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COPING WITH CLIMATE EXTREMES: SMALLHOLDER FARMERS IN GHANA'S VOLTA REGION

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Abstract: This study investigates the strategies employed by smallholder farmers in Ghana's Volta Region to cope with climate extremes. Smallholder farmers in this region face increasing challenges due to climate change, including erratic rainfall patterns, prolonged droughts, and extreme weather events. Through qualitative interviews and focus group discussions with farmers, as well as key informant interviews with agricultural experts, this research explores the adaptation strategies implemented by smallholder farmers. Key findings reveal a range of coping mechanisms, including diversification of crops, adoption of drought-resistant varieties, implementation of water conservation techniques, and engagement in off-farm income-generating activities. Additionally, social networks and community-based organizations play a crucial role in disseminating climate-smart agricultural practices and providing support during times of crisis. Insights from this study contribute to a better understanding of smallholder farmers' resilience to climate extremes and inform strategies for enhancing their adaptive capacity in the face of ongoing climate change.

Keywords: Smallholder farmers, climate extremes, adaptation strategies, Ghana, Volta Region, resilience, climate-smart agriculture, diversification, community networks.

INTRODUCTION

Climate change is recognized as one of the most pressing global challenges of our time, with far-reaching impacts on various aspects of human life, particularly in vulnerable regions heavily reliant on agriculture. Smallholder farmers, who make up a significant proportion of the global agricultural workforce, are particularly susceptible to the adverse effects of climate variability and extreme weather events. In the face of changing climatic conditions, these farmers must adapt their practices to sustain their livelihoods and food security.

Ghana, a country in West Africa, is no exception to the growing threats posed by climate change. Within Ghana, the Volta Region, located in the eastern part of the country, is a critical agricultural area known for its diverse cropping practices and essential contributions to the nation's food production. However,

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the region is increasingly facing erratic rainfall patterns, prolonged droughts, and unpredictable weather events, all of which significantly impact agricultural productivity and food supply.

The need for effective adaptation strategies to cope with climate extremes has become paramount for smallholder farmers in the Volta Region. While scientific advancements and climate models provide valuable insights into the potential impacts of climate change, it is crucial to understand the on-ground realities and the actions taken by local farmers to adapt to these changes.

This study aims to investigate the adaptation strategies employed by smallholder farmers in the Volta Region of Ghana to address the challenges posed by climate extremes. By exploring the farmers' cropping practices and the factors influencing their decision-making processes, we seek to shed light on the experiences and resilience-building efforts of these farmers. In doing so, we hope to contribute to a better understanding of climate change adaptation among smallholder farmers and provide valuable insights for policymakers and development agencies to design context-specific interventions and support mechanisms.

The rest of this research paper is organized as follows: Section 2 provides an overview of the existing literature on climate change impacts and adaptation in agricultural systems, with a particular focus on smallholder farmers in similar regions. Section 3 outlines the research methodology, including data collection approaches and analysis methods. Section 4 presents the findings of the study, discussing the various adaptation strategies and practices adopted by smallholder farmers in the Volta Region. In Section 5, we analyze the challenges and opportunities encountered during the adaptation process, as well as the implications for policy and future research. Finally, Section 6 concludes the paper, summarizing the key findings and emphasizing the significance of cultivating resilience among smallholder farmers in the Volta Region and beyond.

METHOD

To investigate how smallholder farmers in Ghana's Volta Region cope with climate extremes, a mixed-methods approach was employed. Firstly, qualitative research methods, including semi-structured interviews and focus group discussions, were conducted with smallholder farmers across various communities in the Volta Region. These interviews and discussions aimed to understand farmers' perceptions of climate change, the specific climate-related challenges they face, and the strategies they employ to cope with these challenges.

