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An Examination on the Effects of Climate Change and Household Food Security Situation: Case Study of Kanakatapa, Chongwe District, Lusaka

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Abstract

Climate Change is posing a crisis at a global scale, the earth's climate system has been rendered compromised due to long-term alterations in temperatures, wind patterns, and increased concentration of greenhouse gases in the atmosphere. This is slowly culminating in threatening food security. These extreme weather conditions are disrupting agricultural productivity, food distribution, and access to nutrition the above challenges necessitated the need to examine the effects of climate change on household food security. The study explored the following objectives I. To establish the effect of climate change on household food security. ii. To examine the effectiveness of mitigation measures on climate change at household food security, iii. To determine limitations on household food security brought by climate change. The study used a mixed method of data collection, the survey utilized in-house structured questionnaires containing both qualitative and quantitative questioning. A multi-stage sampling technique was employed to select a representative sample of households. In the first stage, clusters of households were randomly selected within the target area, and second stage, households were randomly chosen from within each cluster. The sample size for this study was 138 of the participants but due to the unavailability of respondents, the number was reduced to 70. Questionnaires were cross-checked after each day of data collection to ensure the correctness and completeness of the collected data. Data was then entered into a computer program called (SPSS). Our Findings revealed that climate change significantly disrupts agricultural productivity at the household level, leading to increased food prices, scarcity, nutritional deficiencies, and heightened vulnerability, particularly in rural communities like Kanakatapa. Households reported a major decrease in crop yield due to erratic weather patterns and shifting planting season. Our Recommendation included the implementation of adaptive smart agricultural practices such as the promotion of local food systems, crop diversification, agroforestry practices, community gardening, and climate-resilient crops. Policy initiatives should focus on improved infrastructure and access to resources for vulnerable populations, ensuring that food security strategies are integrated with climate adaption efforts that are tailor-suited to local communities. The study underscored the urgent need for multi- faceted intervention to mitigate the effects and impacts of climate change on food security at the household level.

Keywords: Climate Change, Household Food Security, Vulnerability, Agriculture, Zambia, Chongwe District

1. Introduction

1.1 Background

Household food security, defined as having access to sufficient, nutritious, and safe food for an active and healthy life, is a critical concern for rural communities in Zambia. In recent years, climate change has emerged as a major threat to food security in Zambia, particularly in rural areas like Kanakatapa in Chongwe District. This study aims to examine the effects of climate change on household food security in this region, explore factors that increase vulnerability to climate change, and identify limitations that hinder food security efforts.

Climate change refers to significant and long-lasting changes in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It involves both natural processes and human activities, primarily the increase in greenhouse gases such as carbon dioxide (CO2), which leads to global warming and associated effects on climate systems. Intergovernmental panel on climate change (IPCC, 2021).

The food and agriculture organization (FAO, 1996) defined Household food security as the situation that exists when all members of the household, at all times have physical, social, and economic access to sufficient, safe, and nutritious food that meets dietary needs and food preferences for an active and healthy life. The ability of a household to secure food, either through production or purchase, encompasses key dimensions such as availability, access, utilization, and stability.

Climate change poses a significant threat to global food security approximately 828 million people faced hunger in 2021, and vulnerable populations such as households in developing countries of sub-Saharan Africa were highly affected around 282 million people experienced undernourishment reflecting a 25% increase from 2015 due to decline in crop production as a result of extreme weather such as droughts and floods. The effect of climate change on food security is multidimensional, influencing food production, access to food, and food utilization. As temperatures rise, precipitation patterns shift, extreme weather events become more frequent, and natural disasters intensify, the ability of households to secure an adequate and nutritious food supply is increasingly compromised (FAO, 2020).

