ENSIGN GLOBAL UNIVERSITY, KPONG

EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING CLIMATE CHANGE AMONG MARKET WOMEN IN THE AGONA WEST MUNICIPALITY, CENTRAL REGION, GHANA.

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JUNE, 2025

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JUNE, 2025

DECLARATION

I, Richard Roland Acquaah, hereby declare that this dissertation for my Master of Public Health degree is the result of my independent research work, except where references to other people's works and publications are made, which have been duly acknowledged. To the best of my knowledge, this work has not been submitted, wholly or in part, for any degree or academic honour at any other institution.

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DEDICATION

I dedicate this work to the Almighty God, my source of wisdom, strength, and inspiration. I. also dedicate this thesis to my family who supported me throughout this journey and served as my source of motivation. Finally, I dedicate this thesis to my friends and course mates, whose unwavering support, sacrifices, and encouragements have been extremely helpful.

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ABBREVIATION / ACRONYMS

AWMA Agona West Municipal Assembly

CC Climate Change

CI Confidence Interval

COR Crude Odds Ratio

AOR Adjusted Odds Ratio

ECOWAS Economic Community of West African States

IPCC Intergovernmental Panel on Climate Change

KAP Knowledge, Attitude, and Practices

MESTI Ministry of Environment, Science, Technology, and Innovation (Ghana)

SDGs Sustainable Development Goals

UN United Nations

UNFCCC United Nations Framework Convention on Climate Change

UN-OCHA United Nations Office for the Coordination of Humanitarian Affairs

WHO World Health Organization

WSHGs Women's Self-Help Groups

ABSTRACT

Background: Climate change poses significant challenges to socio-economic development, particularly in vulnerable regions like Sub-Saharan Africa. Market women, who play a crucial role in Ghana's informal economy, are disproportionately affected due to their reliance on climate-sensitive sectors. Despite their vulnerability, limited research exists on their knowledge, attitudes, and practices (KAP) regarding climate change. This study addresses this gap by examining KAP among market women in the Agona West Municipality, Ghana.

Methodology: A cross-sectional quantitative design was employed, with data collected from 416 market women across four major markets. Structured questionnaires administered via KoboCollect assessed socio-demographics, climate change knowledge, attitudes, and adaptation practices. Data were analyzed using descriptive statistics and chi-square tests in STATA version 18.

Results: The study revealed that 73.8% of respondents were aware of climate change, but only 40.6% demonstrated good knowledge. Deforestation (79.8%) and fossil fuel combustion (76.0%) were the most recognized causes. While 68.3% reported good adaptation practices, barriers such as lack of information (87.5%) and financial constraints (59.4%) hindered effective responses. Education level significantly predicted knowledge (AOR = 4.62, p = 0.006) and practices (AOR = 3.97, p = 0.008). Older traders showed lower awareness but more positive attitudes.

Conclusion: Market women in Agona West exhibit moderate climate change awareness but face significant knowledge gaps and adaptation challenges. Targeted educational programs, improved access to climate information, and gender-responsive policies are recommended to enhance resilience. The findings underscore the need for inclusive climate adaptation strategies in Ghana's informal sector.

Keywords: Climate change, market women, knowledge, attitudes, practices, Ghana, adaptation strategies

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Climate change represents one of the most pressing global challenges of our time, with profound implications for both environmental sustainability and socio-economic development worldwide. The Intergovernmental Panel on Climate Change (IPCC) defines climate change as "a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer" (IPCC, 2014; Khatibi *et al.*, 2021).

This phenomenon is predominantly driven by human activities, including the combustion of fossil fuels, deforestation, and industrial processes, which elevate greenhouse gas concentrations in the atmosphere, leading to global warming and associated climatic shifts (IPCC, 2014). Huang W, These shifts manifest as rising sea levels, increased frequency of extreme weather events, and altered precipitation patterns, all of which threaten global food security, water availability, and public health, , undermining efforts to achieve sustainable development (IPCC, 2014; Nhemachena *et al.*, 2020; Abbass *et al.*, 2022).

Research shows that 3.6 billion people already reside in areas highly vulnerable to climate change. By 2030 to 2050, climate change is projected to cause 250,000 additional deaths annually due to undernutrition, malaria, diarrhea, and heat stress alone (WHO, 2023). Additionally, Sub-Saharan Africa is highly vulnerable to climate change due to the interplay of biophysical, political, and socioeconomic stresses that limit its adaptive capacity (Connolly-Boutin and Smit, 2016).

Developing countries, in Sub-Saharan Africa, bear a disproportionate burden of climate change impacts due to their reliance on climate-sensitive sectors such as agriculture, coupled with limited adaptive capacities and pre-existing socio-economic vulnerabilities (Tambo, 2016; Serdeczny *et al.*, 2017).

In this context, Ghana, a West African nation, faces significant climate-related challenges that affect its predominantly agrarian economy and rural populations (Asante and Amuakwa-Mensah, 2015; Dumenu and Obeng, 2016).

Clara Osei Boateng and Andy Apratwum 2011, explains that Ghana's informal sector is made up of proprietary of micro and small -scaled enterprises. It consists of producers, wholesalers, retailers and consumers. There are also intermediary service providers along the value chain such as suppliers of raw materials to manufactures on contractual basis. Informal sector workers are largely self-employed person such as farmers, traders, food processors, artisans and craft-workers to mention but a few. The sector consists of varied activities. In rural Ghana, informal sector work mainly involves agriculture (75%) (GSS, 2008), fishing and fish processing, agro based processing. In contrast, more urban workers (43%) are engaged in non-agricultural activities

In spite of the signing of the United Nations Framework Convention on Climate Change (UNFCCC) by Ghana, the country still faces the adverse effects of climate change in the form of health problems, climate induced disruption of agricultural systems, coastal flooding, and declining water levels in hydroelectric dams, which supply approximately 80% of Ghana's electricity, as a result of reduced levels of precipitation (Amisigo, McCluskey and Swanson, 2015; Asante and Amuakwa-Mensah, 2015; Dumenu and Obeng, 2016). These adverse effects of climate change facing the Ghanaian economy are due to the lack of capacity to undertake adaptive

measures to address environmental problems and socio-economic costs of climate change (Tambo, 2016).

