

Ahmed, S., Simmons, W. P., Chowdhury, R., & Huq, S. (2021). The sustainability–peace nexus in crisis contexts: how the Rohingya escaped the ethnic violence in Myanmar but are trapped into environmental challenges in Bangladesh. Sustainability science, 16, 1201-1213.

Alahacoon, N., Edirisinghe, M., Simwanda, M., Perera, E. N. C., Nyirenda, V. R., & Ranagalage, M. (2021). Rainfall variability and trends over the African continent using TAMSAT data (1983–2020): Towards climate change resilience and adaptation. Remote Sensing, 14(1), 96.

Al-Ansari, N., Jawad, S., Adamo, N., & Sissakian, V. (2019). Water quality and its environmental implications within Tigris and Euphrates rivers. *Journal of earth sciences and geotechnical engineering*, *9*(4), 57-108.

Alipour, A. (2019). A review of the 21st century challenges in the food-energy-water security in the Middle East. *Water*, *11*(4), 682.

Ani, K. J., Anyika, V. O., & Mutambara, E. (2022). The impact of climate change on food and human security in Nigeria. *International Journal of Climate Change Strategies and Management*, *14*(2), 148-167.

Asadieh, B., & Krakauer, N. Y. (2015). Global trends in extreme precipitation: climate models versus observations. *Hydrology and Earth System Sciences*, *19*(2), 877-891.

Asenahabi, B. M. (2019). Basics of research design: A guide to selecting appropriate research design. *International Journal of Contemporary Applied Researches*, *6*(5), 76-89.

Awedoba, A. K., Kamski, B., Mehler, A., & Sebudubudu, D. (2022). Sub-Saharan Africa. In *Africa Yearbook Volume 18* (pp. 3-20). Brill.

Bello, I., & Kazibwe, S. (2022). Pastoralist, farmers and desertification induced conflict in North Central and Southern Nigeria. *Small Wars & Insurgencies*, 1-15.

Ben Hassen, T., & El Bilali, H. (2022). Impacts of the Russia-Ukraine war on global food security: towards more sustainable and resilient food systems? Foods, 11(15), 2301.

Benjaminsen, T. A. (2016). Does climate change lead to conflicts in the Sahel? The end of desertification? Disputing environmental change in the drylands, 99-116.

Böhmelt, T, Buhaug, H., Nordkvelle, J., Bernauer, T., Brzoska, M., Busby, J. W., ... & von Uexkull, N. (2014). One effect to rule them all? A comment on climate and conflict. *Climatic Change*, *127*, 391-397.

Bond, J., & Mkutu, K. (2018). Exploring the hidden costs of human–wildlife conflict in northern Kenya. African Studies Review, 61(1), 33-54.

Briassoulis, H. (2020). Analysis of land use change: theoretical and modelling approaches.

Brown, M. E., Grace, K., Billing, T., & Backer, D. (2021). Considering climate and conflict conditions together to improve interventions that prevent child acute malnutrition. *The Lancet Planetary Health*, *5*(9), e654-e658.

Cao, X., Theodora-Ismene, G., Shortland, A., & Urdal, H. (2022). Drought, local public goods, and inter-communal conflicts: Testing the mediating effects of public service provisions. *Defence and Peace Economics*, *33*(3), 259-279.

Casteel, A., & Bridier, N. L. (2021). DESCRIBING POPULATIONS AND SAMPLES IN DOCTORAL STUDENT RESEARCH. *International Journal of Doctoral Studies*, *16*(1).

Chiang, F., Mazdiyasni, O., & AghaKouchak, A. (2021).Evidence of anthropogenic impacts on global drought frequency, duration, and intensity. *Nature communications*, *12*(1), 2754.

Chinasho, A., Yaya, D., & Tessema, S. (2017). The adaptation and mitigation strategies for climate change in pastoral communities of Ethiopia. *American Journal of Environmental Protection*, *6*(3), 69.

Cianconi, P., Betrò, S., & Janiri, L. (2020). The impact of climate change on mental health: a systematic descriptive review. *Frontiers in psychiatry*, *11*, 74.

