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CLIMATE CHANGE RESILIENCE STRATEGIES AND IMPLICATIONS ON NATIONAL SECURITY : A CASE OF ZAMBIA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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DEDICATION

This work is dedicated to my beloved family for their support during the entire period of this programme when I was unavailable at home. I love you all. May God bless you.

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ABBREVIATIONS AND ACRONYMS

IPCC: Intergovernmental Panel on Climate Change

GHG: Greenhouse Gas

CO2: Carbon Dioxide

UNFCCC: United Nations Framework Convention on Climate Change

NDCs: Nationally Determined Contributions

COP: Conference of the Parties

SDGs: Sustainable Development Goals

REDD+: Reducing Emissions from Deforestation and Forest Degradation

EIA: Environmental Impact Assessment

CDM: Clean Development Mechanism

GWP: Global Warming Potential

LULUCF: Land Use, Land-Use Change, and Forestry

PPM: Parts Per Million

CCS: Carbon Capture and Storage

ETS: Emissions Trading Scheme

ABSTRACT

This paper analyses strategies on climate change and their repercussions to the security of Zambia. Allying the polices noted in the above literature, the study aims at establishing the following: This study examines the available policies to understand how they have influenced the management of climate change related issues; especially with regard to food and water security and socio-economic stability. Consequently, the study adopted the following objectives: To assess the existing policies and strategies on climate change in Zambia, To assess the impact of existing policies/strategies on climate change mitigation and adaptation in Zambia and finally, To identify how to enhance the existing policies/strategies to reduce the effects of climate change impact on security in Zambia. The research used interview with some stakeholders and literature review as research instrument in considering climate change policies and adaptation measures in Zambia. Qualitative interviews were carried out with persons selected from the government, the policy-making institutions, universities, and civil society organizations with a view of understanding their attitudes and experiences as regards climate change policy and planning. On the part of background study, a critique of various academic articles, government reports and policy documents gave background information for analysis. The study identified different climate change policies and plans in Zambia that included matters relating to combating hunger through supporting sustainable agriculture, promotion of renewable energy, disaster risk management and sustainable natural resources management. Despite the understanding these policies brought, concerns continued regarding the ability to implement these policies, lack of funds associated with the same as well as socio-economic issues that surrounded the issue at hand. However, despite the measures in place to mitigate climate change, the effect on food and water insecurity and human security were still huge especially to communities in need. Based on this, the study pointed at the urgency of improving the measures against climate change in Zambia and the issue of policy effectiveness and execution. Despite the efforts made towards capacity development, however, there has been a strong need posed to enhance, innovate, and advance multi-stakeholder collaboration to address climate change effects. It is important for socio-economic status including poverty and inequalities to be given attention in order to achieve a level of fairness in resilience as the effort is being deployed across the communities. Accordingly, some of the propositions that the study suggested as measures to improve Zambian response to climate change include the following. Firstly, it can be also stated that there is a requirement for further development of cooperation between different levels of the state power, NGOs and businesses regarding effective climate change policies and measures. This encompasses creating partnership, resource exchange, and goal congruency in an effort to amplify the effects in the organization. Moreover, there is a need for higher spending on mitigation activities on climate change, especially to the vulnerable groups so as to strengthen the socio-economic systems that have been made vulnerable by climate impacts.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This study investigated climate change resilience and mitigation strategies and their implications on national security in Zambia and suggested solutions for handling the implications. It provides a broad background of the study topic, problem statement, objectives, justification, significance, scope, and limitations. Climate change presents a growing threat to global stability, and Zambia, like many nations is increasingly facing the realities of this challenge. In Zambia, resilience strategies to mitigate these threats are essential, particularly as the country relies heavily on climate-sensitive sectors such as agriculture and hydropower. Developing robust climate change resilience strategies is not only critical to safeguarding the environment and economy but also to ensuring long-term national security. These strategies include strengthening disaster preparedness, promoting sustainable agriculture, and enhancing water management systems. Understanding the interplay between climate resilience and national security is crucial for policymakers in Zambia as they navigate an increasingly unpredictable future.

1.1 Background of the Study

Environmental changes in particular, and climate change in specific is one of the most important and emergent issues affecting society and the global human populace. Locally and internationally, vulnerable persons suffer the impacts of climate change most severely. Hence, it is the responsibility of every nation for them to ensure that its citizens are protected from the effects of climate change. Global warming and other climate changes observed and expected for the twenty-first century are significant world phenomena that took place over the last 65 years. CC is a complex global phenomenon which has numerous implications for such significant factors of ecology, environment, socio-politics, and socio-economics (Adger et al. , 2005; Leal Filho et al. , 2021; Feliciano et al. , 2022).

Global climate change threat has attracted the attention of political leaders from all parts of the world hence eliciting a noticeable shift in the flow of climate change discussions between decision makers in the North and in the South. Some countries for example Bangladesh are very much aware and have been fighting the effects of climate change from year 2000. During this period the nation experienced 185 severe weather phenomena that put into use of $3. 72 billion. These disasters affected nearly the entire population of this nation since hardly any family may remain unaffected by these catastrophes. A survey conducted by USAID in 2018 on the climatic vulnerability in Bangladesh shows that 89% of its population which is equivalent to almost 143 million people live in climatically vulnerable places. Since 75 % of Bangladesh lies below the sea level it is predict that it will loss 11% its land by 2050 due to rising sea level. This contemplates to lead to the displacement of 17. 7% of total population of Bangladesh.

Being headed by Honourable Prime Minister Sheikh Hasina, the government of Bangladesh is now trying their best to address problems and improve the situation of the country. MoEFCC, MoDMR, MoA, MoWR and all other concomitant ministries/divisions and agencies are working very hard to improve the climate change resilience at national level. Globally and locally, there will be need to enhance better adaption measures to avert detrimental impacts of climate change and variability regardless of the measure of mitigation realized in the next three decades. The necessary policies and regulatory frameworks have been developed at the national level of Bangladesh to implement the effective measures to achieve the climate- resilient sustainable development (United Nations Climate Change 2022).

Throughout the years, the Government has developed the following policies, strategies, and programs to tackle climate change and disaster risk management: Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was formulated for the first time in 2009 and its second iteration was prepared in 2022. This included the Bangladesh Climate Change Trust Act of

2010, The Nationally Determined Contributions (NDCs) of 2015 and updated in 2021 NAPA, Bangladesh Delta Plan 2100, National Adaptation Plan, NAP 2022 and Mujib Climate Prosperity Plan MCPP for the year 2022-2041. Bangladesh Climate Fiscal Framework 2020, Disaster Management Act 2012, National Disaster Management Policy 2015, Standing Order on Disaster 2019 Sendai Framework for Disaster Risk Reduction 2015-2030 Implementation Plan, National Strategy for Internal Displacement Management 2021, National Plan for Disaster Management 2021-2025 and Draft of the International Solar Energy Roadmap for 2021-2041 and Bangladesh Energy Efficiency and Bangladesh has developed its own policies in 2008 such as Policy on Renewable Energy in Bangladesh, Some other action plans that were made by the Bangladesh government are & Bangladesh National Action Plan for Reducing Single-Limit Cooking Products (SLCPs), 2012, Revised in 2018 and National Action Plan for Clean Cooking, 2020-2030.

Bangladesh is very much in the process of adopting low-carbon development path with emphasis on use of renewable energy and energy conservation. With that aim, they have undertaken the following actions: The 708. 17 MW capacity solar power plants including installation and construction of an additional 1625. 79 MW solar power plant and the ongoing construction of a 149 MW wind power plant. Supplied more than 6 million Solar Home Systems in the remote areas not connected to the electricity supply and distributed 4. 5 million Improved Cook Stoves all over the country in rural areas. The government of Bangladesh has carried out studies on developing drought, cold, water logging, disease, pest and salt tolerant crop varieties in order to adapt the agriculture faced with the climate variations. The floating benches are used to grow vegetables spices and seedlings using locally available water hyacinth and other aquatic weeds in the south-central coastal regions of the country. It has become success story and role model for managing disasters and risk reduction especially in the South

Asian region which has been acclaimed on international level (United Nations Climate Change 2022).

The Cyclone Preparedness Programme (CPP), which the Father of the Nation Bangabandhu Sheikh Mujibur Rahman formulated in 1973 has a total of 76,140 volunteers of which 50 percent are women. Additionally, 46, 000 volunteers of the urban populace are enlisted with United Nations Climate Change 2022 to safe and secure the urban environment. EU's European Security Strategists also state that climate change also leads to increased conflict over resources and thus makes it easier for conflicts to project security in different areas of the world and migration in other areas (EU, 2003).

Regionally in Africa the African Union in a decision made in January 2007, " expressed worried because Africa's socio- economic and productive system is highly vulnerable to climate change and variability because of Africa's low mitigation and response capabilities" (African Union 2007). For the last several decades, a cycle of crisis in Somalia has severely compromised its ability to cope with one of the main threats it currently faces: The danger of global warming and climate change. One of the countries that are feeling the impact of this severest drought as experienced in the Horn of Africa in the last forty years is Somalia where some areas of the country are in danger of famine. Somalians are approximately 62% pastoralists and this therefore means that they depend on fashion enough rain to feed their flocks. However, this has over the last decade became even more difficult to achieve. The same applies to the farmers of Somalia whose enterprise contributes 65 percent of this nation's GDP. In February 2020, Somalia made a national emergency declaration because the desert-attacking desert locusts destroyed food, water and fodder necessary to feed millions (Soderberg et al. , 2020).

Nevertheless, in the above-discussed situation, it does not deny that Somalia has set up remarkable policies, legal and institutional frameworks for climate change and sustainable

natural resource management. National Development plans NDP9 for the period 2020-2024 offered the backdrop for climate change plans and policy to achieve socio economic transformation, sustainability and gender sensitive. The climate change factor is incorporated in the economic development of NDP which emphasize on increasing adaptation and the resilience of the agriculture and livestock sector to climate change. Itemized in NDP-9 are the priority interventions for all the climate vulnerable sector of the economy for preventing and responding to the climate change and its impacts. They are water management investments, protection and reneWable energy for Somalia country. Somalia's National Climate Change Policy (2020) provides the governmental sectoral strategies and how-to-do regarding the matters of climate change especially the adaptation and the mitigation (Federal Government of Somalia 2022).

Due to the effects of global warming it affected the lives of human beings and other living organisms that makes the eco-system due to high temperatures. But if no step is to be taken then maybe there will be a chance that some of the life forms living on this earth will cease to exist because of the occurrence of climate change. Therefore, human beings have to think of various methodologies that may be helpful in containing or alleviating the adverse impacts of climate change on everyone across the country. This year it was the 27th United Nations Climate Change Conference also known as COP (Conference of the Parties) 27 that was held on November 6- 18, 2022 in Sharm El Sheikh, Egypt. There was an Africa Climate Summit on 4th to the 6th of September 2023 in Nairobi, Kenya in an attempt to look for ways of how to fight the impacts of climate change. Climate change effects have affected the whole world but vulnerable people in the poor countries or the rural and poor people in the rich countries, or those who lack the abilities to adapt are likely to be most affected since they depend on the climate vulnerable sectors such as agriculture, fishing, forest products and many others.

This has a negative impact of global warming since it interferes with the lives of human beings and other living organisms that composes the eco-system because of high temperatures. But if no step is to be taken then maybe there will be a chance that some of the life forms living on this earth will cease to exist because of the occurrence of climate change. Hence, people have to devise various strategies that could in one way or the other assist in minimizing or reducing the effects of climate change on everybody within the country. It was held this year on November 6- 18,2022 and is referred to as the 27 th United Nations Climate Change Conference also known as COP (Conference of the Parties) 27 and it was held in Sharm El Sheikh, Egypt. There was Africa climate Summit on 4th to the 6th of September 2023 in Nairobi Kenya as try to searching for ways on how to combat impacts of climate change. The effects of climate change have impacted the entire world, but the vulnerable people in the poor countries, or the rural/ poor people in the developed countries, or those who lack the capabilities to adapt are most at risk to the climate vulnerable sectors such as agriculture, fisheries, forest products, and many more.

Due to the above challenges, Zambia has developed climate change related resilience, a mitigation strategy and policies on climate change. Some of these policies include; the National Environmental Policy (NPE, 2007); the National Adaptation Plan of Action (NAPA) 2007; The National Energy Policy of 2008; the National Climate Change Response Strategy (NCCRS, 2010); The National Forestry Policy of 2014; The National Agricultural Policy of 2014; The National Strategy for Reducing Emissions from Deforestation and Forest Deg

The formulation of the National Adaptation Plan (NAP) was launched in Zambia in 2014 after conducting some orientation activities and consultations that were done. The dialogue thus aided stakeholders to meet the LEG Technical Guidelines for National Adaptation Plan processes of the UNFCCC. Considering the participants of the orientation, it was targeted at the planning personnel that operated in the line ministries of government. The GCF was then

contacted in December 2018 with a conception of the NAP readiness to enhance Zambia in crafting out its viable long-term adaptation framework. The broad NAP framework would ensure excellent planning of adaptation to the long term since integrated sectorwise National Development Planning embraces sectorial NAP planning.

All these policies, strategies, programmes and projects are aligned to what is stated and espoused in the National Development Plan and Tanzania's Vision 2030 that will give a low carbon and climate resilience environment developmental path. Also, the Government became a signatory to the Kyoto Protocol among other things to assist in adoption of the CDM. These polices and strategies have provided the needed impetus and have also continued to provide opportunities through which climate change programmes may be aligned to ensure that Zambia attains vision 2030 through incorporating climate resilient and low carbon development as part of sustainable development strategies. Nonetheless, all these resilience and mitigation measures and policy interferences have not fully safeguard Zambia against the effects of climate change of which the security sector is not immune.

1.2 Statement of the Problem

This social issue has remained a major causes of loss of lives and property every year in the different parts of the world. According to World Health Organisation (WHO) report 2023 on various climatic changes, the increase in frequency and extent of storms, heat waves, floods, drought, and wildfire are evident with the changing climate conditions. These weather and climate hazards have a direct and an indirect impact on security thus leading to death. It also has its implication on infrastructure. Harsh weathers, more pressures like changes in temperature and precipitation patterns, drought, floods and increasing sea levels erode the environment. The WHO (2019) reported that according to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change up to 3. 6 billion individuals globally reside in areas deemed susceptible to climate change.

It was estimated that 60 thousand people in the world perished in natural disasters annually on average for the last decade (Wiranata and Simbolon 2021). Shock events have a devastating impact: Some examples of natural disasters include the famine and drought that occurred in Ethiopia between 1983 and 1985; the Indian Ocean tsunami of 2004; and the Cyclone Nargis that hit Myanmar in 2008; as well as the 2010 Haiti earthquake (Erman et al. , 2021). In addition, such climate-related disasters has led to the displacement of people in areas such as Bangladesh. According to the Internal Displcement Monitoring Centre (IDMC) global figures point to 4 million people displaced by disasters in 2020 only. Besides these issues, the absence of adequate education in the environmental field and knowledge, people's non updated consumer behavior, scarcity of incentive measures, absence of legislation and the government's indifferent attitude towards the issues of global warming are major issues concerning the general public.