The World Bank noted that women are more susceptible to the impacts of climate change due to a combination of several factors including gender-based cultural norms, inheritance structures and household responsibilities (World Bank, 2016). Due to the reliance of the Ghanaian economy on sectors (such as agriculture, energy and forestry) that are highly sensitive to climate change and its variability (Asante and Amuakwa-Mensah, 2015; Chemura, Schauberger and Gornott, 2020), it is necessary to review past studies of climate change and variability in Ghana. While various studies have explored the concept of climate change in Ghana (Antwi-Agyei, Dougill and Stringer, 2015; Nyantakyi-Frimpong and Bezner-Kerr, 2015; Tambo, 2016; Addaney *et al.*, 2021), there is limited research focusing specifically on market women's knowledge, attitudes, and practices regarding climate change. This oversight is particularly concerning given their central role in the economy and their heightened vulnerability to climate-related shocks (OECD and SWAC, 2019).

This study therefore seeks to bridge this knowledge gap by investigating market women's understanding of climate change, their attitude towards its impacts, and their current adaptation practices in the Agona West Municipality. The findings will contribute to the growing body of literature on climate change adaptation in Ghana and inform policy measures aimed at supporting vulnerable groups in responding to climate change challenges.

1.2 Problem Statement

Climate change is a growing global challenge with severe implications for the environment and local economies, particularly in developing countries like Ghana, where agriculture and informal trade form the backbone of livelihoods. According to the (ECOWAS, 2022) Community Report, West Africa (including Ghana) will experience a temperature increase of approximately +2.3°C

by 2060, or a warming of +0.6°C per decade (ECOWAS, 2022). Women, who are key intermediaries between agricultural producers and consumers, face severe challenges as these climate-induced disruptions threaten their businesses, incomes, and food security (Chanana-Nag and Aggarwal, 2020; Dibakoane, Siyongwana and Shabalala, 2022; Duru, Aro and Oladipo, 2022; Lecoutere *et al.*, 2023).

In Ghana, informal employment accounts for eighty – nine percent (89%) of total employment, with women being the majority. Ninety-two percent (92%) of employed women work in the informal sector, compared to eighty-six percent (86%) of men (Baah- Boateng and Vanek, 2020). While the Ghana National Climate Change Policy (2013) and the National Adaptation Plan Framework (2018) outline broad strategies for adaptation across sectors such as agriculture, disaster preparedness, and infrastructure development, they do not specifically address the vulnerabilities of informal market traders (MESTI, 2013; NREPP, 2018).

According to the Department of Agriculture in the Agona West Municipality, climate change has been observed in the form of torrential rains, market flooding, environmental degradation, lack of fridge for storage but high temperature that hasten the spoilage of their goods and increases its cost.

Despite the pressing nature of these issues, limited research has been conducted on how market women understand, perceive, and respond to climate change. Most climate change studies in Ghana have focused on farmers and large-scale industries (Limantol *et al.*, 2016; Odame Appiah *et al.*, 2018), leaving a critical gap in knowledge regarding informal traders like market women. This study bridges a critical knowledge gap by generating robust, context-specific data on the climate change impacts, adaptive practices, and vulnerabilities of market women in the Agona West Municipality. Its findings will empower climate change activists, policy

makers, governments, and international bodies to design and implement evidence-based interventions, ensuring that adaptation strategies are both gender-responsive and tailored to the unique challenges faced by vulnerable informal sector groups.

1.3 Rationale of the Study

Market women play a critical role in Ghana's local economy by facilitating food distribution and ensuring food security for urban and rural populations. Understanding their knowledge, attitudes, and coping strategies is essential for addressing the broader impacts of climate change on trade and economic stability in the region.

This study is significant because it seeks to bridge the research gap concerning how informal traders, particularly market women, are affected by and respond to climate change. Findings from this study will provide empirical data to inform local government policies, climate adaptation programs, and educational initiatives tailored to market women. Additionally, the study will highlight barriers to climate change adaptation, enabling policymakers to develop targeted interventions that enhance resilience and sustainability within the informal trade sector.

Furthermore, the study aligns with the SDGs (Morton, Pencheon and Squires, 2017), which emphasize the importance of empowering vulnerable groups, such as women in the informal economy, to build resilience against climate change. This research is, therefore, timely and necessary, as its findings will contribute to a broader understanding of climate change's socio-economic impacts and support efforts to integrate gender-responsive climate policies in Ghana's development agenda.

1.4 Conceptual Framework

Knowledge, Attitude, and Practice outcome model (KAP)

The present study aligns with the Knowledge, Attitude, and Practice Outcome (KAP) model Mutaru et al. (2016). This model establishes a connection between knowledge, attitude, and practices in various domains. In the context of this study, the model highlights the relationship between socio-demographic characteristics, knowledge, attitudes, and adaptation practices related to climate change among market women in the Agona West Municipality. It assumes that a trader's knowledge and awareness of climate change influence their attitudes and risk perceptions, which in turn shape their adaptation strategies. Socio-demographic factors such as education, years of trading experience, income level, and access to climate information determine the extent of climate change awareness and the ability to adopt effective coping measures.

Market women's attitudes, including their perception of climate risks and willingness to adapt, influence how they respond to climate-related disruptions. Those with higher awareness and stronger risk perceptions are more likely to engage in adaptive practices such as adjusting trading patterns, using weather forecasts, improving product storage methods, and modifying market infrastructure. This framework underscores the need to strengthen climate knowledge and promote policies that support the resilience of informal traders against climate change impacts.