Clark, P. K. (1973). A subordinated stochastic process model with finite variance for speculative prices. *Econometrica: journal of the Econometric Society*, 135-155.

Coates, S. J., Enbiale, W., Davis, M. D., & Andersen, L. K. (2020). The effects of climate change on human health in Africa, a dermatologic perspective: a report from the International Society of Dermatology Climate Change Committee. *International journal of dermatology*, *59*(3), 265-278.

Daoudy, M., Sowers, J., & Weinthal, E. (2022). What is climate security? Framing risks around water, food, and migration in the Middle East and North Africa. *Wiley Interdisciplinary Reviews: Water*, *9*(3), e1582.

Ehiane, S., & Moyo, P. (2022) Climate change, human insecurity and conflict dynamics in the Lake Chad Region. Journal of Asian and African Studies, 57(8), 1677-1689.

Erondu, C. I., &Nwakanma, E. (2018). New dimensions of the farmers and herdsmen crisis in Nigeria and the implications for development. *African Research Review*, *12*(4), 16-27.

Feldt, T., Karg, H., Kadaouré, I., Bessert, L., &Schlecht, E. (2020). Growing struggle over rising demand: How land use change and complex farmer-grazier conflicts impact grazing management in the Western Highlands of Cameroon. *Land use policy*, *95*, 104579.

Genyi, G. A. (2017). Ethnic and Religious Identities Shaping Contestation for Land Based Resources: The Tiv-Farmers and Pastoralists Conflicts in Central Nigeria until 2014. *Journal of Living together*, *4*(5), 1.

Gerten, D. (2021). The Political Ecology of Groundwater Mining in Yemen.

Gesami, Brigid. "The Effectiveness of the East African Community Response to COVID-19." *Available at SSRN 4086667* (2022).

Guye, M., Legesse, A., & Mohammed, Y. (2023). Pastoralists under Threat Continuum: quantifying vulnerabilities of pastoralists to climate variability in Southern Ethiopia. *GeoJournal*, *88*(2), 1785-1806.

Haider, H. (2020). Conflict analysis of North Eastern Kenya.

Herzberg, A. (2019). Urban Water Scarcity in Sana'a, Yemen. *Focus*, *15*(1), 21.

Hirwa, H., Li, F., Qiao, Y., Measho, S., Muhirwa, F., Tian, C., ...& Turyasingura, B. (2022). Climate change–drylands–food security nexus in Africa: From the perspective of technical advances, challenges, and opportunities. *Frontiers in Environmental Science*, *10*, 851249.

Hodbod, J., Stevenson, E. G., Akall, G., Akuja, T., Angelei, I., Bedasso, E. A., ...& Tebbs, E. (2019). Social-ecological change in the Omo-Turkana basin: A synthesis of current developments. *Ambio*, *48*, 1099-1115.

Hoffmann, R., Dimitrova, A., Muttarak, R., Crespo Cuaresma, J., & Peisker, J. (2020). A meta-analysis of country-level studies on environmental change and migration. *Nature Climate Change*, *10* (10), 904-912.

Hoffmann, R., Šedová, B., & Vinke, K. (2021). Improving the evidence base: A methodological review of the quantitative climate migration literature. *Global Environmental Change*, *71*, 102367.

Imana, C. A., & Zenda, M. (2023). Impact of climate change on sustainable pastoral livelihoods in Loima Sub-County, Turkana County, Kenya. *South African Journal of Agricultural Extension*, *51*(1), 13-33.

Islam, M. R. (2023). Climate Change, Migration and Conflict in Bangladesh.Taylor & Francis.

İsmail, K. O. Ç. (2022). Determining the biocomfort zones in near future under global climate change scenarios in Antalya. Kastamonu University Journal of Engineering and Sciences, 8(1), 6-17.

Jakob, M., Flachsland, C., Steckel, J. C., & Urpelainen, J. (2020). Actors, objectives, context: A framework of the political economy of energy and climate policy applied to India, Indonesia, and Vietnam. *Energy Research & Social Science*, *70*, 101775.