Africa has also suffered a lot in climate change natural disasters, which are expected to escalate in intensity and occurrence. The Global Center on Adaptation in its publication of the report 2022 noted that droughts and flood incidences that happened between January 2021, and September 2022 affected approximately 52 million people severely impacting African means of living. Specifically, African food systems had a high risk to climate variations and fluctuations in weather situations since most of the food production systems in the region relied on rain-fed agriculture and livestock grazing. Africa is very much affected by climate change and the impacts on the region have not been very pleasing to say the least. This is serious in the Horn of Africa because of the drought that has be experiencing in East Africa. This is because extreme variability affects water-dependent areas across Africa, moving them principally and negatively. In all modeled climate change scenarios, extreme hydrological variability will steadily increase, depending on the region. Variations in estimations of the number of individuals that will be undergoing water stress within the 2050s range in huge

numbers which could increase or decrease by hundreds of millions. These ones call for adaptation planning under conditions of high risk (Global Center on Adaptation 2022).

Boko et al. , 2007 notes that rainfall is irregular both spatially and temporally in Africa. In the recent decades, the sub-tropical areas of the continent such as the Saharan, Mediterranean and southern Africa have become drier. In southern Africa, Inter-annual variability in the last 40 years has shown a large increase with more severe and extended droughts. There has been an enhancement in intense rainfall occurrences in most of the countries of the region (Angola, Namibia, Mozambique, Malawi and Zambia) as well as shift in seasonality and changes in weather variability (Boko et al. , 2007). Tropical Cyclone Freddy struck Malawi in April 2023 resulting to severe flooding, landslides, mudslides, highest ever cholera outbreak ever recorded in Malawi as well as high food insecurity during the period of heaviest rainfall. Malawi: Of cases of cholera more than 50,000, of cholera deaths 1,700. Also, about 3. 8 million people experienced moderate to severe food insecurity in that regards (Government of Malawi, 2023).

In Zambia, climate change has manifested in increasing temperatures, droughts, floods, and erratic rainfall patterns. As a consequence, the following issues have arisen: The Ministry of Lands and Natural Resources (2021) has identified several consequences of disasters, including diminished water quality, decreased water availability during the dry season, reduced hydropower potential, infrastructure damage, heightened food insecurity, increased transmission of climate-sensitive diseases such as malaria, waterlogging, increased crop losses/failure, proliferation of pests, weeds, and pathogens, loss of habitat and species, diminished ecosystem services, and incre Intensity and frequency of severe climatic events are projected to rise, presenting substantial threats to Zambia's economy, the well-being of its population, and the long-term viability of its natural resource reserves. Based on the ND-GAIN Country Index (Notre Dame Global Adaptation Initiative, 2020), Zambia is classified as one

of the nations with the greatest susceptibility and least capacity to withstand the impacts of climate change.

Because of these climate change effects, some mitigation measures like educating people on mechanisms of reducing Green House Gas (GHG) emissions like use of alternative low-carbon fuels such as biofuels and compressed natural gas; Coming up with policies for forest protection and afforestation, reducing deforestation, reforestation, protecting existing forests and substituting wood fuel with other fuels; Waste prevention, recycling, composting, waste-to-energy incineration and carbon capture from landfills and wastewater; Improving crop cultivation and animal husbandry to minimize carbon emissions, decreasing the use of artificial fertilizer to minimize Nitrogen emissions and improving farming methods, such as the no-till approach, to increase carbon storage in soil have been carried out.

With all these interventions, it is expected that there should be an improvement in the climatic conditions. However, there has been an increase in heavy precipitation in some areas, low precipitation in other places, and high temperatures, posing a danger to life and infrastructure in the country. Therefore, this research seeks to look at the Zambian government's approach to these problems by focusing on understanding the existing resilience and mitigation strategies policy framework for dealing with climate change effects, evaluating the effects of climate change on security, and identifying opportunities for improving existing strategies and lastly exploring other alternative mitigation measures of reducing the effects of climate change.

1.3 Research Objectives

This section brings out the General and Specific objectives that guided the research.

1.3.1 General Objectives

The general objective was:

To examine climate change strategies and their implications on national security in Zambia

1.3.2 Specific Objectives

The specific objectives of this study were:

(i) To evaluate the effects of climate change on security in Zambia

(ii) To assess the government's climate change strategies and policies towards the enhancement of security in Zambia

(iii) To propose strategies that would help the government in mitigating the impacts of climate change on security in Zambia

1.4 **Research Questions**

Arising from the specific objectives outlined above, this research was aimed at providing answers to the following questions:

(i) What effects of climate change are there on security in Zambia?

(ii) Which government's climate change policies and strategies are there to enhance security in Zambia?

(iii) What challenges and opportunities are available to the government in mitigating the impacts of climate change on security in Zambia

1.5 **Justification of the Study**

This section comprises the policy and academic justification of the study.

1.5.1 Policy Justification

The study holds significance in the realm of public administration and management. Understanding climate change resilience and security enhancement strategies can contribute to developing best practices for managing similar problems in other government agencies. Policymakers will use the findings to refine policies related to the handling of climate change.

1.5.2 Academic Justification

From an academic standpoint, the study contributes to the existing body of knowledge on climate change resilience and the enhancement of national security. The unique context of

Zambia provides an opportunity to generate insights that can be valuable not only for security wings but also for academia, researchers, and policymakers globally. By examining the effectiveness of climate change resilience strategies, the study aims to uncover patterns, challenges, and successes that can be extrapolated to inform academic discourse on change resilience strategies within government institutions in Zambia. The academic community will use the findings to refine theories related to organizational behavior, public administration, and the intersection of climate change resilience and the enhancement of national security.

1.6 Significance of the Study

The significance of this research was that the findings would provide appropriate information on the effects of climate change on security in Zambia, and it would help empower the nation to deal with the impacts effectively and efficiently through various policies. It will also essentially be an instrument for providing climate change impact management methods to the government and the general public. Furthermore, the findings provide the necessary evidence for obtaining assistance for the nation's benefit regarding climate change impacts. Therefore, there is a need to pay particular attention to the programs that empower community habitats to provide vital solutions to cushion the effects of climate change on security. In this aspect, it is hoped that this research supplemented the existing literature on the effects of climate change on security in Zambia. For this reason, the findings from this research serve as a reminder to stakeholders of the dangers of climate change. It also sensitizes the communities on the dangers of engaging in activities that add to the greenhouse gases in the atmosphere.

1.7 Key Assumptions

This research study was anchored on the assumption that the respondents would be a great source of information and that they were to exhibit transparency and honesty in answering the questionnaires. Additionally, it was assumed that the instrument used in the qualitative research, the questionnaire, had validity and measured the desired constructs. It was also assumed that the mode of administration of the questionnaire would ensure that the respondents

answered all the questions. Furthermore, it was believed that the sample size selected for this study sufficiently represented the entire study population, that the respondents were exceedingly truthful in answering the survey questions, and that their actual accounts of climate change effects constituted both witnessed and observed experiences.

1.8 Scope and Limitations

The study provided a fair understanding of the effects of Climate Change on security in Zambia. It covered policy issues concerning climate change adaptation in the Lusaka province of Zambia. Selected male and female respondents from the named province were interviewed. The research took place from December 2023 to February 2024 and took a mixed-method approach. It encountered some limitations, such as respondents who did not fully understand how important the research was and those who were busy with their programs. The other limitation was the insufficient sample size for statistical measurements. The research also faced weather limitations, especially disturbances from the rains, as the study was conducted during the rainy season. The financial aspect of this research was another limiting factor, as the researcher was expected to pay research assistants for data collection in the research areas. Limited access to data and a lack of previous research studies on the effects of climate change on security in Zambia were other challenges that the research encountered. To address these limitations, the researcher clearly defined the scope and target population, specified the study duration, employed rigorous validation procedures for data collection instruments, and acknowledged the influence of external factors while focusing on providing a snapshot of the effectiveness of savings and credit programs within the defined context.

1.9 Chapter Summary

This chapter endeavoured to provide a background, statement of the problem, objectives, research questions, justification, significance of the study, assumptions, scope, and limitations.

These formed the basis of developing the literature review in line with the objectives, which is the basis of the next chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides a comprehensive analysis of the existing research about the impact of climate change on security in Zambia. The present analysis identified many deficiencies in the existing literature, some of which were examined in this work, while others were suggested for future investigation. Climate change, a pervasive issue in many regions of the globe, has prompted several individuals to conduct study in order to ascertain the fundamental reason and, eventually, devise a remedy. Notwithstanding these studies, which have been conducted globally, namely in Africa and Zambia, climate change continues to be a problem. In addition, the chapter provided definitions of the pertinent terminology used in this study and examined the climate change scenario in Zambia. Analysed were the climatic patterns and their impact on security in Zambia to assess the susceptibility of security to climate fluctuations. Following that, a range of papers were examined to provide substantiation of the strategies used for adaption.

2.1 Literature Review

A comprehensive literature assessment was conducted to ascertain the existing research on the subject being investigated and to pinpoint any deficiencies. In accordance with the study's aims, the literature has been organised into topics.

2.1.1 Effects of climate change on security in Zambia

The 2020 analysis undertaken by Hamududu and Ngoma reveals that in Zambia, the primary findings suggest a predicted rise in temperature of 1.9℃ and 2.3℃ by 2050 and 2100, respectively. The expected change in rainfall is estimated to be over 3% by the middle of the century, and a somewhat smaller decline of around 0.6% towards the end of the century nationwide. Alterations in precipitation and temperature will result in a 13% reduction in water availability at the national level by the end of the century in 2100. Projections indicate that the water resources in the northern basins of Zambia will either remain unchanged at the river basin level or see modest increases, in contrast to the southern and western regions where decreases of up to 9% are expected. Projections indicate that the Zambezi, Kafue, and Luangwa River basins would see a decrease in water supplies as a result of decreased precipitation and increased temperatures (Hamududu and Ngoma 2020). The declining water levels in the Kafue and Zambezi rivers result in a decrease in the hours during which power is generated in Zambia, therefore posing a security concern, particularly during times of darkness.

Lupele (2020) asserts that climatic unpredictability and change pose a significant challenge to the achievement of sustainable development ambitions in Zambia. Existing climate-induced risks in the nation include drought and dry periods, seasonal and flash floods, and severe temperatures. The frequency and severity of some hazards, particularly droughts and floods, have escalated in recent decades, resulting in negative consequences for food and water security, water quality, energy, and the lives of people, particularly in rural areas. The future trajectory of the nation is characterised by an increase in the average temperature, a potential decline in total precipitation, and preliminary evidence of intense rainfall occurrences. An

evaluation of possible climatic consequences indicates that if unattended, they would significantly weaken the endeavours to enhance the quality of life for Zambians. The report undertook a more comprehensive analysis of the adverse effects of climate change on crucial economic sectors such as water, agriculture, forestry, wildlife, tourism, mining, energy, infrastructure, and health.

Given their reliance on natural resources and weather-dependent industries, as well as their limited access to information, decision-making, investment, and services, Dasgupta et.al (2015) demonstrate that rural regions are more susceptible to climate change. It is imperative that adaptation techniques effectively tackle these weaknesses. For instance, most rural communities depend on rain-fed cultivation farming. As a product of climate change, drought has also severely impacted agriculture. Due to the lack of adequate rains and the severity of pest and disease outbreaks, many different crop species have withered and died in Africa and other parts of the world (Sintayehu 2018). Widespread droughts and crop failures in the drier climates of Africa lead to increased malnutrition and starvation. This leads to a decreased yield from farming activities and compromises food security, affecting everyone.

In their 2009 publication, Brown and Crawford delineate three primary aspects of the security risk presented by climate change. In the first instance, climate change has the potential to escalate land-use disputes and stimulate environmental migration by worsening pre-existing environmental issues such as drought, water shortages, and soil degradation. Furthermore, increasing global temperatures have the potential to weaken the foundation of some people's means of subsistence, particularly in underdeveloped areas. The phenomenon of climate change is expected to surpass the ability of local communities to adjust to evolving environmental circumstances and further exacerbate the prevailing tendency towards overall instability in numerous societies and regions, especially in weak and vulnerable states characterised by inadequate systems of governance and institutions. Furthermore, climate

change might give birth to novel causal connections between environmental circumstances and the occurrence of conflict, namely via phenomena such as sea-level rise, flooding catastrophes, and the melting of glaciers that jeopardise downstream water resources. Moreover, there is apprehension that if not controlled, global warming may surpass certain thresholds at which climate change gains independent speed.

An investigation conducted by Mulenga and Wineman (2014) in Zambia revealed that less rainfall or extended periods of drought have resulted in a decline in the water levels of streams, rivers, lakes, and wells. The consequence of this was a decrease in the water supply for vegetable cultivation throughout the dry season. In addition, they highlight that cattle producers in Zambia are increasingly commuting greater distances to water-points as a result of acute water shortage. This phenomenon has resulted in reductions in the weight of cattle and consequent rises in animal mortality, therefore posing a danger to food security, which is the focus of this research. Dhanush and Vermeulen (2016) and the IPCC (2014) suggest that the interplay between climatic variability and other environmental variables may exacerbate the decline in agricultural output by promoting the growth of current and emerging pests, weeds, and diseases. Variations in precipitation, temperature, and seasonality might potentially alter the natural habitat of pests, weeds, and illnesses, therefore influencing their distribution in response to climate change. For instance, the weed Striga Hermothica, which significantly hampers grain production in Sub-Saharan Africa, is expected to proliferate as a result of climate change.

2.1.2 Government's climate change policies and strategies towards the enhancement of security in Zambia

According to England et al. (2015) the effectiveness of polices and measures for combating climate change in Zambia is being called to doubts due to the absence of the record about the implementation of the initiatives. This climate change conversation has been done in the way that formulates in the Zambian development paradigm but does not challenge it. While global

institutions such as the World Bank promotes the idea of ecological modernisation, climate change is viewed as the means through which societies could develop. But Phương's study reveals that the vast majority of Zambian policy papers reviewed for this paper depict climate change as a risky phenomenon. These values are supported by the previous studies completed in the area and show that governments overemphasise risks linked to climate change (England et al. , 2015).

As shown by Irish Aid Zambia 2017, some of the policies on climate change that have been put in place include the National Adaptation Plan of Action (NAPA) 2007, Intended Nationally Determined Contribution (INDC) 2015, National Climate Change Response Strategy 2010 and the National Policy on Climate Change 2016. At the policy level these include the National Policy on Environment (NPE, 2007) and the National Forestry Policy of 2014 in which environmental conservation, adaptation and mitigation measures are provided. Lapses in policies at the sectoral level remain a major constraint on incorporating climate change adaptation as an integrated consideration at the present time (Irish Aid 2017).