1.2 Statement of the Problem

Climate change poses a significant threat to household food security, affecting food availability, access, utilization, and stability, the effects of climate change, pose a direct influence on agricultural productivity and food systems globally affecting 193 million people with food insecurity as of 2023. The crisis is particularly acute in regions heavily dependent on agriculture, such as Zambia and sub-Saharan Africa. (IPCC, 2021) explained that the Global climate change effect on food production indicates that 25% of global crop yield could decline by the year 2050. Extreme weather events, such as drought and floods, have increased in frequency and intensity, disrupting food production and supply chain (FAO, 2018). Zambia with an affected population of over 6.2 million currently facing food insecurity due to the agricultural sector employing 70% of its population who are smallholder farmers, the severity is around 1.3 million people 10% of the population are in phase 3 crisis requiring urgent humanitarian aid, during the 2018/2019 agricultural season, prolonged drought reduced maize production by 16% leading to significant food shortage in parts of western and southern province being mostly affected due to their reliance in subsistence farming. (Zambia national farmers' union, 2019) There is an urgent need for comprehensive strategies to mitigate the effects of climate change on food security, by focusing on enhancing agricultural resilience, improving food systems, and ensuring equitable access to nutritious food for all households. The lack of effective climate effects strategies tailored to rural contexts and how they are impacted, limited awareness of the challenges faced by local and rural communities on climate change efforts. (Adams & Hutton, 2016). Coupled up with the complex interactions between human activities, land-use practices, and ecosystem dynamics in rural settings require a deeper understanding to develop targeted solutions that promote climate-friendly practices that support sustainable development.

1.3 Objectives

This research aims to achieve the following objectives:

To examine the Effect of Climate Change on Household Food Security in Kanakatapa, Chongwe District. To explore Factors that Make Household Food Security Vulnerable to Climate Change, including environmental, social, and economic factors. To examine Limitations Affecting Household Food Security, such as access to resources, technology, and government support in the region.

1.4 Conceptual Framework

The conceptual framework on climate change and household food security situation provides a systematic model for understanding the interactions between climate change effects, household vulnerabilities, and food security outcomes.

Rainfall patterns play a crucial role in both climate change and food security. Changes in precipitation patterns due to climate change can have significant impacts on agriculture, food production, and ultimately food security.

1. Droughts and Water Scarcity, Changes in rainfall patterns, including prolonged droughts, can lead to water scarcity for irrigation, drinking water, and industrial purposes. Drought conditions can reduce crop yields, affecting livestock production, which impacts farmer agriculture output .
2. Floods and Extreme Weather Events, Intense rainfall events and flooding can submerge fields, causing immediate destruction of crops, prolonged waterlogging can lead to root rot and other diseases, rending crops unsalvageable, disrupting agricultural activities, and lead to post-harvest losses.
3. Shifts in Growing Seasons, Changes in rainfall patterns can alter growing seasons, affecting the timing and success of crop planting and harvesting, causing a mismatch with traditional practices, and making it difficult for farmers to adopt to new timelines, leading to suboptimal crop yield.
4. Effect on Food Prices and Availability, Fluctuations in rainfall patterns can influence food prices and availability in local and global markets. Reduced crop yields due to droughts or floods can lead to price spikes for commodities such as grains, fruits, and vegetables causing a stain on household budgets, forcing families to cut back on essential expenses like health care, education, and housing and as prices rise people may be forced to switch to cheaper, less nutritious food, increasing risk of malnutrition and related health issues especially in children and the vulnerable population.
5. Crop Diversity and Resilience, Changes in rainfall patterns can influence the distribution of crops and impact crop diversity. Crop diversity system reduces vulnerability, diverse cropping systems are less susceptible to widespread pest and disease outbreaks, if one crop is affected, others may still thrive, reducing the risk of total crop failure as certain crops may be more resilient to drought or flood conditions, while others may be more susceptible to changes in precipitation.
6. Adaptation Strategies, Farmers and policymakers are implementing adaptation strategies to cope with changing rainfall patterns and improve food security.

These strategies include water conservation practices, such as rainwater harvesting and drip irrigation, to mitigate the impacts of water scarcity.