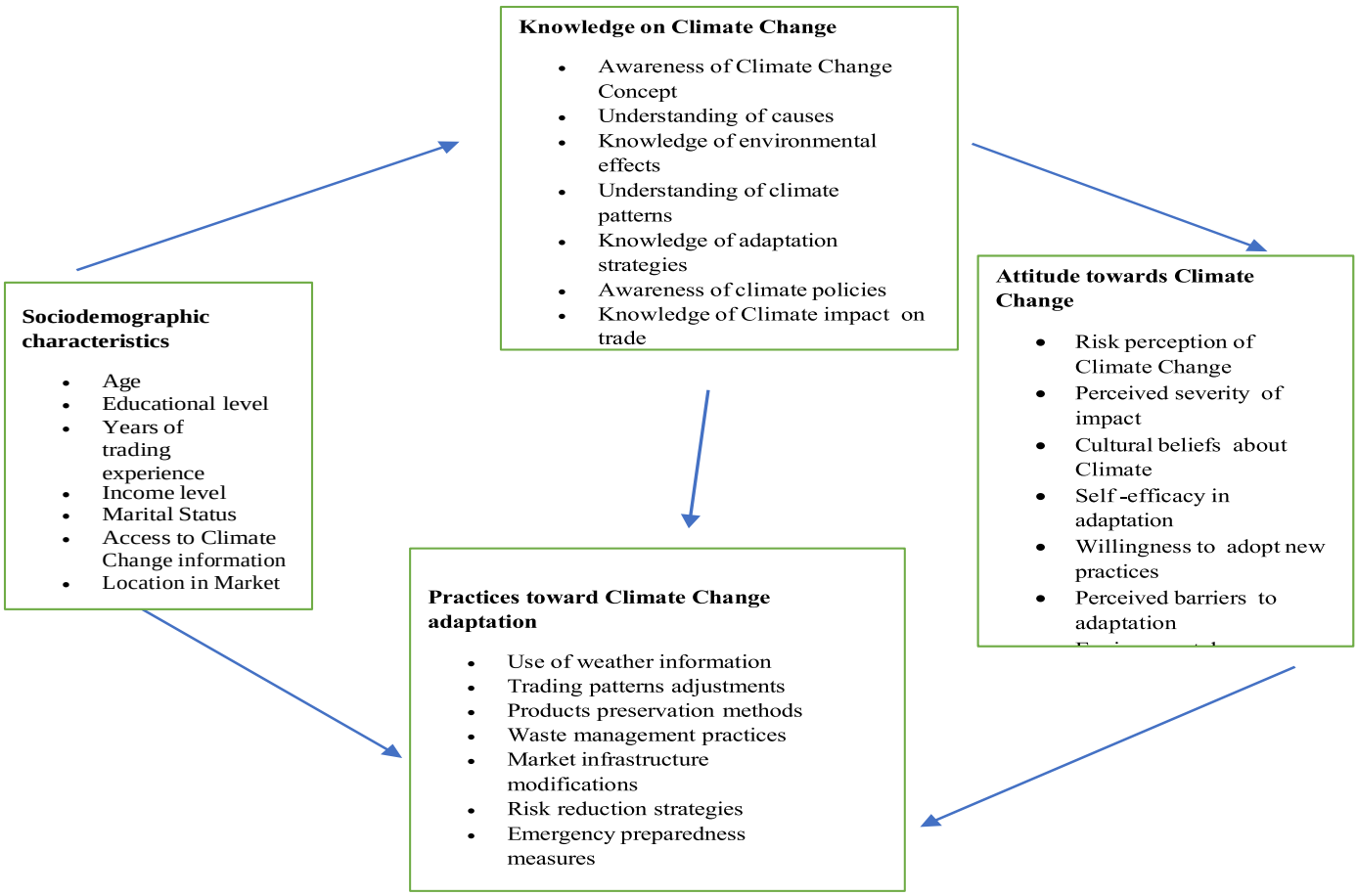

Figure 1.1 The conceptual framework of knowledge, attitude, and practices of climate change [adapted from (Mutaru et al., 2023)]

1.5 Research Questions

1. What is the extent of market women's knowledge about climate change and its causes in the Agona West Municipality?
2. How do market women in the Agona West Municipality perceive the risks associated with climate change, and what attitudes do they hold regarding its impacts?
3. What adaptation strategies are currently employed by market women in the Agona West Municipality, and what barriers hinder their implementation?

1.6 General Objective

To assess the knowledge, attitude, and practices regarding climate change and its environmental effects among market women in the Agona West Municipality, Ghana.

1.7 Specific Objectives

1. To determine the level of knowledge and awareness of climate change among market women in the Agona West Municipality.
2. To examine market women's attitudes and risk perceptions towards climate change impacts on their trading activities and livelihoods in the Agona West Municipality.
3. To identify current adaptation practices and barriers to climate change response among market women in the Agona West Municipality.

1.8 Profile of the Study Area

Agona West Municipal Assembly (AWMA), one of the twenty-two (22) political and administrative districts in the Central Region of Ghana, was carved out of the former Agona District Assembly (ADA) on 29th February, 2008 by LI 1921. Agona West Municipality is situated in the eastern corner of Central Region within latitudes 50309 and 50509N and between longitudes 00359 and 00559W. The Municipality occupies a land size of 447 km2 with a population density of 379.6 persons per square kilometre. The Municipal shares boundaries to the North by Agona East, to the East and South by Gomoa East and to the North and West by Asikuma- Odoben-Brakwa and Ajumako Enyan-Essiam Districts respectively.

The Municipality9s population in 2021 was 136,882, with more females 71,380 (52.1%) than males 65,502 (47.9%). The Municipal capital of AWMA is Agona Swedru. Administratively, the municipality has 6 zonal councils and 2 urban councils and made up of 31 elected assembly

members and 13 government appointees. The six zonal councils in Agona West Municipality are; Swedru Zonal Council, Nyakrom Zonal Council, Otsenkorang/Edukrom Zonal Council, Nkum/Ahamadonko Zonal Council, Bobikuma/Kwaman Zonal Council and Abodom/Kukrantumi Zonal Council.

There are 31 electoral areas also in the municipal. The Municipal Assembly is the highest governing body and exercises its executive and administrative functions through the Executive Committee, which is chaired by the Municipal Chief Executive. The Akan ethnic group (88.5%) is the largest in the Municipal, followed by Ewe (4.0%), Gurma (2.3%), Ga-Dangme (1.1%) with the remaining ethnic groups (Mole-Dagbani, Guan, Grusi, Mande and others) constituting 6.4 percent.

The highest share of the region's population is affiliated to the Christian Religion (84.2%) with 9.6% to the Islamic Religion. Less than two percent are either traditionalists (0.2%) or belong to other religions (1.3%). The rest (4.7%) have no religion. Agona West has a literacy rate of 77.4 percent for the population 6 years and older, which is higher among males (82.3%) than females (73%). The municipal's economy is dominated by the services sector, which accounts for 60.1 percent of the employed population 15 years and older, while agriculture and industry represent 27.7 percent and 12.2 percent, respectively.