Jerome van Rooij in a study that was conducted in 2014, the Zambia National Policy on Climate Change 2016 explained that the country's deforestation rates were substantial and estimated to be at between 250, 000 to 300, 000 hectares per year. The above policy pointed out charcoal and firewood consumption, timber production, un-sustainable agriculture for instance shifting cultivation and other exploitative land use practices. However, it paid little attention to the contributions of deforestation and forest degradation to total greenhouse gas emission of the country. Unfortunately, the authors of the study were unable to directly link them to alterations of the hydrologic conditions in the country and consequently, the availability of water supply. Thus, even though there were the climate change policies in the society throughout this period, the gap was that they did not clearly define specific correlations,

for instance, between deforestation and climate change. What has become rather apparent is that there was lack of adequate clarity in the current policies.

As highlighted by Pilli-Sihvola (2020), the purpose is to improve the understanding of the cross-cutting approach of DRR-CCA policies as a way of addressing risks related to weather and climate change in the most efficient and effective manner possible. The author of this written work intended to give clear and concise working definition on integration, in the horizontal (inter-ministerial) and vertical (intra-ministerial) planes. Also, it brings forward an improved policy integration cycle and a conceptual framework for assessing the integration of DRR and CCA policies at the policy formulation and implementation phases. The policy level emphasis is used because policies guide actions, and, perhaps the policy level integration may also improve the overall integration of DRR and CCA. Many techniques and abilities have been established to enhance the implementation of Zambia climate change policy.

2.1.3 Challenges and opportunities available to the government in mitigating the impacts of climate change on security in Zambia

In the essence, Stadtbaumer, Ruesink, and Gronau (2022) point the need for policy interventions like; Intensify agriculture through improved seeds, technological tools and extra oxen labor. Furthermore, policy should be directed towards the use of different seeds and crops, different method of planting/farming or crop rotation, predicting the weather and information on the impacts of climate change. It is the characteristics of the households' asset structure and the effect of climatic conditions on the identification of relevant adaptation procedures.

Further, Romdhani, et al, (2018) found out that at the Lusaka-city level it was called "Economically strong, Environmentally-friendly; Community Hope and Opportunity'' (ECHO). To date, efforts towards implementing this strategy has mainly been on the economic sub-strategies including a ring road to enhance city circulation. However, if there was more money available the ECHO umbrella term might provide a mechanism for Dearman to engage with decision makers as this strategy already sets out the environmental agenda.

According to Kaoma-Sikaneta in the research done in 2020, there are several methods used in the assessment of the policy interjection and implementation and policies processes. They revealed that mitigation policies/actions/programs converge into three programs with mitigation and adaptation effects: Knowledge of Education: Sustainable use of natural resources: Sustainable forest management, Sustainable agriculture, Renewable energy: Energy efficiency. Similarly, the adaptation measures arising from the vulnerability assessment of seven major sectors of the economy that is agriculture, water, forestry, energy, wildlife, infrastructure and health which has seven goals/programs has great mitigation co-benefits. These are the strategic productive systems of adaptation among them being: Agriculture; forests and wildlife; water systems; strategic infrastructures and health; systems; enhanced capacity; Research; technology transfer and finance. The researcher agrees with Kaoma-Sikaneta (2020) making the point that understanding what a given public policy contains is critical to ensure that the members of the public implement the policy and advocate for it.

2.2 Theoretical Framework

This study was anchored within the theoretical frameworks of the Environmental policy theory, Policy implementation theory, and Human Security Theory, which collectively explain the development and implementation of policies to address environmental and human security issues. The sub-chapter reviewed the theories in the study of climate change policies' effectiveness in promoting the country's national security.

2.2.1 Environmental Policy Theory

Environmental policy theory can be defined as the system of concepts which may help in making and applying the environmental policies. The source of this theory is the understanding of the interdependence of people's actions and the natural environment as well as the requirement for their rational use for generations. Sustainable development is one of the major pillars of the theories that underpin environmental policy. This includes the encouragement of activities that do not harm the environment, the conservation of natural resources and

improvement of the lot of communities. Three policy areas are reviewed comprehensively, namely sustainable consumption, environmental valuation, and policy in its broad sense (Gsottbauer and Van den Bergh 2011).

Various scholars have shaped environmental policy theory over time, and it draws on contributions from multiple disciplines. Some influential figures in this field include the following scholars: John Kingdon. His work on policy agenda-setting and the role of multiple streams in policy formulation has influenced environmental policy analysis. David Easton. As a political scientist, Easton's systems theory has been applied to understand the functioning of environmental policy within broader political systems. Thomas R. Dye. Known for his work on policy analysis, Dye has contributed to understanding the government's role in addressing environmental challenges. Michael E. Kraft. As a political scientist, Kraft has made significant contributions to studying environmental policy and governance.

Roberts (2010) explains that it is important to note that environmental policy theory is an interdisciplinary field, and various scholars from political science, economics, sociology, and environmental science have contributed to its development. The application of environmental policy theory can be seen in various policy areas, such as the conservation and preservation of natural habitats and biodiversity, Regulation of pollution and emissions to protect air and water quality, Promotion of renewable energy sources and energy efficiency, Implementation of waste management and recycling programs, Development of land use and urban planning policies to minimize environmental impact and International agreements and treaties to address global environmental challenges.

Applying environmental policy theory involves engaging stakeholders, conducting scientific research, setting goals and targets, and using a combination of regulations, incentives, and voluntary initiatives to achieve environmental objectives. The ultimate goal is to foster a

harmonious relationship between human activities and the natural environment, ensuring that both needs are met sustainably.

2.2.2 Policy Implementation Theory

As explained by Howlett (2019), policy implementation theory involves the study and understanding of how policies are put into practice, including the processes, challenges, and outcomes associated with turning policy decisions into tangible actions and results. There are several key concepts and approaches within policy implementation theory, each of which influences the application of policies in real-world contexts. Some key elements of policy implementation theory include institutional analysis, which involves examining the organizational and institutional structures responsible for implementing policies, including understanding the roles, responsibilities, and capacities of different actors involved. Stakeholder Engagement: Effective policy implementation often requires engaging a wide range of stakeholders, including government agencies, non-governmental organizations, communities, and the private sector. Understanding the interests and influence of these stakeholders is crucial for successful implementation. Resource Allocation: Implementing policies requires strategically allocating financial, human, and technological resources to achieve the desired outcomes. Resource constraints can often be a significant challenge in policy implementation.

It also involves the following: Monitoring and Evaluation. Policy implementation theory emphasizes the importance of establishing monitoring and evaluation mechanisms to assess progress, identify challenges, and adjust as needed. Adaptation and Learning: Implementation theory recognizes that policies often need to be adapted as they are put into practice, and learning from experience is crucial for improving implementation over time. The application of policy implementation theory can be seen in various policy domains, including education, which implements policies related to curriculum development, teacher training, and school

infrastructure to improve educational outcomes. Healthcare: Putting in place policies to expand access to healthcare services, improve public health outcomes, and address healthcare disparities. Environmental Protection: Implementing regulations and programs to mitigate pollution, conserve natural resources, and promote sustainable practices. Economic Development: Operationalizing policies to foster entrepreneurship, job creation, and poverty reduction. Social Welfare: Implementing policies related to social assistance, child welfare, and support for vulnerable populations.

Applying policy implementation theory involves careful planning, stakeholder collaboration, resource management, ongoing monitoring and evaluation, and a willingness to adapt strategies as needed. Successful policy implementation requires a deep understanding of the local context, effective communication, and navigating complexities and unforeseen challenges.

2.2.3 The Human Security theory

Human Security hypothesis was used in this study. It was conceived, in the Human Development Report published in 1994, as a way of linking security to groups and individuals and not territory within the spirit of development by the United Nations Development Programme (UNDP). The domination of the security concept in the international system has, therefore, made security the cardinal aspect that sustains formation and perpetuity of states in the world (Cocklin, 2002). According to MacFarlane and Khong (2006), Human Security discourse emerged to challenge the traditional security paradigm that was increasingly criticised for its state-centric orientation, which endorsed the state's weapons of violence, and for promoting the idea of state sovereignty.

Besides, it was accused of focusing on imposing proactive measures toward security issues. Solutions which are possible include sound management measures that can help in reducing or otherwise addressing the effects of climatic change. Some of the scholars who pioneered and developed the theoretical approach are Mohammed Waseem Ul Haq, who published his work

on “New Imperatives of Human Security” in 1994 with the intention to present a theoretical document on the theory of human security which was later introduced and promoted internationally. Indeed, he pointed out that through such a theory as the Human Security rhetoric, more attention was given to security. According to Haq, terrorism, poverty, sickness, and narcotics can be considered as a threat to human security.

In addition, he tried to widen it by adding such threats as North-South divide, dominant political economy, and inequitable distribution of resources to the list of threats to human security (Rothschild, 2008; Bajpai, 2000). Community-based, intersectoral, and primarily of a preventive nature as well as being context-sensitive principles serve at the base of the idea. The first principle concerns persons as basic components of security threat analysis. Second it is based on a broad concept of insecurity that captures many vantage points hence broadening the spectrum of security threats and variables in areas of food, health, politics, economy, environment, person, and community security. Moreover, one has to remember that human anxieties cannot be solved on one’s own. Taylor (2004) outlines the positions and perspectives elaborated in the text as complex and recognising the need for a collaborative and multi-sectoral approach to the issues of safety, development and human rights.

Last is the aspect of human security that recognized the many and dynamic settings where human security was operational and this facilitated emergence of solutions for human insecurity. Climate change is a well understood complex threat to peace and security in the world. The disastrous effects have been global with most of the sufferings being borne by humanity itself. This is the message of climate change; the many faces of climate change are complications that have the potency to alter lives as they offer elaborate challenges to existence. The perceived threats to human lives because of climate change have affiliated climate change to insecurity. Therefore, human security theory which is a significant approach in the study of security is important in providing understanding as well as offering solutions to the risks

resulting from human activities tied to climate change complexity. For this investigation the theory was selected due to its comprehensive discussion of the goals.

The theoretical framework discussed in this paper is relevant to this study as it asserts that any environmental policy theory entails stakeholders' involvement, scientific research, goals and targets setting, and the application of a mixture of compliance measures, incentives and voluntary schemes to meet environmental objectives to understand how policies are implemented, the processes, the challenges, and effects of translating policy decisions into implementable and achievable actions and outcomes to address human-related threat from the phenomenon of climate change.

2.3 Conceptual Framework

Independent Variables ***Dependent Variables***

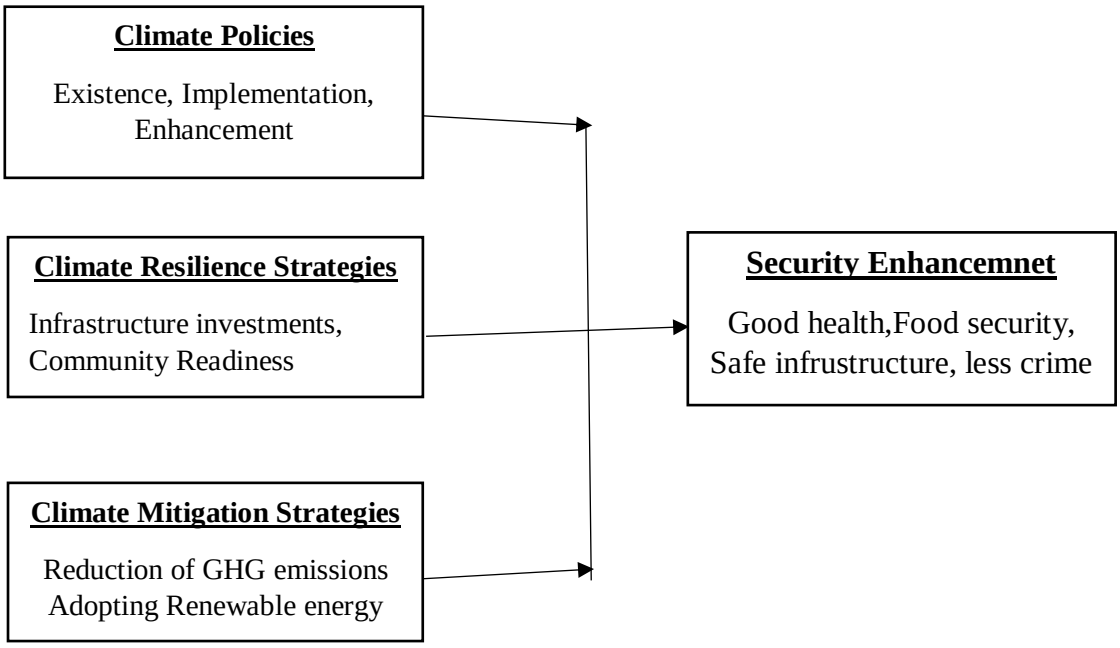

Figure 2.1 Conceptual Framework Source: Researcher, 2024

Climate policies: Climate change policies may include the following issues: Government concern towards the climate change challenges, extent of climate change policies, and policies change towards climate change challenges. These policies provide standard guidelines on statements and actions on Climate change response for the purpose of reducing the vulnerability of the region, strengthening on capacity for adaptation and building socioeconomic resistance of affected populations as well as the affected ecosystems.

Climate Resilience Strategies: Environmental catastrophes has the capacity to do significant harm to many vital infrastructure elements, therefore interrupting vital services and posing a threat to public safety and security. Infrastructural systems, which are fundamental to contemporary civilisation, include several areas such as electricity grids, water plants, airport infrastructure, road bridges, rail lines, and more. Potential resilience metrics include infrastructure investments in climate-resilient technology, community preparedness and

adaptation to climate-related events, and economic indicators of resilience, such as post-disaster employment rates, among other factors.

Climate Mitigation Strategies: Climatic change mitigation refers to the reduction of the overall release of greenhouse gas emissions that are causing global warming. Climate change mitigation involves restricting the release of greenhouse gases that trap heat into the atmosphere. Climate change mitigation refers to the reduction of greenhouse gas emissions from primary sources such power plants, companies, automobiles, and farms. Forests, seas, and soil also process and sequester these gases, constituting a crucial component of the solution. Mitigation of greenhouse gas emissions, implementation of sustainable energy sources, and allocation of resources towards carbon capture and storage technology, among other initiatives.

Security promotion: Security includes the following issues: Physical security from climate-related disasters (e.g., infrastructure protection), Economic security (e.g., the impact of climate events on national GDP), and Social and political stability in the face of climate-related challenges.