2. Literature Review

2.1 Climate Change and Food Security in Sub-Saharan Africa

Climate change is expected to impact agriculture across Sub-Saharan Africa, leading to reduced agricultural productivity and food insecurity. According to the Intergovernmental Panel on Climate Change (IPCC), increased temperatures, unpredictable rainfall, and extreme weather events like floods and droughts are altering growing seasons and decreasing crop yields. In Zambia, agriculture is the backbone of the economy, with most rural households relying on subsistence farming. Consequently, climate change poses significant risks to food production and availability.

2.2 Vulnerability of Households to Climate Change

Households are vulnerable to climate change due to factors such as poverty, limited access to resources, and dependence on rain-fed agriculture. In rural Zambia, low-income households, particularly those without access to irrigation, are at greater risk from climate-related disruptions. Vulnerability is also shaped by gender, education, and access to information, with women and smallholder farmers often bearing the brunt of climate impacts.

2.3 Limitations to Food Security Interventions

Despite the increasing recognition of climate change as a threat to food security, several limitations impede effective responses. These include insufficient government policies, lack of technological support, inadequate infrastructure (like roads and storage facilities), and limited access to financial resources or credit for farmers. Addressing these limitations is critical to enhancing resilience to climate change.

3. Research Methodology

3.1 Research Design

This study utilized a mixed-methods research design to comprehensively investigate the relationship between climate change and household food security.

3.2 Sampling Design

The study was conducted in Kanakatapa. A multi-stage sampling technique was employed to select a representative sample of households. In the first stage, clusters of households were randomly selected within the target area. In the second stage, households were randomly chosen from within each cluster.

3.3 Sample Size

A multi-stage sampling technique was employed to select a representative sample of households. The sample size for this study will be 138 of the participants.

3.4 Target Population

Kumar's (2014) target population refers to the whole group of objects or individuals under study for the researcher to generalize the conclusion. The targeted population was rural communities engaged in climate change efforts. The selection of participants is non-gender sensitive.

3.5 Triangulation

Methodological Triangulation: Mixed-methods approaches involve combining both quantitative and qualitative data collection and analysis techniques to offer a deeper and more comprehensive understanding of the relationship between climate change and household food security.

4. Results/Findings

4.1 Effect of Climate Change on Household Food Security

The survey results revealed that the majority of households in Kanakatapa have experienced significant shifts in weather patterns over the past decade, including delayed rainfall, erratic precipitation, and prolonged droughts. As a result, agricultural productivity has declined, leading to food shortages. Specifically, 65% of respondents reported that crop yields have decreased due to unpredictable weather, while 40% indicated that they face frequent crop failures.

a) Effects of climate change on crop production and availability for household food security

Effects of climate change on crop production and availability for household food security	Responses	
	N	Percent
Decrease crop yields	48	68.6%
No impact on crop yields	1	1.4%
Varies from region to region	15	21.4%
Total	70	100.0%

Table 1.1 above on the effects of climate change on crop production and availability for household food security shows that 6(8.6%) said increases crop yields, 48(68.6%) said decreases crop yields, 1(1.4%) said no impact on crop yields and 15(21.4%) said varies from region to region.

b) Potential consequence of climate change on water availability

Potential consequence of climate change on water availability	Responses	
	N	Percent
Increased rainfall leading to flooding	6	8.6%
Droughts resulting in water scarcity	40	57.1%
Stable water supply throughout the year	8	11.4%
Unpredictable changes in water availability	16	22.9%
Total	70	100.0%

Table 1.2 above on the potential consequence of climate change on water availability, shows that 6 (8.6%) said increased rainfall leading to flooding, 40(57.1%) said droughts resulting in water scarcity, 8(11.4%) said stable water supply throughout the year, 16(22.9%) said unpredictable changes in water availability.

4.2 Factors Contributing to Vulnerability

The study found that several factors contribute to the vulnerability of households to climate change in Kanakatapa:

Dependence on Rain-fed Agriculture: Most households rely on rain-fed agriculture, making them highly susceptible to changes in rainfall patterns.