The Municipality has four main markets, Agona Swedru Central Market and Mandela Market, Agona principal streets market and Agona Wawase Market where economic activities take place. The markets are situated in Agona Swedru, Agona Wawase and Mandela with Mondays, Tuesdays, Thursdays and Fridays as their major market days. On such days, people from Winneba, Asikuma, Kasoa, Afransie, Bawjiase, Mankessim, Cape Coast, Akim Oda, Akroso, Accra and

other surrounding towns throng the Agona Municipal Markets for economic activities (AWMA, 2023; GSS, 2023).

According to Agona West Municipal Directorate of Ministry of Food and Agriculture (MOFA) 2023/2024 reports, there has been verifiable cases of climate change indicators in the municipality. This ranges from draught, excessive heat temperature, heavy rainfall, flooding, unpredictable weather pattern etc. affecting agriculture, environment and economic activities of human beings. However, the Agona West Municipality suffered its severe form of climate change in June 2010 when heavy rains caused the district to be submerged completely by flood leading to loss of lifes and properties (OCHA, Floods situation report 3, 5 July 2010).

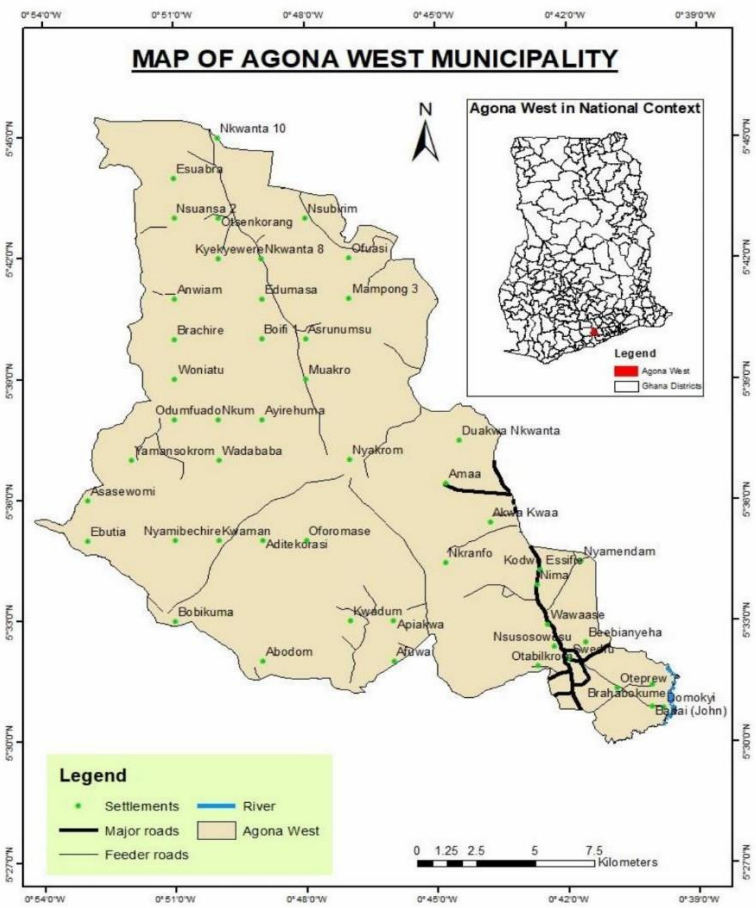

Figure 1.2 Map of Agona West Municipal Assembly [Source: (AWMA, 2023)*]*

1.9 Scope of the Study Area

This study assesses the knowledge, attitude, and adaptation practices of market women in the Agona West Municipality regarding climate change and its environmental effects. It specifically focuses on evaluating their awareness and understanding of climate change causes and consequences, analysing their perceptions of climate-related risks to their trading activities and livelihoods, and identifying the adaptation strategies they employ alongside the barriers they face. The study is limited to market women in the Agona West Municipality and adopts a cross-sectional approach to provide insights into their climate change-related experiences within this context.

1.10 Organization of the study

This thesis is structured into six chapters. Chapter 1 introduces the study by providing the background, problem statement, research objectives, significance, and scope of the study.

Chapter 2 presents a review of relevant literature, focusing on market women's knowledge, attitude, and adaptation practices concerning climate change, along with theoretical frameworks and empirical studies. Chapter 3 outlines the research methodology, detailing the study design, sampling methods, data collection techniques, and ethical considerations.

Chapter 4 presents the research findings, summarizing key trends in knowledge, risk perceptions, and adaptation practices among market women. Chapter 5 discusses the findings in relation to the research objectives, comparing them with existing literature and highlighting implications for policy and practice.

Finally, Chapter 6 concludes the study by summarizing key insights and providing recommendations for policymakers, climate adaptation programs, and future research directions.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter outlines relevant literature on market women and climate change, focusing on the aforementioned specific objectives key areas. By examining existing studies, this chapter provides a foundation for understanding the context of market women's climate change experiences and identifies gaps that necessitate further research.

2.2 Descriptions of climate change

Climate change is a pervasive and growing global threat to biodiversity and ecosystems (Díaz et al., 2019). Climate change affects individual species and the way they interact with other organisms and their habitats, which alters the structure and function of ecosystems and the goods and services that natural systems provide to society (Díaz et al., 2019). Understanding the direction and magnitude of ecological responses allows human communities to better anticipate these changes and adapt as necessary.

Climate change is a long-lasting change in the weather arrays across tropics to polls. It is a global threat that has embarked on to put stress on various sectors. In turn, it is challenging the global feeding patterns, particularly in countries with agriculture as an integral part of their economy and total productivity. Climate change has also put the integrity and survival of many species at stake due to shifts in optimum temperature ranges, thereby accelerating biodiversity loss by progressively changing the ecosystem structures. Climate variations increase the likelihood of particular food and waterborne and vector-borne diseases, and a recent example is a coronavirus pandemic. Climate change also accelerates the enigma of antimicrobial resistance, another threat

to human health due to the increasing incidence of resistant pathogenic infections. Besides, the global tourism industry is devastated as climate change impacts unfavourable tourism spots (Abbass et al., 2022).