This conceptual framework provides a structured approach to exploring the complex interplay between climate change resilience strategies, mitigation strategies & policies, and their impact on security. When a state has effective climate change policies, resilience, and mitigation strategies, it has a more secure environment against climate change effects.

2.4 Literature Gap

After reviewing the various studies and literature done by other scholars on the subject of study, it was noted that most of the write-ups did not cover the effects of Climate Change on traditional security but rather dwelt so much on the elements of contemporary security. Additionally, most literature did not emphasize the importance of policy as a solution to dealing with the effects of climate change. Policies provide guidance, consistency, accountability,

efficiency, and clarity on an organization's operations. This offers members in public or private sectors guidelines and principles to follow; hence, their importance cannot be over-emphasized. Therefore, the above issues provided a gap in the reviewed literature.

2.5 Chapter Summary

The literature examined in this study included writings and research works by several writers and experts on the impacts of climate change on several interconnected and interdependent components of a nation's security. The examined research demonstrated that climatic changes have a significant influence on security. The majority of research assessed the impact of climate change on human security, food security, and traditional security. The findings from the majority of these investigations validated the theoretical literature conclusions that climate change has a negative impact on a nation's security. Studies have shown that climate change presents a significant obstacle to the security and well-being of people, communities, and countries. Evidence confirmed that climate change is expected to weaken the ability of countries to provide the necessary opportunities and services for people to maintain their means of living. The content of this chapter establishes the foundation for the study that requires a systematic approach, which will be addressed in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The primary objective of this study was therefore to assess the strategies deployed in the climate change and their impact on the security of Zambia. This chapter identifies the use of strategies that will enable the achievement of the research objectives. This chapter aimed at describing the general approach in conducting the research, the population of interest, the sample selection method and data collection approaches that would help in addressing the research question. The text discussed the approaches applied to the analysis of the qualitative and the quantitative data collected from the field. In this research, focus was laid on Lusaka province in Zambia and data was collected by using both quantitative as well as qualitative research approaches. The main data collection technique that was employed with the researched population was through administration of questionnaires.

3.1 Research Design

The present study involved both Quantitative and Qualitative research designs and more specifically an Action Design Methodology combined with a Qualitative approach and am Descriptive Survey Design methodology combined with a Quantitative approach. This approach was useful when collecting and analyzing numerical and descriptive data. Gillis and Jackson (2002) stated that Action Research is a systematic approach of collecting data with a view of making a change. Descriptive research is, therefore, focused on giving accurate and systematic account of a scenario, problem, phenomena, service or program, spewing out information on the quality of life within a given community or presenting community's perception on a given issue (Abbott & McKinney, 2013). A mixed-method research design is a type of a research approach where both, the quantitative and the qualitative research concepts, techniques or vocabularies are used in a single research study. This kind of research system

allows researchers to gather high levels of perceptual integration of the phenomena being examined (Leavy, 2022). The design was the chosen because of its self-explanatory nature in demonstrating the link between the effects of climate change and the security of a nation. Descriptive was employed by this study in order to explain and elaborate the effects of climate change on the security of a country.

3.2 Area of Study

The Lusaka province of Zambia was investigated as the research area. The Lusaka Province is a constituent province of Zambia, which consists of 10 provinces. Lusaka, the capital of Zambia, may also be considered a district. With a total size of 21,896 km2, it is the smallest province in Zambia. Lusaka is the most densely inhabited province in Zambia, with a population of 3,181,225 and a population density of 100 people per square kilometre. The province borders Zimbabwe to the south, Southern province to the west, Central province to the North, Eastern province to the East, and Mozambique to the South-East. The Zambezi river lies between the province and Zimbabwe; it separates the two. Lusaka is characterized by socioeconomic activities such as Subsistence and commercial Agriculture, mining, small & medium entrepreneurs, and tourism. Lusaka was chosen because it has a well-informed population to help answer the research questions, easy to access and it has necessary institutions to support the research.

Figure 3.1: ***Map showing Study Area***

3.3 Target Population

A Target Population, as described by Banerjee and Chaudhury (2010), is a specific population from whom the sample is appropriately chosen. The respondents chosen were all adult clients, both genders, from the security sector and other relevant sectors dealing with climate change issues who could speak languages with which the researcher was well conversant. The researcher used questionnaire interviews to gather data on their experiences and perspectives to administer the study to the respondents.The Target population was approximately 600 participants.

3.4 Sampling Techniques

Sampling is the systematic process used by a researcher to choose individuals, locations, or items for investigation. Accurate generalisation of findings on the population requires the generation of a representative sample via proper sampling. A sampling method refers to a systematic approach used to acquire samples and data from a certain population. In this study, a purposive sampling procedure was employed, following the recommendations of Kelly

(2010). This technique was employed to ensure an equal representation of the variables for the study, and also, by applying a simple random sampling of the probability sampling design was utilised for the selection of respondents.

3.5 Sample Size Determination

The method for selecting individuals from which information was collected has been described in the literature (Kish 1965, Gupta and Kapoor 1970). Several factors were taken into account when selecting individuals. Investigations were conducted on the entire group or a representative subset to ensure comprehensive coverage. It was imperative that any sample chosen be representative of the population under study. Furthermore, during the selection process, careful consideration was given to the heterogeneity within the group, and appropriate sampling techniques were applied to mitigate biases.

The study employed a specific formula to determine the appropriate sample size required for the research from the target population. $n = \frac{N}{1+Ne^2}$

n = Sample Size, N = Target Population, e = error margin of 0.05

3.6 Instruments and Tools

The study utilized a structured questionnaire for data collection to understand the research topic fully.

3.6.1. Questionnaires

The research utilized a questionnaire to gather information because it was an efficient and cost-effective way to reach many respondents who were spread out geographically. The flexible nature of this tool made it necessary to consider using this method, which allows informants to answer by means and without coercion. The questionnaire targeted research area members who deal with climate change-related matters. The respondents were selected using random and purposive sampling techniques. The research assistant was employed and trained to explain the questionnaire to those who did not understand English well. The questionnaires were used for

this research because of their ability to reach a bigger population, giving respondents time to answer questions and making them easier to supervise.

3.6.2 Interview

Some participants for the study were to be spoken to using an interview guide. They were selected considering their in-depth knowledge and expertise on climate change issues. The interviews allowed the information to sink into their thoughts. Security personnel were chosen from the sample size based on their experience and role as custodians of security. However, the physical interview method was not used due to certain challenges.

3.7 Validity and Reliability

Assessing the reliability of a research instrument is essential for achieving precise findings. Validity pertains to the extent to which a measuring instrument accurately assesses the behaviour or quality it is designed to evaluate. It is a measure of the effectiveness with which the measuring instrument carries out its intended purpose (Anastasi and Urbina, 1997). Validity is established by the interpretative significance and appropriateness of the data acquired from the measuring device after the analysis. This research used content validity to evaluate the extent to which the chosen items accurately represented the tested content. In order to establish the tool's validity, the researcher engaged in a discussion with colleagues from the department and obtained input to verify that the items effectively reflected the study topic. The reliability of a measuring device pertains to its stability and consistency across time. According to Byers (2022), a test is deemed dependable when it can be used by many researchers in consistent environments and produces consistent and repeatable results. Consistency and replicability throughout time are indicative of dependability. Furthermore, the reliability of a test is considered to be dependent on its freedom from measurement mistakes, where a higher number of measurement errors reflect a lower level of dependability. The

reliability of the measuring equipment is a crucial factor for ensuring the validity of the study's findings. Hence, our study guaranteed the reliability of the measurement apparatus used.

3.8 Data Collection Procedures

Data collection refers to the systematic process of acquiring information that is pertinent to the study objective or enquiries (Burns & Grove 1997:383). Data collection was place over the months of November and December in 2023. Methods of data collection included an organised survey. Two key categories of data collecting were employed: primary and secondary. The present research included secondary data acquired from many sources. Comprehensive information on the research was provided to the clients in their native language prior to obtaining their agreement to take part. Consent was received both orally and in writing.

3.9 Data Processing and Analysis

Since this research used a mixed method, qualitative and qualitative data were processed. The research guided the entire data analysis and presentation process. Descriptive statistics were used to study the collected data. The acquired data was analyzed using Microsoft Excel software and then displayed in frequency distribution tables, bar graphs, pie charts, descriptive reports, and verbatim reports. Descriptive statistics was used to describe each participant's diverse stories, sentiments, and responses to the study's many variables. Data analysis for quantitative data from questionnaires was analyzed using Statistical Package for Social Sciences (SPSS), while qualitative data was analyzed through descriptive methods with the help of Microsoft Excel.

3.10 Ethical Considerations

It is important to adhere to ethics in social science research when conducting empirical investigations. Conformity to the principles of permission, privacy, and confidentiality was maintained throughout the investigation. The study participants were provided with the necessary information to make well-informed judgements on the research. Participants were given the guarantee that their data would be maintained in strict confidentiality and only used

for research purposes. The participants were provided with information on the objectives of the research and were urged to freely reveal whatever essential data they considered appropriate without any concern, therefore making their participation in the data collecting voluntary. All participants were handled with the necessary respect and recognition for the many communities in the region, and the principle of confidentiality was upheld.

3.11 Chapter Summary

The current chapter outlines a comprehensive strategy for executing the study. The text delineates the many methodological decisions, including the techniques used for data gathering and analysis, and provides an explanation for their selection. Furthermore, it unveiled the methodologies and protocols for identifying and scrutinising data pertaining to my study question. The research facilitated the identification of the study region and target population, as well as the selection of the most suitable research design, sampling strategy, and data collecting and analysis techniques, among other criteria. The present chapter has furnished the essential data prerequisite for the subsequent chapter's analysis.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

Chapter Four presents the research findings and discusses those findings concerning the research objectives. This chapter is crucial for understanding the study's results and implications for the broader research topic. Let's proceed with the presentation of research findings and discussion.

4.2 Response Rate

This section analysed the rate at which respondents completed the survey undertaken for this study. The response rate is an essential measure that describes the extent to which the target population participates and engages with the research. This analysis offers valuable information on the efficiency of the data gathering procedure and the degree to which the sample is representative.

Table 4.1: ***Response Rate***

Category	***Frequency***	***Percentage(%)***
Responded	48	80%
No Response	12	20%
Total	60	100.0%

The current study's survey response rate is shown in Table 4.1. Out of the 60 individuals invited to take part in the research, 48 responded, accounting for 80% of the selected sample. In contrast, 12 individuals did not provide a response, accounting for the remaining 20%. The substantial response rate implies that the sample collected is very likely to be a reliable representation of the group under study, therefore demonstrating a significant level of engagement from the intended audience.

4.3 Presentation of Research Findings and Discussions

Data was gathered in an unprocessed state; so, the intrinsic information was challenging to comprehend. Hence, it is necessary to synopsise, analyse, and display raw data accurately. Data presentation tools are efficient communication tools that streamline data by making it simply comprehensible and legible, while also capturing and retaining the attention of its readers and successfully presenting vast quantities of intricate data in a simpler fashion. This study offered data across many formats, including text, tabular displays, graphical representations, and pie charts. The writing served as the primary means of transmitting information, elucidating findings and patterns, and offering contextual details. Text was used to provide explanation or highlight certain facts.

According to In and Lee (2017), when communicating quantitative information that involves one or two numbers, it is more suitable to utilise textual language rather than tables or graphs. If additional data were provided or if other information, such as data trends, were communicated, a table or bar chart would be more suitable. A portion of the data was presented using tables. The advantage of tables is in their ability to precisely display information that is not feasible to convey using a graph. An further advantage is that data consisting of many units is shown together. For example, a single table displays temperature fluctuations, precipitation patterns, and humidity statistics. Finally, tables are valuable for summarising and comparing numerical data of many variables.

Nevertheless, the process of comprehending information using tables is more time-consuming compared to graphs, and tables may not be suitable for analysing data patterns. Moreover, given the equal significance of every data in a table, it becomes challenging to recognise and appropriately choose the necessary information. Furthermore, graphs were used to illustrate the data, since they streamline intricate information by using visuals and highlighting data patterns or trends. Furthermore, they have use in the process of summarising, elucidating, or investigating quantitative data. Although graphs are efficient for displaying extensive data, they

are frequently used as a substitute for tables to convey condensed collections of data. Visual representations were used to facilitate comprehension of the material for readers and reviewers. Bar graphs were used to visually represent and contrast values within a certain category or group, as well as the frequency or other statistical aspects of measurement. Based on the number of categories and the size or complexity of each category, bars were generated. The height (or length) of a bar corresponds to the information contained inside a category. Bar graphs are versatile and are used in a grouped or subdivided bar structure when presented with two or more data sets within each category.

Pie charts, used to depict nominal data (i.e., data labelled into distinct categories), graphically illustrated the distribution of these categories. The choice of this format in this research was based on its suitability for clearly displaying information that is organised into a limited number of categories.

The findings of the study are presented as follows:

***4.3.1 Objective One*:** The objective intended to assess the impacts that climate change poses to security in Zambia. To this end, the respondents were requested to show their knowledge on the impact of climate change on security in zambia. Some of them knew quite well and their responses were well articulated while others only had a vague idea about them and their responses were noted down based on their knowledge. Among the respondents, 10 from the Environmental ministry, 10 from the Agriculture sector and 20 from the military & police, all stated that they had prior knowledge on impact of climate change on security in Zambia. Moreover, the respondents were self-completed questionnaires where they where needed to tick on the part of climate change where they had a clue on. The participants from the Ministry of Green Environment, Military & Police, and the Participants from the Agriculture sector

listed them as drought, high temperatures and Floods. Three quarter of the respondents did not know the impacts of climate change on security.