Jayne, Thomas S., Milu Muyanga, Ayala Wineman, Hosaena Ghebru, Caleb Stevens, Mercedes Stickler, Antony Chapoto, Ward Anseeuw, Divan Van der Westhuizen, and David Nyange. "Are medium-scale farms driving agricultural transformation in sub-Saharan Africa?" *Agricultural Economics* 50 (2019): 75-95.

Kadagi, N. I., Wambiji, N., & Swisher, M. E. (2020). Potential for conflicts in recreational and artisanal billfish fisheries on the coast of Kenya. *Marine Policy*, *117*, 103960.

Kalele, D. N., Ogara, W. O., Oludhe, C., & Onono, J. O. (2021). Climate change impacts and relevance of smallholder farmers' response in arid and semi-arid lands in Kenya. *Scientific African*, *12*, e00814

Kamunywe, J. M. (2022). Provenance of Food Insecurity.A Critical Literature Review. *Journal of Climate Policy*, *1*(1), 36-48.

Kaufman, D., McKay, N., Routson, C., Erb, M., Dätwyler, C., Sommer, P. S., ...& Davis, B. (2020). Holocene global mean surface temperature, a multi-method reconstruction approach. *Scientific data*, *7*(1), 201.

Kipkemoi, S., Nyamasyo, G., Mari, N., & Musingi, J. (2017). Natural resource-based conflicts in Tana River County, Kenya. International Academic Journal of Human Resource and Business Administration, 2(3), 599-610.

Krampe, F., Van De Goor, L., Barnhoorn, A., Smith, E., & Smith, D. (2020). *Water security and governance in the Horn of Africa*. Stockholm International Peace Research Institute.

Latta, G., Temesgen, H., Adams, D., & Barrett, T. (2010). Analysis of potential impacts of climate change on forests of the United States Pacific Northwest. *Forest Ecology and Management*, *259*(4), 720-729.

Legg, S. (2021). IPCC, 2021: Climate change 2021-the physical science basis. Interaction, 49(4), 44-45.

Lenshie, N. E., Ojeh, V. N., Oruonye, E. D., Ezeibe, C., Ajaero, C., Nzeadibe, T. C., ... & Osadebe, N. (2022). Geopolitics of climate change-induced conflict and population displacement in West Africa. Local Environment, 27(3), 287-308.

Liebig, T., DuttaGupta, T., Pacillo, G., Sax, N., Carneiro, B., & Läderach, P. (2022). Climate Security Pathway Analysis: Sudan.

Littman, R. (2018). Perpetrating violence increases identification with violent groups: Survey evidence from former combatants. *Personality and Social Psychology Bulletin*, *44*(7), 1077-1089.

Ludwig, K. (Ed.). (2003). *Donald Davidson*.Cambridge university press.

Mariano-Neto, E. (2022). Fire propensity in Amazon savannas and rainforest and effects under future climate change. International Journal of Wildland Fire, 32(2), 149-163.

Massoud, E., Massoud, T., Guan, B., Sengupta, A., Espinoza, V., De Luna, M., ...& Waliser, D. (2020). Atmospheric rivers and precipitation in the middle east and north africa (Mena). *Water*, *12*(10), 2863.

Matveeva, A. (2017). Divided we fall… or rise? Tajikistan–Kyrgyzstan border dilemma. *Cambridge Journal of Eurasian Studies*, *1*(2017), 1-20.

Mishra, V., Thirumalai, K., Jain, S., & Aadhar, S. (2021). Unprecedented drought in South India and recent water scarcity. *Environmental Research Letters*, *16*(5), 054007.

Mohamed Sala, S., Otieno, D. J., Nzuma, J., & Mureithi, S. M. (2020). Determinants of pastoralists' participation in commercial fodder markets for livelihood resilience in drylands of northern Kenya: Case of Isiolo. Pastoralism, 10(1), 1-16.

Murunga, M., Partelow, S., & Breckwoldt, A. (2021). Drivers of collective action and role of conflict in Kenyan fisheries co-management. *World Development*, *141*, 105413.