2.3 Global, regional and national trends in Climate Change

Climate change is a global issue which affects the world negatively. The best-known greenhouse gas is carbon dioxide (CO2). It represented almost 80% of the volume of all greenhouse gas emissions in the EU in 2021. Other greenhouse gases are present in a smaller quantity in the atmosphere, but they may have a bigger warming effect. For example, methane accounted for 12% of the impact of EU's greenhouse gas emissions in 2021(Kovats et al., 1999).

Evidence that our world is warming has become stronger in recent years. Scientists have now confirmed that these changes are due to human activities (Houghton et al.,1995). Although, there is considerable uncertainty in forecasting regional and local changes in climate in Europe, it is likely that these observed trends will continue (Beniston et al., 1998).

The United Nations (UN) reported in 2017 the impact of severe flooding in the West and Central Africa axes (Halim et al., 2017). The incident resulted in acute human and physical losses, reflected in river overflows, displacement of people, and an increase in disease burdens and deaths in Sierra Leone, Guinea, Mali, Ghana, Nigeria, Burkina Faso, the Central African Republic, and Niger. In Niger, the official estimate of flood victims was 206,513, with 56 deaths, 1200 houses damaged, 16,000 herds of cattle lost, and 9800 hectares of cultivated land lost. The case of Nigeria was not so different, with more than 100,000 people affected by about 21 local government areas.

Similarly, almost all the Burkina Faso regions were affected, with 30,862 people impacted by flooding and violent winds (Halim et al., 2017).

In the Eastern part of Africa, where dry weather is prevalent, there have also been drought experiences due to the ITCZ-ENSO movements (Mpelasoka et al., 2018). ENSO9s progress reflects the processes that occur in the Pacific (Tchilibou et al., 2009). However, its impacts which are in the form of increases in surface air temperature, and sea and land warming gives rise to drought and water unavailability, which have spillover effects in Africa and particularly in Eastern Africa. Historically, the El Niño between 1997and 1998 resulted in droughts and forest fires in some Asian economies and in East Africa, where many health challenges were also recorded (Mpelasoka et al., 2018). According to a study Ramin et al. (2009), the drought areal-extent decadal spans from 0.6% in Tanzania to 3.7% in Ethiopia. In contrast, the probabilities of experiencing drought can be as high as 40%, and most of the dryness in East Africa for 11 decades (190332013) spans between 14 and 24 months over two years.

Indeed, Africa is one of the most vulnerable regions to climate variability and change (De Souza et al., 2015). The literature identified some of the effects of the climate alterations in Africa, such as sea-level rise, glacier melting, water resources reduction, reduction in agricultural production and food security (Opoku et al., 2023). Lesser biodiversity increases in zoonotic diseases, and increase in erosion drought, and flood (De Souza et al., 2015). An increase in sea and land temperatures is an expression of the growth of warming, despite identifying water bodies, such as seas and oceans, as absorbers for climate distortions or ensuring eco-balance Stern.

In Agona West Municipality of Ghana where Agona Swedru is its district capital, climate change is already determining the course of people's lives. Extreme weather events and unpredictability in weather patterns are having very serious consequence on people who rely on land, forests and

rivers to feed themselves and earn a living. Climate change is a critical issue and sound public knowledge, attitude and practices are required to address the problem.

2.4 Knowledge and Awareness of Climate Change, Its Causes, and Environmental Effects

According to Bansal *et al.* (2022), while a majority of respondents (85%) in a study in India were aware of the negative effects of pesticide use, knowledge of broader climate-related issues, like global warming and the role of fossil fuel combustion, was notably low (51-54%). Similarly, (Rani and Jyothi, 2020) reported that 74% of farm women lacked knowledge of climate change causes, despite acknowledging issues such as pollution (78%), global warming (79%), and natural disasters (78%).

A similar trend is evident in Africa, where studies among female farmers reveal significant knowledge gaps. According to (Obisesan and Chitakira, 2021), 53.4% of women farmers in South Africa's Lephalale municipal area were unfamiliar with the term climate change, although they had observed shifting weather patterns. Likewise, de la Torre-Castro *et al.* (2022), found in Zanzibar, Tanzania that while many women in coastal communities recognized environmental changes such as rising sea temperatures, decreasing rainfall, and increased droughts, their understanding of climate change as a broader phenomenon remained limited. Approximately 65% of respondents struggled to define climate change, relying primarily on localized ecological observations rather than scientific explanations.

According to Daudu *et al.* (2014), 66.5% of women crop farmers in Kogi State, Nigeria, lacked awareness of climate change, with only 21.6% obtaining information from radio and television, and an even smaller proportion (9.2%) learning from extension workers. Beyond agriculture, research has also explored climate change awareness among market women. Itasanmi (2019) found that market women in Ibadan, Nigeria, had a relatively strong understanding of

environmental issues such as erosion (72.2%) and air pollution (64.3%), yet significant knowledge gaps existed in areas like soil degradation (37.2%), recycling (31.8%), and waste management (45.4%). Similarly, Michael (2024) found that women traders in the riverine areas of Bayelsa State, Nigeria, were acutely aware of the increasing frequency of flooding.

In Ghana, Addaney *et al.* (2021), found that while female smallholder farmers recognized erratic rainfall (54%) and rising temperatures (32%) as climate indicators, their understanding of climate change causes was constrained by limited formal education and poor access to extension services. Similarly, Lawson *et al.* (2020), revealed that women farmers in semi-arid Ghana linked increasing temperatures and unpredictable rainfall to agricultural challenges such as crop failures and pest infestations. However, their knowledge was primarily derived from lived experiences rather than scientific or institutional sources.

2.5 Women's Attitudes and Risk Perceptions Towards Climate Change Impacts on Their Livelihoods

According to Daudu *et al.* (2014), many women in Kogi State, Nigeria did not explicitly recognize climate change but perceived changes in rainfall patterns and droughts as threats to their crop production. Their perception of risk was largely influenced by immediate economic challenges rather than long-term climate adaptation, with many engaging in farming practices such as bush burning and deforestation that exacerbated environmental degradation.