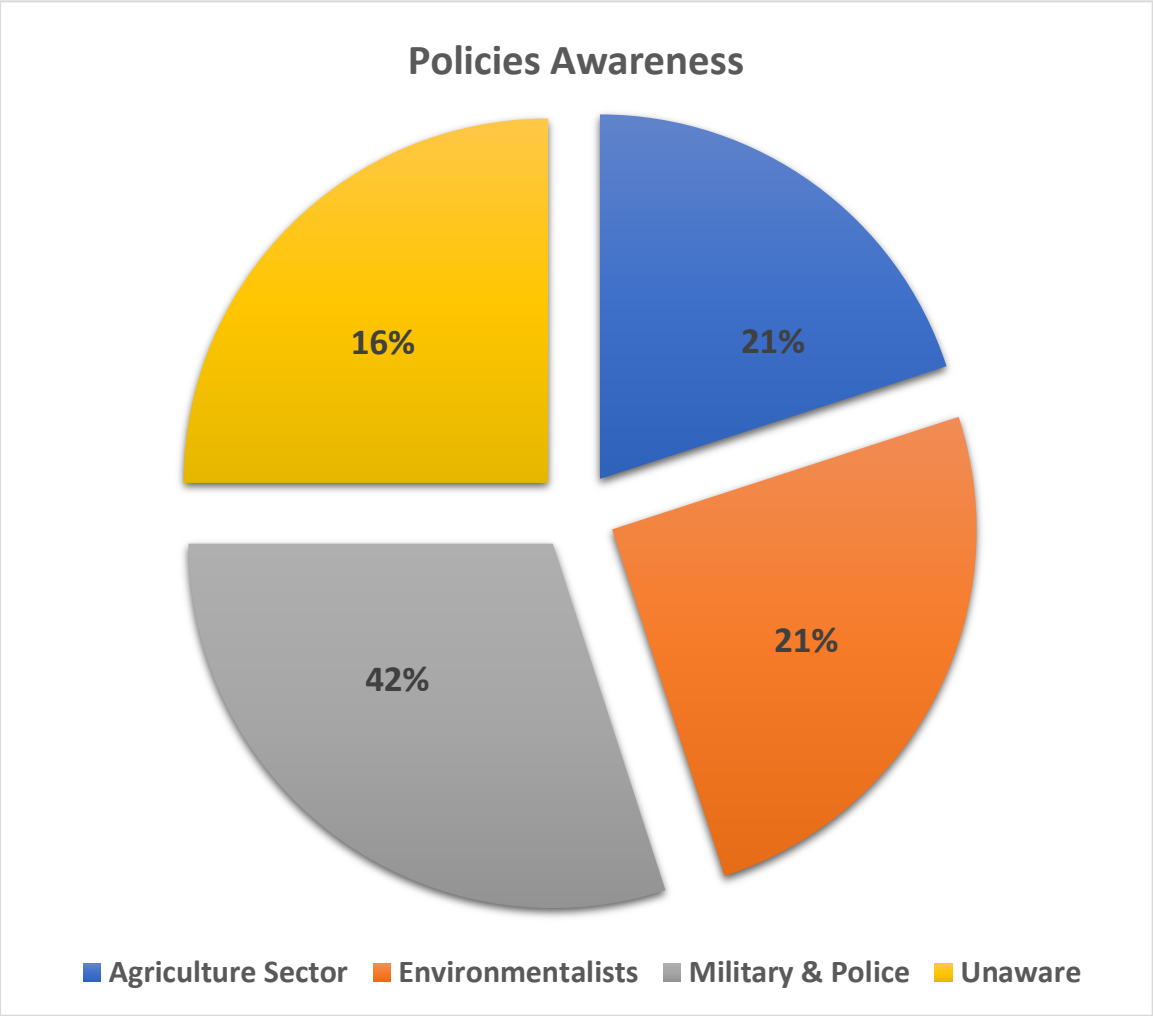

Fig 4.1 Awareness of the effects of climate change on security

***4.3.2 Objective Two*:** The purpose of this research therefore will be to assess the climate change policies and strategies that the government of Zambia has adopted with a view to enhancing security. Agriculture industry = 21%, which corresponds to the first value on the x-axis of Figure 4. 2 reported that they were concerned that their industry was one of the worse affected by climate change. The authors pointed out that even though there were formulated policies, there were challenges as to the implementation of these policies; they highlighted the following challenges as being a limitation to policy implementation: lack of adequate financial

resources, lack of adequate technical skills, and conflicting interests. The figure 2 indicates that 21 percent of the respondents from the Ministry of Green Environment said that some of the policies like the National Climate Response Plan are implemented especially during calamity. Among the respondents from the Military & Police, 42% as depicted in the number 3 on the x-values indicated policy utilisation. The rest of the participants (16 %), represented by the numerical value 4 on the X axis of Figure 4. 2, remained skeptical on the existence of the policies.

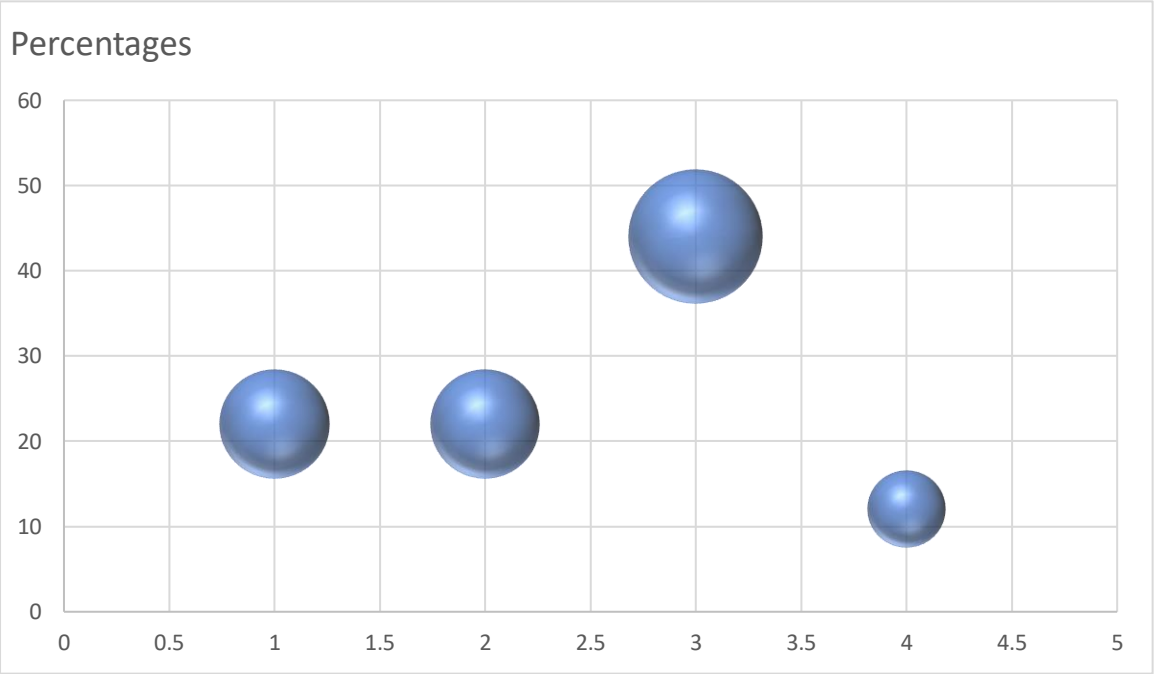

Fig 4.2 Effectiveness of existing policies and strategies

4.3.3 Objective Three: The challenges and opportunities for the government of Zambia in containing the impacts of climate change on security is what this work seeks to examine systematically. For this purpose, participants were asked to enumerate the opportunities available for the government in Zambia to address negative impacts of climate change on security. Their comments revealed various ideas, and these were captured accordingly, in their comments. Over one half of the participants, to be precise 42% supported the notion that the Zambian Government should further probe into and promote the idea of using alternative energy. This is because during the time of little rainfall and low river supplies, Zambia power

Supply Corporation (ZESCO) uses power load shading. This in turn sees an extension of duration of the dark periods hence creating a conducive environment for underworld activities on the vulnerable population. AND% Those who answered that the current policies should be implemented as is are 21% from the Agriculture sector while 21% from Green Environment.

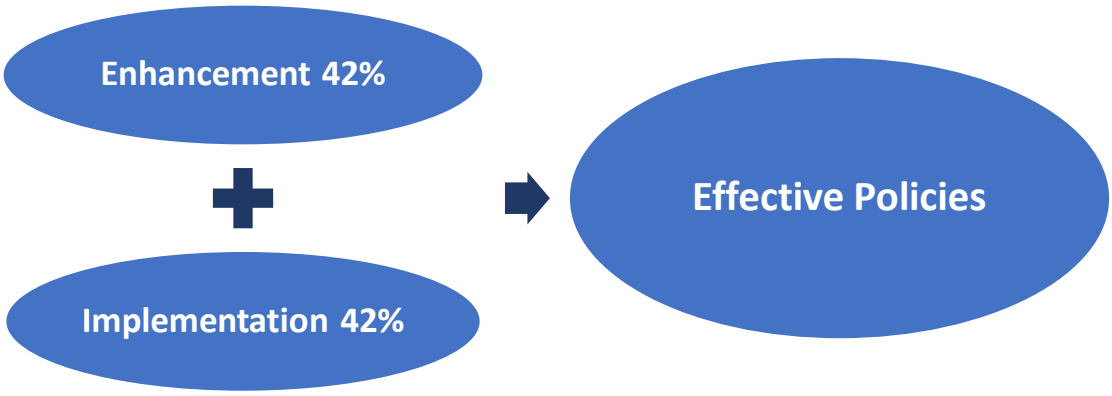

Fig 4.3 Ways to improve the existing policies

4.4 General Information

The data that the researcher collected included the following aspects: Age, Gender, and various information from various respondents from the Defence & Security wings, Ministries of Home Affairs and Internal Security, Green Environment, Health and Agriculture. In this subsection, the demographic characteristics of the participants were presented and discussed. These characteristics include gender, age, education level, experience, and occupation. Understanding the demographic profile of the participants was essential for contextualizing the findings and understanding how different factors might influence their perspectives on the effects of climate change on security in Zambia. These aspects of data allowed the researcher to identify patterns and trends across different groups, ensuring that findings are not biased towards a particular segment. Let's delve into each demographic characteristic in detail.

4.4.1 Gender of Respondents

This subsection examines the distribution of participants based on gender to provide insights into the representation of different genders in the study.

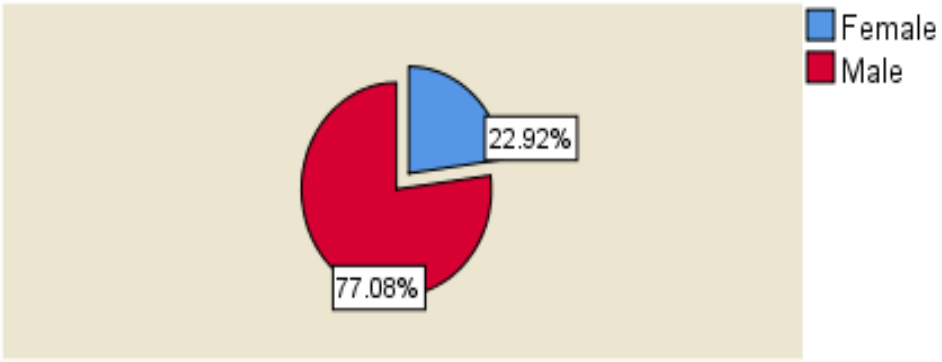

Figure 4.4: Gender of Respondents

Figure 4.4 depicts the distribution of respondents in the survey according to gender. Among the 48 participants, the majority, accounting for 77.1%, were male, while the remaining 22.9% were female. The data reveals a notable disparity in gender representation within the sample, with males being the majority of responders. The overrepresentation of males in the study may indicate gender discrepancies in specific fields or sectors associated with climate change and security, where men are more frequently engaged or occupy positions of power. Furthermore, it could indicate wider societal influences on the participation rates in research projects. The findings emphasize the significance of considering gender dynamics while analyzing the results and forming conclusions from the study.

4.4.2 Age of Respondents

The following subsection presents the age distribution of the participants involved in the study.

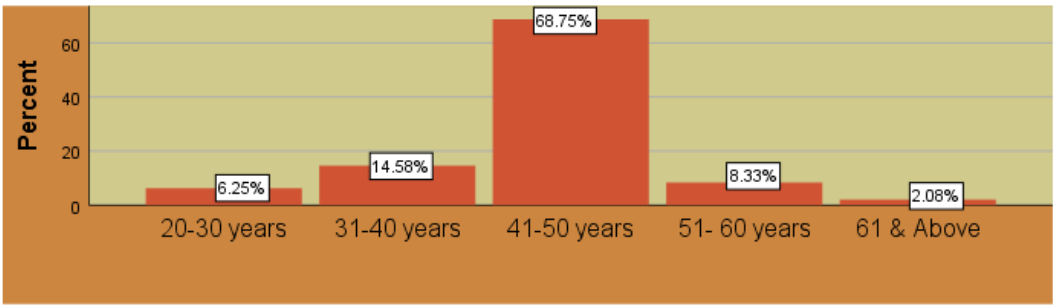

Figure 4.5: Age of Respondents

Figure 4.5 depicts the age distribution of the respondents, indicating that the largest proportion of participants, accounting for 68.8% of the total respondents, falls within the age range of 41-50 years. Next, the age group of 31-40 years accounts for 14.6% of the participants. The respondents are divided into three age groups: 20-30 years, 51-60 years, and 61 years and above, which account for 6.3%, 8.3%, and 2.1% of the total, respectively. The study's age distribution shows more middle-aged participants, indicating a varied representation across various age groups.

4.4.3 Highest Education Qualification Attained

In this subsection, the highest education qualifications attained by the respondents are examined to provide insights into their educational backgrounds.

Table 4.2: Highest Education Qualification Attained

	Frequency	Percent
Certificate	2	4.2%
Degree	25	52.1%
Diploma	8	16.7%
Masters	13	27.1%
Total	48	100.0%

Table 4.2 presents the highest education qualification attained by the respondents. 52.1% of the respondents possess a degree, while 27.1% have a master's degree. In addition, 16.7% of individuals possess diplomas, while only 4.2% hold certificates as their highest educational attainment. The distribution of responders reveals a significant prevalence of higher education qualifications, with degrees being the most common qualification.

4.4.4 Respondents Experience

In this section, the experience level of the respondents is examined to understand their level of expertise and exposure relevant to the study.

Table 4.3: Respondents Experience

	Frequency	*Percent*
1-5 Years	4	8.3%
11-15 Years	11	22.9%
5-10 Years	9	18.8%
Above 15 Years	24	50.0%
Total	48	100.0%

Table 4.3 presents the distribution of respondents based on their years of experience in relevant fields. 50.0% of the participants, who make up the majority, reported having more than 15 years of experience, suggesting a notable level of knowledge among them. In addition, 22.9% of respondents said they had 11-15 years of experience. This was followed by 18.8% who reported having 5-10 years of experience and 8.3% who had 1-5 years of experience, respectively. The respondents' wide range of experience levels offers a thorough viewpoint on climate change and security challenges in Zambia.

4.4.5 Respondents Occupation

In this subsection, we explore the various occupations of the respondents involved in the study, shedding light on the diverse professional backgrounds contributing to the research findings.