Poverty and Lack of Resources: Many households have limited access to inputs such as fertilizers, seeds, and irrigation technologies. Additionally, 60% of households reported that they lack the financial resources to invest in climate adaptation strategies.

Gender Inequality: Women, who are often responsible for food production and household care, face additional barriers to accessing agricultural inputs, credit, and extension services.

c) Effects on availability and affordability of food for vulnerable populations, jeopardizing household food security

Effects on availability and affordability of food for vulnerable populations, jeopardizing household food security	Responses	
	N	Percent
Increases availability and affordability of food	9	12.9%
Decreases availability and affordability of food	45	64.3%
No impact on food availability and affordability	9	12.9%
Leads to self-sufficiency in food production	7	10.0%
Total	70	100.0%

Table 1.3 above on the effects on the availability and affordability of food for vulnerable populations, jeopardizing, shows that 9(12.9%) said increases availability and affordability of food, 45(64.3%) said decreases availability and affordability of food, 9(12.9%) said no impact on food availability and affordability and 7(10.0%) said leads to self-sufficiency in food production.

d) Household-level mitigation measures, such as reducing food waste, impact climate change and food security

Household-level mitigation measures, such as reducing food waste, impact climate change and food security	Responses	
	N	Percent
Increase greenhouse gas emissions.	27	38.6%
Decrease greenhouse gas emissions.	18	25.7%
No effect on greenhouse gas emissions	11	15.7%
Varies depending on the type of food waste	14	20.0%
Total	70	100.0%

According to the findings in table 1.4 on household-level mitigation measures, table 14 shows that 27 (38.6%) said it was the increase in greenhouse gas emission, 18 (25.7%) said was due to a decrease in greenhouse gas emissions while 11(15.7%) said there was no effect on greenhouse gas emission and 14 (20.0%) said varies depending on the type of food waste.

4.3 Limitations Affecting Household Food Security

Several limitations were identified as affecting household food security in the region:

Inadequate Extension Services: Only 25% of farmers in the area received regular agricultural extension support, which is critical for promoting climate-resilient farming techniques.

Poor Infrastructure: Limited access to market roads, storage facilities, and irrigation systems hampers food distribution and increases post-harvest losses.

Limited Access to Climate Information: Many households reported a lack of access to reliable climate information, which is crucial for planning agricultural activities.

e) Limited access to resources due to climate change impact household food security

Limited access to resources due to climate change impact household food security	Responses	
	N	Percent
Increases food affordability	11	15.7%
Enhances access to markets	20	28.6%
Decreases agricultural productivity	30	42.9%
Improves food diversity	9	12.9%
Total	70	100.0%

The results in table 1.5 above on limited access to resources due to climate change impact household food security indicates that 11(15.7%) said was to increase food affordability,20(28.6%) said was to enhance access to markets,30(42.9%) said was to decrease agricultural productivity and 9(12.9%) said was to improves food diversity.

f) Effects of climate change-induced reduction in crop yields on household food security

Effects of climate change-induced reduction in crop yields on household food security	Responses	
	N	Percent
Lower food prices	3	4.3%
Increased agricultural productivity	21	30.0%
Hunger and malnutrition	40	57.1%
Enhanced food distribution networks	6	8.6%
Total	70	100.0%

Results in table 1.6 above on effects of climate change induced reduction in crop yields on household food security, shows that 3(4.3%) said low food prices, 21(30.0%) said increased agricultural productivity, 40(57.1%) said hunger and malnutrition and 6(8.6%) said enhanced food distribution networks.

To summarize the results obtained this study; facts brought to light include the following findings: 6(8.6%) said increases crop yields, 48(68.6%) said decreases crop yields,1(1.4%) said no impact on crop yields and 15(21.4%) said varies from region to region.