Structural barriers also influence women's climate risk perceptions. According to (Nyahunda and Tirivangasi, 2022), women perceived climate change in Vhembe District, South Africa as a direct threat to agricultural productivity and household food security. The unpredictability of rainfall and temperature changes created uncertainty in farming, contributing to concerns over failed harvests, food shortages, and economic hardship. Similarly, Ifeanyi-obi (2023), in Southern Nigeria

found that while rural women acknowledged climate change as a significant threat, their responses were constrained by socio-cultural factors, including traditional gender roles that limited their decision- making power and access to critical adaptation resources such as land, loans, and agricultural extension services.

Climate change also poses risks to specific industries dominated by women. According to de la Torre-Castro *et al.* (2022), coastal women in Zanzibar, particularly those engaged in seaweed farming, perceived climate change as a direct threat to their livelihoods. Rising sea temperatures and changing rainfall patterns negatively affected seaweed cultivation, leading to declining productivity and financial insecurity. Many women felt powerless to address these challenges due to economic limitations, gendered labour divisions, and restricted decision-making power within their households and communities.

Beyond agriculture, women engaged in trading activities also expressed concerns about climate variability. Michael (2024) in Bayelsa State, Nigeria, found that women traders in riverine areas were highly aware of increasing flood risks and their impact on business operations. As a result, they experienced lack of high patronage of goods and services, lack of financial capital to be injected into their businesses lines of operations and low profit margins. However, inadequate infrastructure, poor access to climate information, and economic instability limited their ability to implement effective coping strategies. Gannon *et al.* (2022) similarly noted that female entrepreneurs in sub-Saharan Africa acknowledged the growing threats of climate change but faced significant challenges in implementing adaptation measures due to institutional and economic constraints.

In Ghana, Addaney *et al.* (2021) reported that unpredictable rainfall and prolonged dry seasons were major concerns for female smallholder farmers in Akropong, as they directly contributed to

reduced crop yields and financial instability. Over half (58%) of respondents identified declining yields as a key impact, while others cited delays in rainfall affecting planting schedules. Similarly, Lawson et al. (2019) found that women farmers in semi-arid Ghana viewed reduced rainfall and extended dry spells as significant threats to agricultural productivity.

2.6 Entrepreneurs Perceived Impacts of Climate Variability and adaptation practices

According to Antwi-Agyei et al. (2021), evidence of Climate Change coping and adaptation practices by smallholder farmers in Northern Ghana, there is a growing body of literature showing that, in order for farmers to initiate climate change adaptation or coping practices, they must first perceive extreme climatic events as a problem (Deressa et al., 2009; Orlove et al., 2010). Thus, during the fieldwork for this study, both female and male farmers were asked if they have observed any changes in climate over time. For those who indicated experiencing extreme climatic events, they were also asked about associated impacts on livelihoods and daily life more broadly.

Overall, five main extreme climatic events were reported by the study participants. These included erratic rainfall, increased windstorms, and increased incidence of flooding. Others were increased temperature, and the drying up of water bodies. These findings are similar to those of other studies, including research comparing farmer perceptions of climate change and how these compare with the official climate data in Ghana's Upper East Region (Fagariba et al., 2018; Nuhu and Matsui, 2019; Issahaku et al., 2016).

In Ghana, Addaney *et al.* (2021) found that female smallholder farmers used both indigenous and modern adaptation methods, including intercropping, erosion control, and irrigation techniques. Traditional weather prediction methods, such as observing cloud patterns and animal behavior, also played a role in farming decisions. Similarly, Lawson *et al.* (2020), reported that women

in semi-arid Ghana relied heavily on mixed farming (95.3%) and shifting planting dates (100%) to cope with climate variability. However, access to modern agricultural inputs remained a challenge, as only 1.9% of respondents reported using chemical fertilizers due to financial constraints.

Beyond agriculture, (Nyahunda and Tirivangasi, 2022), found in South Africa that rural women diversified their livelihoods to enhance climate resilience. Many turned to small businesses, including firewood trading and beer brewing, while others joined community savings groups to cushion economic shocks. In Kenya, Walker *et al.* (2022), found that pastoral women adapted by adjusting livestock migration patterns and selling animals strategically. Those with formal education were more likely to retain cash reserves rather than reinvesting immediately, demonstrating greater awareness of long-term climate risks.

Women traders also adopted various adaptation strategies to sustain their businesses. In Bayelsa State, Nigeria, Michael (2024) found that traders diversified income sources, used informal financial savings schemes, and stored goods in elevated locations to protect them from flooding. Similarly, Gannon *et al.* (2022), reported that women entrepreneurs in sub-Saharan Africa adjusted business models, leveraged social networks, and explored new market opportunities to cope with climate-related challenges. However, access to financial services and business support remained major barriers.

Coastal women engaged in seaweed farming in Zanzibar faced unique climate adaptation challenges. According to de la Torre-Castro *et al.* (2022), many diversified their livelihoods beyond seaweed farming, engaged in small-scale trading, and used indigenous knowledge to predict environmental changes. However, these strategies were often inadequate due to restricted access to credit and limited participation in formal organizations that could provide institutional support.

Despite these adaptation efforts, several barriers hinder women's ability to effectively respond to climate change. A recurring challenge across multiple studies is limited financial access. Women often lack the capital needed to invest in climate-smart technologies, irrigation systems, or improved crop varieties (Lawson *et al.*, 2020; Obisesan and Chitakira, 2021). Restricted access to credit and land tenure insecurity further limits their capacity to make long-term investments in climate adaptation (Ifeanyi-obi, 2023).

Institutional barriers also play a significant role. Many women have limited access to agricultural extension services and climate-related information. In South Africa, only 12% of respondents in Obisesan and Chitakira (2021) study received climate-related information from extension officers, with most relying on informal sources such as radio and community discussions. Similarly, Dhal (2023) found that in Odisha, India, Women's Self-Help Groups (WSHGs) served as a critical source of climate knowledge, compensating for the lack of formal climate education. However, these groups still faced structural barriers such as inadequate government support and restrictive gender norms.

Socio-cultural constraints further restrict women's adaptive capacity. In Nigeria, Ifeanyi-obi (2023) found that gender norms often limit women's decision-making power in farming, restricting their access to essential resources such as loans and extension services. Similarly, Walker *et al.* (2022) highlighted how patriarchal norms in Kenya constrained women's ability to implement climate adaptation strategies, as financial control and land ownership remained predominantly male-dominated.