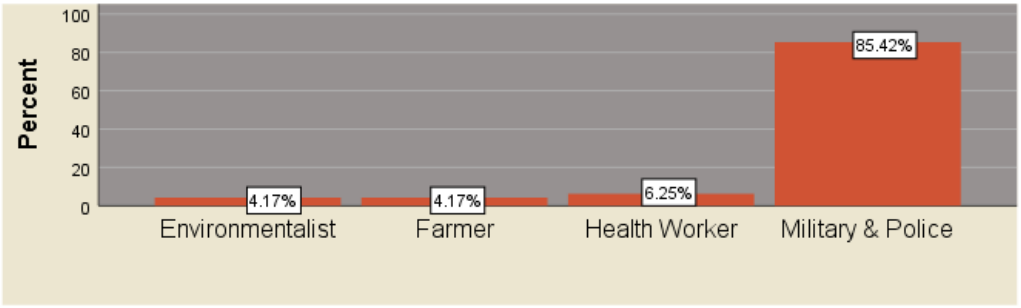

Figure 4.6: Respondents Occupation

Figure 4.6 illustrates the distribution of respondents' occupations involved in the study. Most respondents, constituting 85.4%, are from the military and police sectors, highlighting their significant representation in the research. The survey reveals that health workers constitute 6.3% of the participants, while environmentalists and farmers comprise 4.2% of the respondents. The distribution of occupations among the sample population offers valuable information regarding the range of professions and their significance concerning the research focus on climate change and security in Zambia.

4.5 Knowledge of Climate Change

This section examines the respondents' knowledge and perceptions regarding climate change. It involves assessing their understanding of climate change, its causes, the contribution of people in Lusaka to climate change, and the perceived impact of climate change on Zambia.

4.5.1 Understanding of Climate Change

Respondents were asked to indicate their understanding of climate change, and the results were as presented below;

Understanding Climate Change as Weather Pattern Shifts

Respondents in this study view climate change as predominantly consisting of changes in weather patterns and environmental conditions. This perception is based on a strong grasp of the impact of human activities on the environment. This viewpoint demonstrates a comprehension of climate change due to human activity, namely pollution, emphasizing the

interdependence between human actions and environmental deterioration. Respondents acknowledge the connection between human activities and the deterioration of the environment, resulting in alterations in weather patterns. This demonstrates a sophisticated comprehension of the human-caused factors contributing to climate change and their effects on weather systems.

"Changes in environmental conditions due to human activities such as pollution."

The response reflects the understanding that climate change results from human-induced environmental alterations, particularly through activities like pollution. The respondents' recognition of human activities as significant factors in climate change demonstrates an understanding of the human-induced impact on environmental deterioration and weather patterns (Bruine de Bruin *et al.*, 2021; Seddon *et al.*, 2020). This perspective emphasizes the significance of acknowledging human accountability in addressing climate change and embracing sustainable actions to reduce additional environmental deterioration. It aligns with current study findings that highlight the importance of collective efforts to tackle the underlying factors of climate change and reduce its negative effects on weather patterns.

The respondents' impression is consistent with Bruine de Bruin *et al.*, (2021) findings, which indicate that the general public understands climate change terminology and its association with human activities. Similarly, Seddon *et al.*, (2020) underscored the need to acknowledge anthropogenic environmental changes, emphasizing the need for a comprehensive global awareness of the influence of human activities on the climate. These investigations confirm that the respondents know the human-caused factors contributing to climate change and the resulting impact on environmental stability. The agreement with previous studies highlights the uniformity in public comprehension regarding the connection between human actions and climate change, emphasizing the significance of tackling human-caused environmental deterioration through collaborative efforts and governmental measures.

Climate Change as Long-term Weather Variability

Respondents in this theme describe climate change as prolonged alterations in temperature and weather patterns. This perspective suggests that respondents view climate change as a gradual phenomenon occurring over extended periods. They recognize the temporal dimension of climate change, understanding it as a process characterized by sustained shifts in weather conditions. This interpretation aligns with the findings of Iniguez-Gallardo *et al*., (2020), who observed similar perceptions among communities in southern Ecuador. Recognizing climate change as a gradual and prolonged process underscores the importance of long-term strategies for mitigation and adaptation. Additionally, it highlights the need for interventions that address the cumulative impacts of climate change over time, emphasizing the significance of sustained efforts to combat environmental degradation.

"Climate change is a long-term shift in temperatures and weather patterns."

According to this viewpoint, respondents perceive climate change as a process that occurs gradually, resulting in enduring alterations in weather patterns. This view emphasizes understanding climate change as an intricate and developing phenomenon that has enduring consequences for environmental circumstances. This perspective aligns with the findings of Senior *et al.,* (2021), who highlighted the ever-changing character of climate change and its significant impact on the local climates in Africa. Respondents accept the necessity of adaptive methods that can accommodate the long-term implications of environmental change by recognizing climate change as a constant and developing process. This perspective emphasizes the significance of implementing comprehensive strategies for addressing climate change that consider the interdependence of environmental systems and the long-term impacts of climate change.

The interpretation aligns with the findings of Iniguez-Gallardo *et al*., (2020), who conducted a study on climate change perceptions in Ecuador. Furthermore, it corresponds with the focus on

extended-term climate fluctuations in the research conducted by Mulyasari *et al*., (2021) and Aubry *et al*., (2022), underscoring the worldwide acknowledgment of this facet of climate change. Iniguez-Gallardo *et al*., (2020) discovered that individuals throughout Ecuador held the same perception of climate change as a progressive phenomenon, indicating a common comprehension that transcends various geographical settings. In addition, Mulyasari *et al*., (2021) noted that fishermen in Indonesia share similar perspectives, highlighting the widespread recognition of climate change as a gradual and ongoing phenomenon. Aubry *et al*., (2022) offered valuable insights into the influence of climate change on volcanic processes, demonstrating the interdependence between climate change and geological phenomena. These studies collectively highlight the extensive acknowledgment of climate change as a complex phenomenon characterized by long-term changes in environmental conditions, supporting the interpretation gained from respondents' perspectives.

4.5.2 Causes of Climate Change

Respondents were asked to indicate their perception of climate change, and responses were as presented below;

Human Activities as Drivers of Climate Change

"Human activities that release CO2 to the atmosphere."

In this theme, respondents exhibit a comprehensive understanding of the anthropogenic drivers behind climate change, emphasizing activities such as industrialization, deforestation, and the combustion of fossil fuels as major contributors to greenhouse gas emissions. This realization emphasizes the interdependence between human activities and the effects on the environment, indicating an increasing acknowledgment of the pressing requirement for sustainable measures to alleviate the impacts of climate change. By recognizing that climate change is caused by human activity, respondents emphasize the crucial importance of both individual and collective efforts in tackling environmental issues and fostering climate resilience.

Furthermore, the respondents' emphasis on the necessity of sustainable practices corresponds with the findings of Fahad and Wang (2020), who highlight the socioeconomic susceptibilities of rural populations to climate change caused by human activities. Respondents acknowledge the need to incorporate socioeconomic factors into climate change mitigation initiatives, highlighting the need to tackle structural disparities and advance fair solutions to environmental issues. In addition, Malla *et al*., (2022) emphasize the need for public awareness and education. This demonstrates the respondents' acknowledgment of the significance of spreading knowledge to encourage sustainable behaviors and promote environmental stewardship. The analysis highlights the importance of using several disciplines and involving the community to tackle climate change issues and progress toward sustainable development goals.

Environmental Degradation and Climate Change

"Pollution, cutting down of trees, emission of gases into the atmosphere."

Respondents demonstrate a sophisticated comprehension of the complex connection between environmental degradation and climate change within this topic. Respondents emphasize the negative effects of pollution and deforestation on climate stability, identifying them as significant factors contributing to environmental deterioration. Their acknowledgment of the interdependence between ecosystem well-being and climate patterns emphasizes the significance of implementing conservation initiatives and sustainable land management methods to alleviate the adverse impacts of environmental degradation on climate change. This viewpoint highlights the importance of comprehensive environmental management strategies that prioritize maintaining the integrity of ecosystems while also focusing on climate resilience.

Joshi *et al*., (2020) provided insight into the health effects of environmental degradation, specifically focusing on respiratory disorders. They emphasized the significance of climate change on public health. This is consistent with the recognition by respondents of the negative

impacts of environmental damage on human welfare and emphasizes the importance of urgently resolving environmental concerns to protect public health. In addition, Lee *et al*., (2020) investigate how young people view climate change, focusing on the importance of cooperation across different generations in encouraging environmental responsibility and sustainable progress. Respondents acknowledge the significance of collective effort and community engagement in tackling environmental concerns and promoting climate resilience. The analysis highlights the complex and interrelated relationship between climate change, the environment, society, and health in influencing how we address environmental issues.

Awareness of Climate Change Impacts

"Global warming, anthropogenic activities."

Regarding this subject, the answers demonstrate a thorough comprehension of the diverse effects of climate change, specifically regarding the rise in global temperatures and the deterioration of the environment. Their acknowledgment of the human-caused factors behind climate change emphasizes the necessity for immediate measures to mitigate the detrimental impacts of human activity on the environment and society. Respondents emphasize the significance of comprehensive strategies for climate prevention and adaptation by recognizing the interdependence of climate change effects on various sectors.

Malla *et al*., (2022) stress the importance of effectively combining scientific information with public perspectives to tackle climate-related concerns. This is consistent with the respondents' understanding of the intricate nature of climate change and the necessity of inclusive decision-making procedures in order to formulate complete solutions. In their study, Fahad and Wang (2020) examine the susceptibility of rural communities to the effects of climate change, highlighting the significance of fair adaptation measures in safeguarding marginalized populations. Respondents acknowledge the unequal effects of climate change on vulnerable populations, highlighting the necessity for specific actions to improve resilience and advance

social justice. In summary, the analysis emphasizes the significance of combining scientific knowledge with community viewpoints to create climate policies and inclusive initiatives that are relevant to the specific setting.

Call for Sustainable Practices

"Deforestation, manufacturing goods, using transportation, etc."

Respondents in the issue demonstrate a proactive stance in addressing the effects of climate change by pushing for sustainable practices. Their focus on mitigating deforestation, endorsing sustainable industrial practices, and championing alternate transportation options demonstrates a holistic comprehension of the interdependence between human actions and ecological well-being. Respondents' acknowledgment of the crucial role of individual and communal activities in tackling climate change indicates their dedication to environmental stewardship and sustainable development. Joshi *et al*., (2020) emphasize the significance of encouraging sustainable behaviors to reduce the health risks of climate change. Respondents' emphasis on adopting eco-friendly methods to decrease environmental deterioration and boost public health aligns with this statement. In addition, Lee *et al*., (2020) emphasize the need to include young people in promoting climate action and sustainable development goals. This aligns with the respondents' proactive approach to solving difficulties related to climate change. In summary, the analysis emphasizes the significance of using several disciplines and involving the community in order to tackle climate change concerns and promote sustainable development goals. By incorporating knowledge from public health, youth advocacy, and environmental science, experts may create comprehensive approaches to reduce the effects of climate change and promote a more environmentally friendly future.

4.5.3 Contribution to Climate Change of People in Lusaka

This section examines the contribution of individuals in Lusaka to climate change. Insights into local climate change dynamics are gained by evaluating respondents' perspectives on their role

in environmental degradation. The analysis delves into the behaviors and activities identified by respondents as significant contributors to climate change within the context of Lusaka.

Unchecked Industrial Emissions

"Yes, through unchecked industrial emissions."

This study's Respondents emphasize industrial activity's substantial impact on climate change in Lusaka. They attribute environmental damage primarily to emissions generated by industry and manufacturing activities. This viewpoint emphasizes the necessity of implementing more stringent rules and adopting sustainable practices in industrial sectors to reduce their adverse effects on climate change. The worries expressed by the respondents regarding industrial emissions are consistent with the conclusions drawn in research such as McClure et al. (2023), which highlight the significant contribution of industrial activities to the worsening of climate hazards in African towns like Lusaka. The focus on uncontrolled emissions highlights the need for promptly developing efficient regulatory frameworks and embracing cleaner production methods to decrease the environmental impact of industries in the area.

Moreover, the focus on industry emissions indicates an increasing recognition among survey participants of the necessity for cooperative endeavors, including governmental entities, industries, and environmental groups, to tackle the difficulties posed by climate change. These findings indicate a change in perspective towards acknowledging the importance of business responsibility in reducing the effects of climate change and fostering sustainable development. Nevertheless, it is imperative to successfully execute regulatory measures and allocate resources toward cleaner technology to transform these worries into measurable environmental enhancements. In addition, promoting collaborations among stakeholders and cultivating a mindset of environmental stewardship can augment the efficacy of mitigation endeavors and facilitate the progression toward a more sustainable future in Lusaka.

Deforestation and Charcoal Burning

"Yes. Cutting down of trees for settlements, charcoal burning, emission of gases from the industries."

Respondents in this study recognize deforestation and charcoal burning as major factors contributing to climate change in Lusaka. They emphasize the transformation of wooded regions into human settlements and the extensive utilization of charcoal for culinary purposes as significant catalysts of environmental deterioration. This viewpoint emphasizes the necessity of using sustainable land management techniques and adopting alternative energy sources to diminish deforestation and mitigate emissions. The concerns expressed by the participants regarding deforestation and charcoal burning align with the conclusions found in studies like Katati (2022), which examine the implementation of measures to address climate change in Lusaka. The focus on releasing gases from industrial sources highlights the interdependence of many human activities that contribute to climate change in urban areas such as Lusaka.

Furthermore, recognizing deforestation and charcoal burning as significant factors in climate change coincides with the conclusions drawn by Mwanza *et al*., (2023), who emphasize the efficacy of climate change awareness initiatives targeting young individuals in Luanshya District, Zambia. This indicates a wider acknowledgment of the necessity for modifying behavior and implementing governmental measures to tackle deforestation and encourage the adoption of sustainable energy alternatives. Nevertheless, overcoming these obstacles would necessitate synchronized endeavors from governmental entities, local populations, and global stakeholders to enforce efficient land utilization regulations and advocate for sustainable energy alternatives. Lusaka can reduce its impact on climate change and enhance its ability to withstand environmental risks by tackling the underlying causes of deforestation and supporting sustainable practices.

Urbanization and Transportation

"Yes, Lusaka is highly industrialized and densely populated. The industrial processes and vehicle emissions may significantly contribute to climate change."

Respondents in this context identify urbanization and travel as significant factors contributing to Lusaka's climate change. They emphasize the swift growth of metropolitan areas and rising vehicles on the roadways as key drivers propelling environmental deterioration. This viewpoint emphasizes the necessity of implementing sustainable urban planning and transport strategies to reduce urbanization's environmental consequences. The worries raised by participants regarding urbanization and transport are consistent with the conclusions found in research by Mwanza *et al*., (2023), which investigate the efficacy of climate change awareness among young people in Zambia. The focus on industrial processes and vehicle emissions highlights the significance of implementing cleaner technology and encouraging public transport to mitigate greenhouse gas emissions in quickly expanding cities such as Lusaka.

Moreover, recognizing urbanization and transport as noteworthy factors in climate change aligns with the conclusions drawn by Mubanga *et al*., (2022), who investigate the efficacy of climate change education in secondary schools in Lusaka. This indicates a requirement to incorporate climate change mitigation and adaptation techniques into urban planning and transportation policy to foster sustainable development. Furthermore, mitigating the environmental consequences of urbanization and transportation necessitates collaborative endeavors among policymakers, urban planners, and transportation authorities to foster sustainable infrastructure and encourage the adoption of public transportation and non-motorized means of travel. Lusaka can reduce its impact on climate change and develop urban environments that are more resilient and sustainable for its citizens by tackling these concerns.