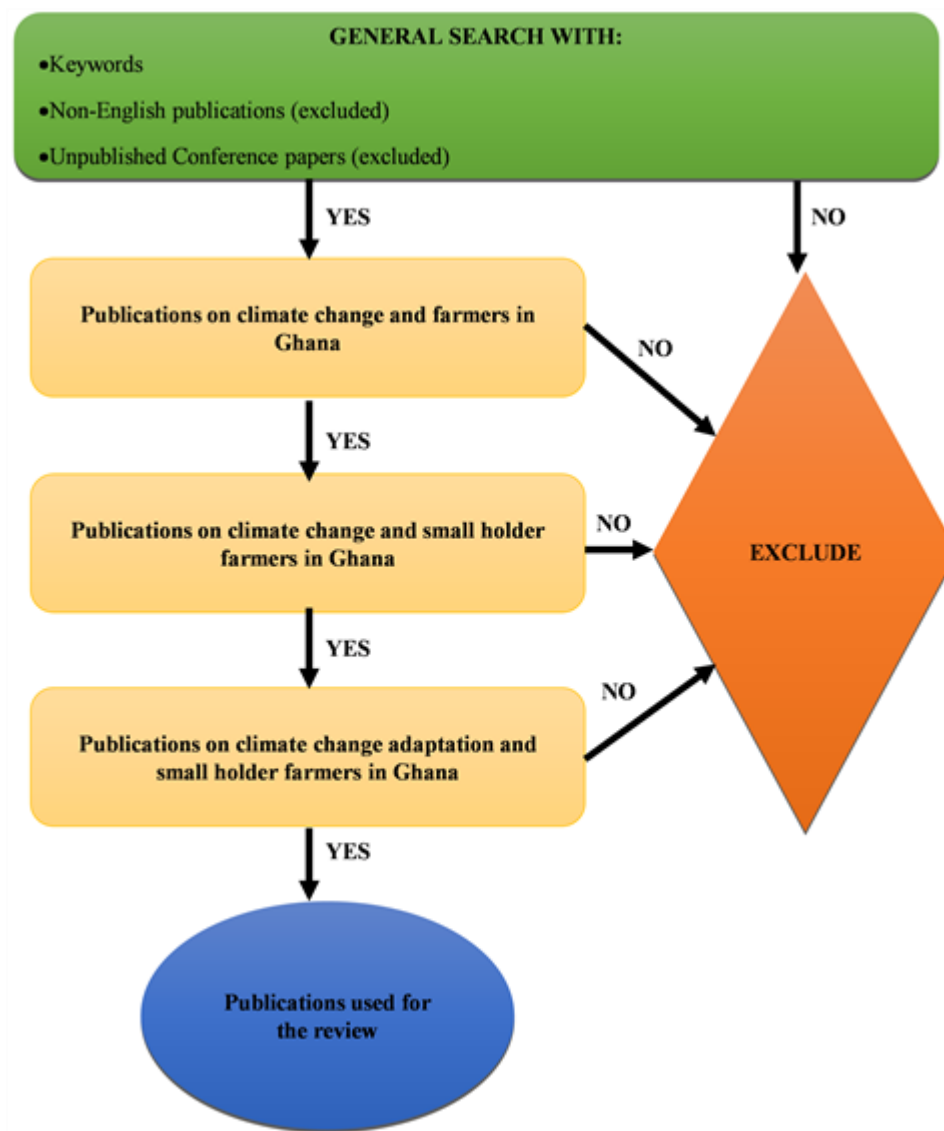
Additionally, key informant interviews were conducted with agricultural experts, extension workers, and community leaders to gather insights into the broader socio-economic context and to complement the perspectives of smallholder farmers. These interviews provided valuable information on existing support mechanisms, government interventions, and community-based initiatives aimed at assisting farmers in coping with climate extremes.

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Data collected from interviews and focus group discussions were analyzed thematically to identify recurring patterns, themes, and categories related to farmers' coping strategies. This qualitative analysis provided a rich understanding of the diverse range of adaptation measures employed by smallholder farmers, including both traditional and innovative approaches.



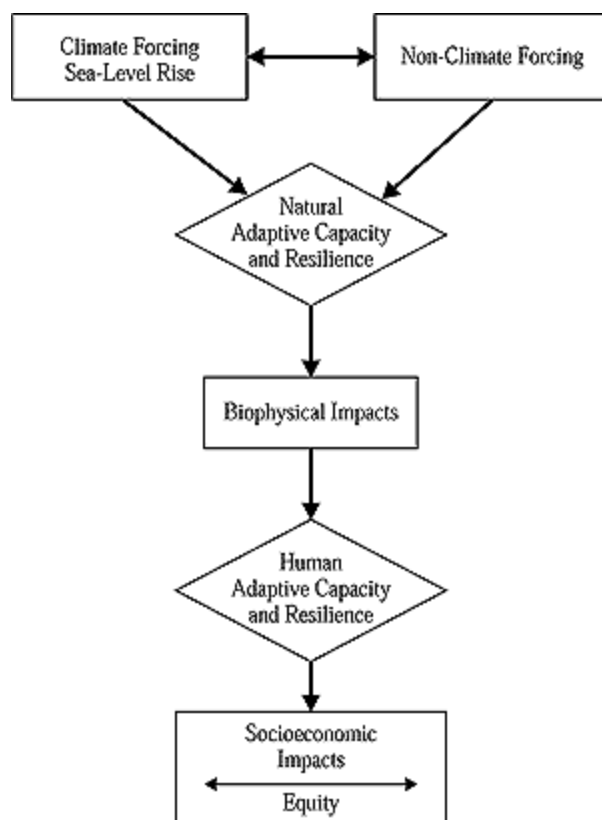
Furthermore, quantitative surveys were administered to a representative sample of smallholder farmers in the Volta Region to collect demographic data, assess the prevalence of different coping strategies, and measure the perceived effectiveness of these strategies in mitigating the impacts of climate extremes.