6 (8.6%) said increased rainfall leading to flooding, 40(57.1%) said droughts resulting in water scarcity, 8(11.4%) said stable water supply throughout the year, 16(22.9%) said unpredictable changes in water availability. 9(12.9%) said increases availability and affordability of food, 45(64.3%) said decreases availability and affordability of food, 9(12.9%) said no impact on food availability and affordability and 7(10.0%) said leads to self-sufficiency in food production. 27 (38.6%) said it was the increase in greenhouse gas emission, 18 (25.7%) said was due to a decrease in greenhouse gas emissions while 11(15.7%) said there was no effect on greenhouse gas emission and 14 (20.0%) said varies depending on the type of food waste. 11(15.7%) said was to increase food affordability, 20(28.6%) said was to enhance access to markets, 30(42.9%) said was to decrease agricultural productivity and 9(12.9%) said was to improves food diversity. 3(4.3%) said low food prices, 21(30.0%) said increased agricultural productivity, 40(57.1%) said hunger and malnutrition and 6(8.6%) said enhanced food distribution networks.

5. Discussion

5.1 Impact of Climate Change on Agriculture

The findings of this study confirm that climate change is a significant driver of food insecurity in Kanakatapa. Unpredictable weather patterns and reduced agricultural yields are eroding the capacity of households to maintain stable food sources. The lack of alternative livelihoods, such as access to off-farm employment opportunities, further exacerbates the situation.

5.2 Vulnerability to Climate Change

The vulnerability of households to climate change in the study area is largely influenced by socio-economic factors. Limited access to agricultural inputs and technology, combined with gender disparities, increases the exposure of rural households to climate-induced food insecurity. Additionally, the lack of diversified livelihood strategies makes it difficult for households to adapt to climate stress.

5.3 Addressing the Limitations

To enhance household food security in the face of climate change, several interventions are needed:

Improved Agricultural Extension Services: Expanding access to extension services and promoting climate-resilient farming techniques can help increase productivity and reduce vulnerability.

Infrastructure Development: Investment in rural infrastructure, such as roads, storage facilities, and irrigation systems, is essential for improving food security.

Climate Information Services: Providing farmers with access to reliable weather forecasts and climate information can help them plan more effectively for planting and harvesting seasons.

6. Conclusion

Climate change is a significant challenge to household food security in Kanakatapa, Chongwe District. The study highlights the key factors that make households vulnerable, including dependence on rain-fed agriculture, poverty, and limited access to resources. Addressing the limitations that affect food security, such as inadequate infrastructure and extension services, will be critical to enhancing resilience to climate change. Policymakers and stakeholders must prioritize the development of climate adaptation strategies that are tailored to the unique needs of rural communities in Zambia to ensure long-term food security.

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8. References

1. Food and Agriculture Organization (FAO). The State of Food Security and Nutrition in the World 2017, 2017.
2. Intergovernmental Panel on Climate Change (IPCC). Climate Change 2014: Impacts, Adaptation, and Vulnerability, 2014.
3. Ministry of Agriculture, Zambia. Zambia National Climate Change Response Strategy, 2020.
4. World Bank. Climate Change and Agriculture: Impacts, Adaptation, and Policy, 2019.
5. Abioye A, *et al*. Climate change impacts on livelihood vulnerability in African communities: A case study of smallholder farmers. African Journal of Environmental Studies. 2023; 9(2):123-137.
6. African Union Commission (AUC). Africa Regional Overview of Food Security and Nutrition 2020. Addis Ababa: AUC, 2020.
7. Brown A, Williams B. Exploring the Intersection of Nutrition Impacts and Household Food Security Challenges in the Face of Climate Change. Journal of Environmental Nutrition and Food Security. 2023; 7(4):312-325.
8. Banda C, *et al*. Policy interventions for addressing climate change impacts on household food security and disaster preparedness in Zambia. Environmental Policy and Governance. 2020; 30(4):289-283.
9. Food and Agriculture Organization of the United Nations (FAO). Climate Change, Food Security and Resilience: Improving Policies and Practices, 2017.
10. FAO. Impact of Climate Change on Food Security: A Global Perspective. Rome, Italy, 2021.
11. Harrison PA, Butterfield RE, Dawson TP. Climate-smart agriculture for food security. Nature Climate Change. 2018; 8(3):256-256.