Muttarak, R. (2019). Climate, conflict and forced migration. *Global environmental change*, *54*, 239-249.

Mwiturubani, D. A., & Van Wyk, J. A. (2010). Climate change and natural resources conflicts in Africa. *Institute for Security Studies Monographs*, *2010*(170), 261.

Nalau, J., & Verrall, B. (2021). Mapping the evolution and current trends in climate change adaptation science. *Climate Risk Management*, *32*, 100290.

Narrain, S. (2018). Social media, violence and the law:'objectionablematerial'and the changing countours of hate speech regulation in india. *Culture Unbound*, *10*(3), 388-404.

Ndesanjo, R. B., Fensholt, R., Nielsen, M. R., & Theilade, I. (2023). Climate variability impacts on pasture productivity and pastoral livelihoods in northern Tanzania. *Regional Environmental Change*, *23*(2), 54.

Nicholas, A. S. (2018). *Turkana-dassanech Relations: Economic Diversification and Inter-communal Conflicts, 1984-2015* (Doctoral dissertation, University of Nairobi).

Njiru, Z. K. (2012). Loop-mediated isothermal amplification technology: towards point of care diagnostics. *PLoS neglected tropical diseases*, *6*(6), e1572.

Njoka, J. T., Yanda, P., Maganga, F., Liwenga, E., Kateka, A., Henku, A., ...& Bavo, C. (2016). Kenya: Country situation assessment. Pathways to Resilience in Semi-arid Economies (PRISE).

Ochungo, P., Khalaf, N., Merlo, S., Beldados, A., M'Mbogori, F. N., Tiki, W., & Lane, P. J. (2022). Remote sensing for biocultural heritage preservation in an African semi-arid region: A case study of indigenous wells in northern Kenya and Southern Ethiopia. *Remote Sensing*, *14*(2), 314.

Olagunju, T. E., Adewoye, S. O., Adewoye, A. O., & Opasola, O. A. (2021, February). Climate change impacts on environment: Human displacement and social conflicts in Nigeria. In *IOP Conference Series: Earth and Environmental Science* (Vol. 655, No. 1, p. 012072). IOP Publishing.

Omisore, A. G. (2018). Attaining Sustainable Development Goals in sub-Saharan Africa; The need to address environmental challenges. *Environmental development*, *25*, 138-145.

Omolo, N. A. (2010). Gender and climate change-induced conflict in pastoral communities: Case study of Turkana in northwestern Kenya. *African Journal on Conflict Resolution*, *10*(2).

Onamuti, O. Y., Okogbue, E. C., & Orimoloye, I. R. (2017). Remote sensing appraisal of Lake Chad shrinkage connotes severe impacts on green economics and socio-economics of the catchment area. Royal Society Open Science, 4(11), 171120.

Palutikof, J. P., Boulter, S. L., Field, C. B., Mach, K. J., Manning, M. R., Mastrandrea, M. D., ... & Swart, R. (2023). Enhancing the review process in global environmental assessments: The case of the IPCC. Environmental science & policy, 139, 118-129.

Pandey, V., Srivastava, P. K., Singh, S. K., Petropoulos, G. P., & Mall, R. K. (2021). Drought identification and trend analysis using long-term CHIRPS satellite precipitation product in Bundelkhand, India. *Sustainability*, *13*(3), 1042.

Parkinson, C. L. (2019). A 40-y record reveals gradual Antarctic sea ice increases followed by decreases at rates far exceeding the rates seen in the Arctic. *Proceedings of the National Academy of Sciences*, *116*(29), 14414-14423.

Peteros, R., Wolyie, J., Imana, G., & Degefa, A. (2022). From Complementarity to Contestation: An Exploration into the Causes, Actors, and Effects of the Karrayyu-Itu Violent Conflicts of 2019-2020. *East African Journal of Social Sciences and Humanities*, *7*(2), 11-28.