Individual Behaviors and Waste Management

"Yes, through indiscriminate disposal of waste, especially plastic waste."

Respondents in this study emphasize that individual behaviors and waste management methods have a crucial role in climate change in Lusaka. They highlight the inadequate disposal of waste, namely plastic waste, as a significant environmental issue. This viewpoint emphasizes the significance of encouraging sustainable consumption habits and enhancing waste management systems to reduce the environmental consequences of individual behaviors. The issues expressed by the participants about waste management are consistent with the conclusions drawn in research, such as Mubanga *et al*., (2022), that evaluates the standard of climate change teaching in secondary schools in Lusaka. The focus on haphazard garbage disposal highlights the necessity for public awareness initiatives and governmental measures to encourage appropriate waste management practices and mitigate environmental contamination in urban areas such as Lusaka.

In addition, the emphasis on human behaviors and waste management methods corresponds to the findings presented by Katati (2022), who examines implementing measures by businesses in Lusaka province to address climate change. This indicates a requirement for all-encompassing approaches that tackle the impact of industries and individuals on climate change, focusing on the importance of public education and campaigns to modify behavior to encourage sustainable lifestyles. Moreover, improving waste management infrastructure and enforcing more stringent restrictions on trash disposal can effectively reduce the environmental consequences of individual behaviors and bolster the overall resilience of Lusaka's urban environment.

4.5.4 Climate Change Affects Zambia

This section highlights the respondents on the impact of climate change on Zambia; the results were as presented below;

Changes in Weather Patterns:

This theme respondent shed light on the discernible shifts in weather patterns, indicating climate change's impact on Zambia. The observations offer a firsthand account of the evolving climatic conditions in the region. One of the respondents noted;

"Change in weather patterns is a clear demonstration of climate change."

The respondents' remarks offer detailed and subtle observations about Zambia's unique climate change occurrences. The reference to changes in rainfall patterns implies a significant deviation from past precipitation standards, which could result in water scarcity and agricultural difficulties. Furthermore, the mention of temperature variations and extreme weather events highlights the unpredictable nature of Zambia's climate, which has significant consequences for sectors such as agriculture, health, and infrastructure resilience. Zambians are becoming more aware of these environmental changes, which shows they recognize the link between local climate shifts and global climate trends. This highlights the importance of taking proactive actions to adapt and mitigate the effects of these changes. These observations are consistent with the research findings of Rosen *et al.*, (2021) and Siatwiinda *et al.*, (2021), emphasizing the impact of changing weather patterns on communities in Zambia. By examining the details of participants' encounters and juxtaposing them with these investigations, we understand the persistent trends of climate-induced consequences across various areas and population segments within Zambia. The convergence of evidence highlights the region's strong and reliable nature of climate change trends. It also emphasizes addressing climate change through well-informed policy interventions and community involvement activities.

Impacts on Agricultural Productivity:

This subsection, respondents express concerns about climate change's adverse effects on agricultural productivity, highlighting its implications for food security and rural livelihoods in Zambia.

“Decreased water availability and increased incidence of pests and diseases are affecting crop yields."

The respondents' insights provide insight into the intricate difficulties that the agricultural sector in Zambia faces due to climate change. The reference to water scarcity emphasizes a crucial problem that significantly impacts irrigation and crop production, especially in countries that heavily depend on rainfed agriculture. Furthermore, the mention of pest infestations highlights the susceptibility of crops to fluctuations in environmental circumstances, as pests flourish in higher temperatures and modified precipitation patterns. These combined effects contribute to crop failures, putting food security and rural livelihoods at risk and prolonging cycles of poverty and vulnerability in affected areas. The concerns raised by the participants align with the results obtained from the research conducted by Mulungu *et al*., (2021) and Ngoma *et al*., (2021). These studies investigate the effects of climate change on agricultural productivity and the well-being of households in Zambia. By comparing the respondents' insights with these studies, we confirm the ongoing difficulties that Zambia's agriculture sector faces due to climate-induced hazards. The accumulation of evidence emphasizes the immediate necessity for adaptive methods that improve agricultural resilience and alleviate the detrimental impacts of climate change on food production and rural livelihoods.

Water Resource Management:

In this theme, respondents discuss the challenges posed by climate change to water resource management in Zambia, highlighting concerns about declining water availability and deteriorating river flows.

"Reduced water availability and dwindling river flows are challenges we face."

The remarks provided by the respondents shed insight into the increasing challenges Zambia's water resources face. They emphasize the negative impacts of climate change on both urban

and rural areas. The reference to diminishing water supplies and increasing water stress highlights the seriousness of the situation, presenting substantial risks to water security, sanitation, and general ecosystem well-being. These problems worsen current vulnerabilities and emphasize the immediate requirement for flexible actions to guarantee the long-term viability and strength of crucial water resources in response to the effects of climate change.

The uncertainties expressed by the participants closely align with the results obtained in the research conducted by Hamududu and Ngoma (2020), which investigated the impact of climate change on the availability of water resources in Zambia. By comparing the participants' viewpoints with various research studies, we emphasise the importance of dealing with water-related problems promptly and the necessity of implementing comprehensive methods for managing water resources to improve resilience. The correlation of results emphasizes the necessity for coordinated endeavors to alleviate the detrimental effects of climate change on water resources and ensure the protection of water security for both urban and rural populations in Zambia.

Societal Well-being:

In this theme, respondents reflect on the broader societal impacts of climate change on Zambia, highlighting concerns about increased poverty, exacerbated health risks, and social vulnerability.

Quote from Respondent

"Increased poverty and exacerbated health risks are affecting our communities."

Respondents' insights shed light on climate change's profound and wide-ranging impacts, extending beyond environmental concerns to affect livelihoods, health, and overall social well-being. The mention of adverse effects on various aspects of life underscores the urgency of addressing climate change as a multi-dimensional challenge that compounds existing

vulnerabilities. These challenges threaten sustainable development efforts and necessitate comprehensive strategies that address the underlying drivers of vulnerability to build resilience and promote long-term adaptation. The concerns voiced by respondents align closely with findings from studies conducted by Ngoma *et al.*, (2021), which analyze the economy-wide impacts of climate change on household welfare in Zambia. We affirm the interconnectedness of climate-related risks and socio-economic development by juxtaposing respondents' perspectives with these studies. This comparison underscores the need for holistic approaches to address climate change impacts effectively, emphasizing the importance of integrating climate resilience into broader development agendas to ensure sustainable outcomes for communities in Zambia.

4.6 Climate Change and Security

This section explores the intersection between climate change and security in Zambia, focusing on respondents' perceptions of how climate-related challenges impact various security dimensions. The analysis delves into the specific security concerns raised by respondents in relation to climate change, offering insights into the complex dynamics between environmental change and security risks.

Impact on Security:

One of the respondents noted that

"Reduced rainfall activity means less food production and food security is threatened, causing high prices and citizens rioting in high-density areas."

Another respondent indicated that

"Increased temperatures, frequent storms, increased drought... It increases the average temperatures, causing a decline in rainfall."

Survey participants express apprehensions regarding the diverse ramifications of climate change on security in Zambia, emphasizing problems such as inadequate access to food and

water, internal displacement, and limited resources. These observations highlight the interdependence between environmental changes and different aspects of security, suggesting the susceptibility of communities to hazards caused by climate change. The respondents' remarks emphasize the profound consequences of climate change on security in Zambia, namely with the insecurity of food and water and the rise in temperatures and extreme weather events. This is consistent with the conclusions drawn by previous researchers like Hamududu and Ngoma (2020), who highlight the connection between changes in rainfall patterns caused by climate change and the availability of water resources and the resulting impact on national security. Similarly, Lee *et al*., (2020) examine the role of climate-induced hazards in causing internal displacements and social conflicts. This supports the worries expressed by respondents about the struggle for resources and security difficulties. In general, the comparison with previous studies confirms the concerns expressed by the participants. It emphasizes the importance of taking immediate action to address security risks associated with climate change by implementing adaptive measures and comprehensive approaches to developing resilience.

Adaptive Measures:

On this, respondents noted that;

"Some relocate to villages... Adapt or evacuate."

"People have started looking for alternative energies... calling upon local authorities to remove garbage."

In light of the difficulties presented by climate change, participants highlight adaptation measures such as modifying agricultural methods, advocating for alternate energy sources, and improving catastrophe readiness. These efforts demonstrate a proactive strategy to reduce the negative impacts of climate change and enhance the ability of communities to withstand its effects. The adaptive actions stated by respondents align with recommendations from previous scholars who have emphasized the significance of community-driven approaches to climate

resilience. Hamududu and Ngoma (2020) have emphasized the importance of implementing adaptive measures, such as encouraging alternate energy sources and improving disaster readiness, to reduce the negative effects of climate change on vulnerable people. Likewise, the focus on altering agricultural methods aligns with the findings of Mulungu *et al*., (2021) and Ngoma *et al*., (2021), who promote sustainable farming approaches to improve resilience against climate-related difficulties.

Moreover, the need for local authorities to tackle issues like waste management demonstrates an acknowledgment of the significance of governance and institutional assistance in aiding adaptation endeavors. This is consistent with the findings of a study conducted by Rosen *et al*., (2021), which highlights the importance of well-functioning governance systems in enhancing the ability of communities to adapt and remain resilient. In general, the respondents' adaptive measures align with previous scholars' recommendations. These measures emphasize the significance of community involvement, sustainable practices, and supporting governance structures in developing resilience to the effects of climate change in Zambia.

Resource Competition:

Some respondents indicated that

"Increased conflict over resources... by the reduction in funding to security so that funds can go to tackling CC."

Another respondent stated that

"Forced migration and displacements in some communities... human security is threatened through aspects such as lack of adequate food and safe clean drinking water."

Climate change intensifies the rivalry for limited resources, resulting in conflicts and tensions among people. The combination of decreased precipitation, crop failures, and displacement exacerbate economic difficulties and social instability, underscoring the intricate socio-economic consequences of environmental degradation. The results about resource competition

align with other academic studies, highlighting the possibility for climate change to escalate disputes over limited resources. Research conducted by Lee *et al*., (2020) and Ngoma *et al*., (2021) has emphasized the role of environmental stresses, such as water scarcity and food poverty, in intensifying social disparities and triggering conflicts.

The reference to decreased financing for security due to climate change adaptation initiatives corresponds with the discourse in scholarly literature regarding the compromises between allocating resources to security measures and tackling environmental issues. Researchers such as Hamududu and Ngoma (2020) have examined the consequences of shifting resources from security to efforts to mitigate and adapt to climate change. They have highlighted the possible security threats that may arise from reallocating resources.

Furthermore, mentioning forced migration and relocation caused by climate-related effects highlights the wider human security issues linked to environmental deterioration. The studies conducted by Rosen *et al*., (2021) and Siatwiinda *et al*., (2021) have provided evidence of how displacement caused by climate change can weaken social unity and worsen vulnerability, especially among marginalized communities. In summary, the results concerning resource competition emphasize the intricate relationship between climate change, limited resources, and security dynamics. This highlights the necessity of adopting comprehensive strategies to tackle environmental and socio-economic issues in Zambia.

4.7 Climate Change Policies, Strategies, and Adaptation Mechanisms

This section looks at the efforts that have been made by the Zambian government to counter climate change such as polices, programmes and adaption measures. The researcher focused on the respondents' evaluation of current policies, the existing policies' effectiveness and the possible enhancements. Furthermore, the research also compared the approach employed by the residents of Lusaka towards the mitigation of the impacts of climate change. This section provided a brief on climate change policy, plan and adaptation systems in Zambia. Establishing

the framework that precedes the subsequent discussion serves to create the background to view participants' perception of prior polices and strategies.

Climate Change Policies in Zambia:

One of the participants noted that

"Yes, through the establishment of the DMMU."

A strategic part of the Zambian fight against climate change disaster is the Disaster Management and Mitigation Unit (DMMU). This entity is also responsible for the coordination of catastrophe preparedness, response and recovery processes. As claimed earlier the primary objective of the DMMU was to provide physical humanitarian assistance in emergency situation. It has proved useful in helping such communities that have been affected by floods, droughts and other disasters occasioned by climate change. The DMMU may be well suited to coordinating and supporting immediate responses to disasters to protect lives and assets; it lacks the ability to act as a champion for the non-disaster environment needed to change the conditions that foster climate vulnerability in the long-term.

To determine whether the DMMU has been effective in addressing climate change issues it is necessary to determine the extent to which the organization is capable of integrating climatic change factors in aversion of other catastrophes. This comprises disaster response and application of measures in stemming the effects of climate change together with bolstering the capabilities of communities. It will then cover both short and long-term issues due to climate change through its expanded jurisdiction in the DMMU for the following; provision of early warning system if adopted, construction of climate resistant structures, and sustainable management of land.

In addition, stronger coordination between the DMMU and other government ministries, NGOS and other climate change international stakeholders is needed when it comes to implementation of a broad range of activities related to climate change adaptation. Thus, in

order to increase the performance of the DMMU focusing on climate change mitigation, it must involve many-sided cooperation of many individuals. In addition, investing on projects that enhance the capability of community and enhancing information dissemination would enable them to participate proactively in climate change adaptation and contribute majorly to the achievement of sustainable development goals.

Another respondent stated that;

"Agricultural practices, environmental protection through the Ministry of Environment and the campaign against indiscriminately cutting trees and smart energy usage."

This is a clear indication that Zambia acknowledges the interrelatedness of climate change issues and the necessity of addressing them holistically. Due to the efforts of the Ministry of Environment to involve itself in supporting sustainable agriculture practices and preventing deforestation, it can be said that there is the intention to aims to address the root of climate change while at the same time encouraging sustainable development. Yet, through the incorporation of climate change issues into the agricultural sector policy and in the forestry management practices, Zambia seeks to improve on its attributes to cope with climate live risks and put down the protection on food security and conservation of biological diversity. Moreover, the focus on Intelligent Energy Conservation in Zambia, the Zambian attempts to shift towards the utilization of renewable energy sources and the global battle against climate change support this claim with evidence.

Significant strategies to deal with and mitigate climate change impacts revealed from a study of previous studies like Aryal et al. (2020) & Kangai et al. (2021). These studies stress for the necessity to achieve systemic solutions for the socio-economic, environmental and institutional aspects of climate change. Additionally, as seen in the declarations, Zambia has strategy that is very detailed and describes and acknowledges the fact that issues concerning climate have interconnections and can be addressed in integrated manner using efforts from different sector.