Finally, inadequate infrastructure poses a critical challenge. Michael (2024) found that in Bayelsa State, Nigeria, the lack of flood-resistant marketplaces and storage facilities significantly hindered women traders' ability to adapt to climate-induced flooding.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter provides a description of the research methodology employed to investigate the knowledge, attitudes, and practices regarding climate change among market women in the Agona West Municipality. It presents a detailed account of the study design, research setting, population characteristics, sampling procedures, data collection methods, and analytical approaches. The chapter also elaborates on quality assurance measures, ethical considerations, and methodological limitations to ensure transparency and scientific rigor throughout the research process.

3.2 Study Design

The research utilized a cross-sectional quantitative study design to examine climate change perceptions and practices among market women. This design was particularly appropriate as it enabled the collection of data at a specific point in time, facilitating the assessment of current knowledge levels, attitudes, and adaptation practices (Wang and Cheng, 2020).

3.3 Study Sites

The study was conducted in the Agona West Municipality, situated in Ghana's Central Region. The research focused on four major market centers: Swedru Main Market, Mandela Market, Agona Principal Streets Market, and Wawase Market. According to recent report from Agona West Municipal Assembly Information Department, Swedru Main Market has 2500 registered traders, Mandela Market has 1120 registered traders, Agona Principal Streets Market has 1050 and Agona Wawase Market has 975 registered traders. (Agona West Municipal Assembly Information Department).These markets have Mondays, Tuesdays, Thursdays and Fridays as their major market days. The markets attract buyers and sellers from the Central Region; (Bawjiase, Kasoa,

Mankessim, Breman Asikuma, Cape Coast), Eastern Region (Oda, Akroso, Asamankese,,Nsawam) and that of Greater Accra region. This makes the markets to be cosmopolitan and vital business hubs for research studies.

3.4 Study Population

The study population comprised of female traders aged 18 years and above who conducted business activities in the selected market centers of Agona West Municipality. These women were primarily engaged in the sale of various commodities including foodstuffs, textiles, manufactured goods, and household items. The population represented diverse ethnic groups, age categories, and educational backgrounds, providing a holistic perspective on climate change awareness and responses. The researcher used only females because women constitute the majority in Ghana's informal employment sector and most of the studies on Climate Change in Ghana have been about farmers who are mostly dominated by males. Ninety-two percent **(**92%**)** of employed women work in the informal sector, compared to eighty-six percent **(**86%) of men (Baah-Boateng and Vanek, 2020),

3.5 Inclusion & Exclusion Criteria

Individuals were included if they met these criteria:

- Female traders aged 18 years and above
- Minimum of six months trading experience in the selected markets
- Temporally registered stalls and permanent stores within the selected market
- willingness to participate in the study

This is because age eighteen (18) is considered to be a matured age and it is a worldwide recognized age for serious decision making such as voting, marriage etc.

Moreover, female traders who have been in business for six months or more are considered well

vested in the issues concerning the geographical area under study. In addition, those with permanent locations or temporally registered stalls within the selected markets are considered to be original inhabitants of the study area. Same cannot be said of new traders who are less than six months in a selected market.

Exclusion criteria included:

- Traders below 18 years of age
- Less than six months trading experience
- Unwillingness to participate
- Male traders
- Traders with cognitive impairment affecting their ability to provide informed consent

3.6 Sampling Technique and Sample Size

Taking into consideration that the study population is well-defined and the study is quantitative, the researcher employed a random sampling technique with proportional allocation to ensure representative sampling across all the four market centers. The sample size was calculated using Cochran's formula (Snedecor and Cochran, 1989):

$n = Z^2pq/d^2$

Where:

n = sample size

Z = 1.96 (95% confidence level)

p = 0.5 (assumed proportion)

q = 1-p = 0.5

d = 0.05 (margin of error)

In a similar study in Ghana, 43.9% of respondents understood the meaning of climate change (Odonkor, Dei and Sallar, 2020). Therefore, p=0.439 will be used.

$$n = \frac{(1.96)^2 \times (0.439) \times (1 - 0.439)}{(0.05)^2}$$

$$n = \frac{3.8416 \times (0.439) \times (0.561)}{0.0025} = 378.44 \approx 378$$

Adjusting for a 10% non-response rate (38), the final sample size is 416 participants. This sample was proportionally allocated across the four market centers based on their respective trader populations, as shown in Table 3.1:

Table 3.1 Proportional Allocation of Sample Size

Name of Market Centre	**Total Number of Traders**	**Required Sample Size**
Swedru Main Market	2500	(2500/5645) *416 = 184
Mandela Market	1120	(1120/5645) *416 = 83
Agona Principal Streets	1050	(1050/5645) *416 = 77
Wawase	975	(975/5645) *416 = 72
Total	**5645**	**416**

Source: Agona West Municipal Assembly Information Department, 2024

3.7 Data Collection Methods and Instrument

Data was collected using a structured questionnaire administered through KoboCollect, a digital data collection platform which enabled real-time data entry and reducing the risk of data loss and enhancing accuracy (UN-OCHA, 2024). The questionnaire was designed to capture demographic information, knowledge of climate change, attitudes towards environmental issues, and adaptation practices (Appendix II). Face-to-face interviews were conducted in participants' preferred language to ensure accurate communication. Closed-ended questions were used to ensure

consistency in responses, while Likert-scale questions measured attitudes and perceptions. Three field officers were recruited and trained on how to use the KoboCollect app for easy, timely and effective data collection process.

3.8 Pretesting

The data collection instrument underwent rigorous pretesting with 42 market women (10% of the sample size) in the Nyakrom market, which shares similar socio-demographic characteristics with the study area. The pretesting exercise assessed the clarity of questions, cultural appropriateness, logical flow, and time required for questionnaire administration. Feedback from the pretesting phase led to modifications in question phrasing, response options, and interview procedures to enhance instrument validity and reliability.

3.9 Data Handling

Data collected through KoboCollect was automatically backed up on secure servers. Access to the data was restricted to authorized research team members through password protection. Regular data quality checks were performed to ensure completeness and accuracy of entries. The data was subsequently exported to STATA version 18 for cleaning and analysis. All ethical standards regarding data privacy were upheld and backup copies would be maintained up to 6 years for future reference checks.