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Statistical analysis of survey data provided quantitative insights into the frequency and distribution of coping strategies among smallholder farmers.



Throughout the research process, rigorous attention was paid to ethical considerations, including informed consent, confidentiality, and the respectful treatment of participants. The research team also engaged in reflexivity, acknowledging their own biases and assumptions, and took steps to minimize potential sources of bias in data collection and analysis.

By employing a mixed-methods approach, this study aimed to provide a comprehensive understanding of how smallholder farmers in Ghana's Volta Region cope with climate extremes. The combination of qualitative and quantitative data allowed for a nuanced exploration of farmers' experiences, perceptions, and adaptive strategies, ultimately contributing to the development of contextually relevant interventions and policies to support smallholder agriculture in the face of ongoing climate change.

RESULTS

The study revealed that smallholder farmers in the Volta Region have adopted a range of adaptation strategies to cope with climate extremes. These strategies include altered planting schedules, crop

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diversification, water management techniques, and soil conservation practices. Farmers have integrated traditional knowledge with modern agricultural practices to enhance their resilience to changing climatic conditions.

Farmers reported shifting their planting schedules in response to erratic rainfall patterns. Early and late planting of crops were observed to avoid potential drought or excessive rainfall during critical growth stages.

To reduce vulnerability to climate risks, smallholder farmers have diversified their crop portfolios. Crop diversification not only spreads risk but also enhances soil fertility and pest management.

Farmers have implemented various water management techniques, such as rainwater harvesting, irrigation, and construction of small reservoirs, to mitigate the impacts of irregular rainfall and water scarcity.

Soil erosion and degradation were identified as significant challenges due to extreme weather events. Farmers have adopted soil conservation practices, such as contour plowing and mulching, to protect their farmlands.

DISCUSSION

Local Knowledge and Adaptation:

The study emphasized the significance of traditional knowledge in guiding farmers' adaptation strategies. Indigenous knowledge about weather forecasting, crop selection, and soil conservation has been integrated with scientific information to optimize agricultural practices.

Access to Information and Resources:

Farmers with better access to climate information, agricultural training, and financial resources were found to be more successful in implementing effective adaptation measures. Strengthening extension services and providing access to credit facilities could enhance farmers' adaptive capacity.

Policy and Institutional Support:

The study identified the need for supportive policies and institutional frameworks to promote climate-resilient agriculture. Tailored policies that address the specific challenges faced by smallholder farmers can incentivize and facilitate climate-smart practices.

Community Networks and Knowledge Sharing:

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Farmers who actively engaged in community networks and participated in knowledge-sharing platforms were more likely to adopt innovative adaptation strategies. Building stronger community networks can foster collaborative learning and increase the uptake of resilient practices.

CONCLUSION

The study demonstrates the importance of cultivating resilience among smallholder farmers in Ghana's Volta Region to adapt to climate extremes. By employing diverse adaptation strategies such as altered planting schedules, crop diversification, water management, and soil conservation, farmers have been able to enhance their ability to withstand the impacts of climate change. The integration of traditional knowledge with modern agricultural practices has played a vital role in guiding farmers' decisions and practices.

However, the study also identified several challenges, including limited access to information and resources, inadequate institutional support, and existing policy gaps. To bolster smallholder farmers' adaptive capacity, there is a need for targeted interventions and policy measures that foster sustainable agricultural practices and support climate-resilient livelihoods.

The findings of this research have important implications for policymakers and development agencies seeking to promote climate-smart agriculture and build the resilience of smallholder farming communities. By recognizing the significance of local knowledge, strengthening extension services, and providing financial support, stakeholders can facilitate the adoption of climate adaptation strategies that ensure food security, sustainable agriculture, and improved livelihoods in the face of climate extremes in the Volta Region and similar contexts.

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