Poornima, B., & Ramesh, R. (2023). Yemen's Survival Quandary: The Compounding Effects of Conflict and Climate Obstruction. *Journal of Peacebuilding & Development*, 15423166231197807.

Price, R., & Reus-Smit, C. (1998). Dangerousliaisons? Critical international theory and constructivism. *European journal of international relations*, *4*(3), 259-294.

Raleigh, C., & Urdal, H. (2017). Climate change, environmental degradation and armed conflict. Political geography, 26(6), 674-694.

Ranjan, A. K., & Gorai, A. K. (2022). Evaluating phenological trends of different vegetation types in response to climate change over the Rajmahal Hills in India during 2001-2019. *Remote Sensing Letters*, *13*(9), 898-911.

Rasul, G. (2021). Twin challenges of COVID-19 pandemic and climate change for agriculture and food security in South Asia. Environmental Challenges, 2, 100027.

Ratemo, C. M., Ogendi, G. M., Huang, G., & Ondieki, R. N. (2020). Application of traditional ecological knowledge in food and water security in the Semi-Arid Turkana County, Kenya. *Open Journal of Ecology*, *10*(6), 321-340.

Sanga, U., & Koli, U. (2023). Mental models of sustainable groundwater management among farmers in semi-arid regions of Maharashtra, India. *Groundwater for Sustainable Development*, *21*, 100904.

Schilling, J., Locham, R., & Scheffran, J. (2018). A local to global perspective on oil and wind exploitation, resource governance and conflict in Northern Kenya. *Conflict, Security & Development*, *18*(6), 571-600.

Selby, J., Dahi, O. S., Fröhlich, C., & Hulme, M. (2017). Climate change and the Syrian civil war revisited. *Political Geography*, *60*, 232-244.

Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., ...& Reinhardt, J. (2017). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. Regional Environmental Change, 17, 1585-1600.

Shahfahad, Talukdar, S., Ali, R., Nguyen, K. A., Naikoo, M. W., Liou, Y. A., ...& Rahman, A. (2022). Monitoring drought pattern for pre-and post-monsoon seasons in a semi-arid region of western part of India. *Environmental Monitoring and Assessment*, *194*(6), 396.

Shrestha, S. (2022). Drought perception and field-level adaptation strategies of farming households in drought-prone areas of Afghanistan. *International Journal of Disaster Risk Reduction*, *72*, 102862.

Stocker, T. F., Qin, D., Plattner, G. K., Alexander, L. V., Allen, S. K., Bindoff, N. L., ... & Xie, S. P. (2013). Technical summary. In *Climate change 2013: the physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 33-115). Cambridge University Press.

Varin, C. (2020). No opportunity lost: the ISWAP insurgency in the changing climate of Lake Chad region. *African Conflict & Peacebuilding Review*, *10*(2), 141-157.

Varisco, D. (2019). Pumping Yemen dry: a history of Yemen's water crisis. Human Ecology, 47(3), 317-329.

Von Uexkull, N., Croicu, M., Fjelde, H., & Buhaug, H. (2016). Civil conflict sensitivity to growing-season drought. *Proceedings of the National Academy of Sciences*, *113*(44), 12391-12396.

Wassie, S. B. (2020). Natural resource degradation tendencies in Ethiopia: a review. *Environmental systems research*, *9*(1), 1-29.

Wiener, M., Saunders, C., & Marabelli, M. (2020). Big-data business models: A critical literature review and multiperspective research framework. *Journal of Information Technology*, *35*(1), 66-91.

Wischnath, G., & Buhaug, H. (2014). Rice or riots: On food production and conflict severity across India. *Political Geography*, *43*, 6-15.

Zipper, S. C., Qiu, J., & Kucharik, C. J. (2016). Drought effects on US maize and soybean production: spatiotemporal patterns and historical changes. *Environmental Research Letters*, *11*(9), 094021.

Zwaigenbaum, L., Bryson, S., Rogers, T., Roberts, W., Brian, J., & Szatmari, P. (2005). Behavioral manifestations of autism in the first year of life. *International journal of developmental neuroscience*, *23*(2-3), 143-152.