Evaluations made on Zambia indicate its commitment in fighting and mitigating the impacts of climatic change as seen with the rest of the world in attempt to counter the numerous and complicated issues which arise due to occurrence of global climate change.

Effectiveness of Policies:

One of the participants noted that

"They are somewhat effective."

The statement of the effectiveness of Zambia's climate change policy, as being 'somewhat effective' entails that the author has provided a fair evaluation of the policy while being mindful of the grey areas that the policy has not excelled in. However, in spite of all this positive results which have ensued from the policies such as policy formulation in response to damage caused by natural calamities, social sensitivity regarding impact of calamities, and roll out of special measures on damage control, there are issues regarding integration of the policies and effective utilization of resources. This categorisation also mean that despite some advancement, it might not be sufficient enough to tackle the various issues contained in climate change. Hence, the need to enchance and innovates policies, funds dissemination and stakeholder participation in the fight against climate change for Zambia.

Another respondent stated that

"Due to poverty, cutting of trees has continued as a means of income for charcoal burners."

This perspective emphasises a formidable barrier to the effectiveness of climate change policy in Zambia: the vast impact that socio-economic problems have especially in poverty stricken areas. Due to poverty the public ends up prioritizing short-term needs for the provision of basic needs of life over the long-term needs of the environment hence engaging in production of charcoal to fulfill their basic needs. While there are intact set down regulations aimed at combating deforestation and or conservation of sustainable soils and land use, the relentless search for income creates the continued unsustainable practices. The measures that define

interaction between poverty and policy implementation explain how many things influence the attitude towards climate change. This called for corrective socio-economic imbalance to address further Socio-economic weaknesses The complimented policy actions to trigger sustainable significant improvement to the drastic realities of climate change.

The impacts of socioeconomic factors on climate change policies and measures, discovered from Zambia are quite similar to the views of Owen (2020) and Wamsler et al. (2020). These studies stress the significant role of socio economic factors in explaining the outcomes of both the attempts to manage climate change impacts. These specialists are therefore an advocate for interventions that are design in order to address the strategic forces of socio-economism by acknowledging the multiple causation of poverty, livelihood and environmentalism. The coherence of what has been established in Zambia with other studies' findings is evidence of the entrenched nature of the problem, as well as the necessity to tailor the formulation and implementation of climate policy to contextual factors.

Enhancement of Policies:

On this, a respondent noted that

"There is a need for enhancement of policies, especially implementation of climate action programs."

The declaration also underscores the urgent need to move from the formulation of policies to policy implementation in Zambia's fight against climate change. Though having population polices is a good starting point it is the actual getting of these policies implemented and put into action that informs their effectiveness. A reference to climate action programs imply a wider number of processes involving a range of activities aimed at tackling climate change. However, such initiatives are only useful if they have sound implementation methods to support their application. To enhance the implementation of the new and existing policies, it is therefore crucial to promote effective and systematic monitoring and evaluation systems,

increased participation of all relevant at all levels and effective capacity building. In order to enhance the outcomes of its climate change initiatives further and offer more enhanced safeguard to its people and environment against the consequences of climate change, Zambia should look into all the gaps in its implementation and set up necessary systems for reporting.

Another respondent stated that;

"Sensitization should be an ongoing process, not just a once-off thing."

This underscores the need for ongoing educational programs and awareness creating efforts to elicit behavioral changes towards compliance with climate change policies in Zambia. Therefore there is need to regularly engage the communities and to continue with other forms of creating awareness in the fight against climate change and its effects. For sustainable change and as a way of empowering people of Zambia in the fight against environmental issues, there is the need to increase awareness and educate everybody. Well, this is very important in order to tackle the problems of climatic change in the most effective way. When comparing these findings to similar studies by Fawzy et al. , (2020) and Brosch (2021), it would be seen that Zambia is in league with other researches stressing the need for constant optimization and participation of the public in endeavors in combating climate change. These two papers brings out the continue need that there is to ensure extensive use of communication and education to ensure that stakeholders are engaged and on board in regards to solutions towards problems posed by climate change. It is easy to note Zambia's commitment to strengthening the base and catalysing substantial changes concerning climate volatilities, thanks to the country's continuing awareness campaigns that share affinity to academic processes.

Climate Change Mitigation Measures in Lusaka

One of the participants stated that;

"Encouraging use of renewable sources of energy."

The use of renewable energy sources especially solar in Lusaka can be considered as a proactive precaution to reduce carbon emissions and depening on fossil sources. By using renewable energy sources the city aims at realizing sustainable development and addressing issue of climate change. Using renewable energy sources like solar energy reduces the emission of greenhouse gases and enhances energy independence helping the local energy structures against difficulties. Lusaka's move of fashion also responds to global efforts at combating climate change by shifting towards the utilization of cleaner and renewable power. This is evidence of Lusaka's commitment towards the protection of environment and sustainable development.

Another respondent stated

"The government has implored the population to avoid using charcoal, which has brought down the demand for tree cutting."

As seen in Lusaka, this is a clear revelation of how the government has embarked on a war to fight deforestation and encourage the use of sustainable land use. Its goal is to reduce the negative impact on the environment and promote utilization of cleaner energy resources by setting the constraints on the use of charcoal which is a major trigger of deforestation. In addition, these actions also portray a company interest in the sustainable development process and is in compliment with measures that seek to reduce climate change impacts. The strategies seen in Lusaka are equally in agreement with the study results conducted by Chen & Gong (2021) as well as Aryal et al 2020. These studies state that conservative utilization of renewable sources of power and reasonable techniques of land utilization are the need for controlling the impacts of climatic change effectively. In the literature, there is a push for the shift in the provision and consumption of renewable energy, and the adoption of sustainable practices in agriculture in a bid to decrease mitigation of climate change impacts and increase farming resilience. It is therefore obvious that similar methodologies are relevant and viable especially

in light of the trends evident in many metropolitan centres like Lusaka. To achieve better understanding of the climate change policies in Zambia and efforts made controlling the impact in Lusaka, the massive elements present in these remarks need to be dissected and compared with those of previous studies. Drawing from this broad literature and a large number of cases, this research provides policy recommendations that are useful to policymakers, scholars, and practitioners to expand the knowledge on how climate resilience and sustainable development can be accomplished. Further, it calls for the need of coming up with strategies that can be adopted to meet socio-economic and environmental challenges of urbanization such as the case of Lusaka.

4.8 Chapter Conclusion

This chapter provided detailed information to the reader as to the manner in which the analysis of the study was done and the presentation of the research findings. In light of the identified objectives of the researcher's study, data analysis was conducted in details. Interview data collected were analyzed using content and thematic data analysis to arrive at qualitative data analysis. This was succeeded by data scrutiny bearing in mind the questions and evidential documentation in reference to the goals of the study and research questions. The comparison was done using information from secondary sources, thus enabling to present all the results of the study. In the next chapter, this data was summarized.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a thorough overview of the results obtained from our research on climate change policies, strategies, and adaption mechanisms in Zambia. Researchers provide essential findings from the data analysis and propose actionable suggestions for policymakers, stakeholders, and future research endeavours. By combining the acquired insights from our study, our goal is to make a valuable contribution to the ongoing discussion on climate change resilience and sustainable development in Zambia and other regions.

5.2 Summary of Findings

5.2.1 Effects of climate change on security in Zambia

The study revealed the interdependence between environmental changes and different aspects of security, suggesting the susceptibility of communities to hazards caused by climate change. The respondents' remarks emphasize the profound consequences of climate change on security in Zambia, namely with the insecurity of food and water, as well as the rise in temperatures and the occurrence of extreme weather events.a range of policies and strategies implemented by Zambia to address climate change. Creating the Disaster Management and Mitigation Unit (DMMU) demonstrates the nation's dedication to preparing for and addressing disasters. In addition, the Ministry of Environment's activities, such as promoting sustainable agriculture practices and battling deforestation, exemplify a comprehensive approach to mitigating climate change across multiple sectors. Efforts promoting intelligent energy utilization, which involve utilizing renewable energy sources and adopting energy-efficient practices, align with worldwide initiatives to decrease carbon emissions. In addition, Zambia's implementation of climate-smart farming techniques and the development of the National Climate Change Policy highlight its proactive approach to adapting to and reducing the impacts of climate change. These findings align with the observations made in prior research. Aryal *et al*., (2020) and Chen and Gong (2021) highlight the significance of employing comprehensive strategies and

policy frameworks to tackle climate change. Similarly, Zambia's policies demonstrate a multi-sectoral strategy that aligns with the recommendations of Owen (2020) and Wamsler *et al*., (2020). This emphasizes the importance of coordinated efforts across many sectors to address the challenges posed by climate change successfully.

5.2.2 Government's climate change policies and strategies towards the enhancement of security in Zambia

Although Zambia has put into effect a range of policies and measures, their efficacy continues to be a matter of examination. Survey participants saw current policies as somewhat effective, suggesting that although some advancements have been achieved, obstacles remain. Socio-economic variables, such as poverty and the necessity for revenue production, have impeded the complete execution of policies addressing deforestation and promoting sustainable practices. Moreover, deficiencies in the implementation and oversight systems have curtailed the effectiveness of climate change measures. These findings are consistent with other research emphasizing difficulties in achieving successful policy outcomes. Brosch (2021) and Fawzy *et al*., (2020) highlight the significance of public understanding and involvement in promoting efficient climate change strategies. Similarly, Kangai *et al*., (2021) and Owen (2020) emphasize the importance of improving policy implementation processes and increasing the capacity to overcome obstacles that hinder policy effectiveness.

5.2.3 Opportunities available to the government in mitigating the impacts of climate change on security in Zambia

To enhance the effectiveness of existing policies and mitigate the effects of climate change on security in Zambia, several measures can be undertaken. Firstly, there is a requirement for improved implementation procedures, which encompass capacity-building, stakeholder involvement, and monitoring. Enhancing the implementation of regulations and raising public consciousness and knowledge are also essential for cultivating a shift in behavior and adherence to climate change policy. In addition, tackling fundamental socio-economic

problems such as poverty and advocating for alternate means of living can decrease dependence on unsustainable activities and strengthen the ability to withstand the effects of climate change. By enhancing existing policies and initiatives, Zambia may better cope with the difficulties posed by climate change and ensure its security and sustainable development. These proposals are based on the findings of previous scholars. Wamsler *et al*., (2020) and Aryal *et al*., (2020) highlight the significance of focused approaches and initiatives to enhance the ability to address obstacles in adapting to and mitigating climate change. Chen and Gong (2021) and Owen (2020) emphasize the importance of adopting comprehensive strategies that tackle socioeconomic elements and encourage the involvement of stakeholders to improve the effectiveness of policies.

5.3 Conclusion

In conclusion, the study provides valuable insights into Zambia's efforts to address climate change through policies, strategies, and adaptation mechanisms. The availability of policies and strategies reflects the country's commitment to mitigating and adapting to the impacts of climate change. However, the effectiveness of these policies remains a subject of scrutiny, with challenges such as poverty and gaps in implementation hindering their full impact. Despite these challenges, there are opportunities to enhance existing policies through improved implementation mechanisms, stakeholder engagement, and public awareness efforts. By addressing these issues, Zambia can better alleviate the effects of climate change on security and foster sustainable development. Overall, our findings underscore the importance of integrated approaches and multi-sectoral collaboration in tackling the complex challenges posed by climate change in Zambia.

5.4 Recommendation to the Study

Based on the findings of our study, several recommendations can be made to enhance Zambia's response to climate change. These are: Enhance Implementation Capacity. The government should prioritize enhancing the implementation mechanisms for current climate change

initiatives. To accomplish this, one must allocate resources to initiatives that enhance the ability to perform tasks, enhance collaboration among key parties, and improve systems for tracking and assessing progress to guarantee successful execution and results. Fostering Public Awareness and Participation is the second recommendation: Efforts should be made to launch targeted awareness campaigns and community engagement programs to educate the public about climate change risks, mitigation measures, and the importance of sustainable practices. Promoting active engagement and responsibility of individuals in climate change projects helps cultivate a culture of adaptability and durability at the local level. The third recommendation is to Integrate Climate Change into National Security Planning: Climate change considerations should be integrated into national security strategies and disaster management frameworks. The government should prioritize integrating climate change into security planning to tackle rising security threats and weaknesses effectively. By taking this action, Zambia can strengthen its ability to withstand climate-related dangers and protect its people's and environment's welfare.

5.5 Area of Further Research

Further studies could explore the socio-economic impacts of climate change on vulnerable communities in Zambia, delving into factors such as livelihood resilience, adaptive capacities, and coping strategies. Moreover, researching the efficacy of particular adaption strategies and their consequences for sustainable development could offer significant knowledge for policymakers and practitioners. Additionally, conducting comparative studies that examine climate change policies and initiatives in various locations within Zambia could provide significant insights and exemplary methods for improving climate resilience at the local level.

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APPENDIX I: RESEARCH QUESTIONNAIRE

Dear respondent,

I am **Innocent Jere,** a student at the National Defence University-Kenya. I am conducting a research on "The Effectiveness of Climate Change Policies, Resilience and Mitigation Strategies in Promoting Security in Africa: A Case of Zambia". I am required to submit a research thesis to the University. I please request your assistance in filling in the questionnaires provided. I also wish to assure you that the information given will be treated with utmost confidentiality and will be used for the sole purpose of this study.

SECTION A. Respondents Details

1. What is your gender?

Male [ ]

Female [ ]

2. What is your age category?

20-30 years [ ]

31-40 years [ ]

41-50 years [ ]

51- 60 years [ ]

61 & Above [ ]

3. Highest Education Qualification Attained

Certificate [ ]

Diploma [ ]

Degree [ ]

Masters [ ]

4. How long have you been working /living in Lusaka?

1-5 Years [ ]

5-10 Years [ ]

11-15 Years [ ]

Above 15 Years [ ]

5. What is your occupation?

Military & Police [ ]

Environmentalist [ ]

Farmer [ ]

Health Worker [ ]

SECTION B: Knowledge on Climate Change

1. What do you understand by Climate Change?

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2. What do you think causes Climate Change?

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3. Are the people of Lusaka contributing to Climate Change? If Yes, Explain

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4. Do you think Climate Change affects Zambia? If the answer is Yes, Explain

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SECTION C: Climate Change and Security

1. In your opinion, how has climate change affected security in Zambia?

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2. How does Climate Change affect people's lives in Lusaka?

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3. How do people react when affected by Climate Change in Lusaka?

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4. Do you think the effects of climate Change affects the Health and Economy of the people of Lusaka and Zambia?

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SECTION D: Climate Change Policies, Strategies & Adaptation Mechanisms

1. Are there any policies in relation to Climate Change in Zambia? If yes, mention some.

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2. If the answer in question 1 above is yes, how effective are the policies?

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3. Do you think the existing policies require enhancement? If yes, explain?

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4. What climate change mitigation measures do the people of Lusaka utilize?

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