3.10 Statistical Analysis

Data analysis was conducted using STATA version 18. Descriptive statistics, such as frequencies and percentages, were used to summarize demographic characteristics and key study variables. These variables were grouped into dependent and independent variables. **Dependent variables** in

this study are the Market women in Agona West Municipality (specifically their climate change related knowledge, attitudes and practices). The market women9s responses or levels of knowledge, attitude, and practices are what the study sought to know 3 they are the outcome of the study.

Independent variables in this study are the Knowledge about climate change, Attitude toward climate change and Practices related to climate change (Polit, D.F., & Beck, C.T. 2017).
These are independent variables because the study is examining how these factors exist or vary among the market women. In other words, they are what the study is measuring or exploring

In a nutshell, independent variables in this study are knowledge, attitude and adaptation practices

Dependent variables are Market women's levels of knowledge, attitudes and adaptation practices (Kaliyaperumal, 2004).

Inferential statistical tests, including chi-square analysis, were performed to assess associations between knowledge, attitude, and adaptation practices. A significance level of $p < 0.05$ was applied for hypothesis testing.

3.11 Dissemination of Results

Research findings will be disseminated through academic publications, conference presentations, and stakeholder meetings with the full thesis report hosted at Ensign Global University's library. A summary report will be shared with the Municipal Assembly, market authorities, and participating market women's associations.

3.12 Ethical Considerations

Ethical approval was obtained from the Ethical Review Committee of Ensign Global University (ENSIGN/IRB/EL//SN-273/01). Informed consent was obtained from all participants, with emphasis on voluntary participation and confidentiality. Participants retained the right to withdraw at any point without consequences. Their privacy was protected throughout the research process and to ensure confidentiality, no personally identifiable information was recorded.

3.13 Limitations of the Study

This study had certain limitations. Due to its cross-sectional design, it captured data at a single point in time, limiting the ability to assess trends over time. Additionally, self-reported responses may have been influenced by potential recall bias or social desirability bias. Furthermore, the study was geographically confined to the Agona West Municipality, which may affect the generalizability of findings to other regions in Ghana.

3.14 Assumptions

The study had assumed that the higher the level of one's education, the more knowledgeable one would be about climate change. There was an assumption that one's maturity would indicate one9s understanding of climate change and its related issues. Moreover, there was another assumption that the longer of years one has been in business indicates ones understanding and knowledge of climate change issues and its adaptation strategies.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents the research findings derived from the study on knowledge, attitudes, and practices (KAP) regarding climate change among market women in the Agona West Municipality, Ghana. The results are structured to address the specific objectives of the study, integrating socio-demographic characteristics and bivariate associations, and analyses.

4.2 Socio-Demographic Information of Respondents

Table 4.1 presents the socio-demographic characteristics of the 416 market women surveyed in the Agona West Municipality. The age distribution of respondents revealed that the majority fell within the middle-aged categories. Specifically, 27.88% were aged 45-54 years, followed by 26.68% aged 35-44 years, and 22.12% aged 25-34 years. The mean age of respondents was approximately 41 years (M = 40.98, SD = 11.60), with ages ranging from 18 to 67 years.

Regarding marital status, more than two-thirds of respondents (68.51%) were married, while 19.95% were single. A smaller proportion were either divorced/separated (6.25%) or widowed (5.29%). The educational background of respondents showed that 33.17% had completed Junior High School, followed by 28.37% with Senior High School. Notably, 13.46% had no formal education, 13.94% had only completed primary school, and 11.06% had attained tertiary education levels (certificates/diplomas) indicating low educational levels on the part of the respondents.

The study also assessed the number of years respondents had been engaged in market trading. The results indicated the largest segment (38.70%) had been engaged in market trading for 1-5 years,

while 30.29% had more than 10 years of experience. About a quarter (24.52%) had 6-10 years of trading experience, and 6.49% had less than one year of experience.

The respondents' household size was categorized into small (1-2 members), medium (3-5 members), and large (6+ members). The majority of respondents (49.76%) had medium-sized households, followed by 34.13% with large households. Those with small households constituted 16.11%.

Analysis of monthly income from trading activities showed varied economic levels among respondents. The largest proportion (35.82%) earned between GH₵500-GH₵999, followed by 28.85% earning GH₵200-GH₵499. Higher income brackets included 18.99% earning GH₵1,000-GH₵2,999 and 15.14% earning GH₵3,000 or more. Only a small percentage (1.20%) reported earnings below GH₵200. The majority of respondents (91.59%) relied solely on trading as their source of income, with only 8.41% reporting additional income sources.

Regarding trading infrastructure, more than half (52.40%) operated from permanent shops/stalls/booths, while 17.55% were hawkers and 14.66% used temporary stalls. The market structure types were predominantly open-air (44.71%), followed by covered markets (31.73%), with 23.56% operating in both environments. In terms of market accessibility, 28.12% travelled 1-5 km to their trading locations, while 23.56% covered 6-10 km. Walking (46.63%) and public transport (43.75%) were the primary modes of transportation to the market.

Table 4.1: Sociodemographic characteristics of respondents

Variable	Frequency (N=416)	Percentage (%)
Age (years)		
18-24	32	7.69
25-34	92	22.12
35-44	111	26.68
45-54	116	27.88
55-64	57	13.70
65+	8	1.92
Mean age	41	SD = 11.6
Marital Status		
Single	83	19.95
Married	285	68.51
Divorced/Separated	26	6.25
Widowed	22	5.29
Educational Level		
No Formal Education	56	13.46
Primary Education	58	13.94
Junior High School (JHS)	138	33.17
Senior High School (SHS)	118	28.37
Tertiary Education	46	11.06
Years of Market Trading		
Less than 1 year	27	6.49
1 3 5 years	161	38.70
6 3 10 years	102	24.52
More than 10 years	126	30.29
Household Size		
Small (1-2)	67	16.11
Medium (3-5)	207	49.76
Large (6+)	142	34.13

Mean household size	4.84	SD = 2.46
Trading Setup		
Permanent Shop/Stall/Booth	218	52.40
Temporary Stall	61	14.66
Mobile Vendor	28	6.73
Multiple Locations	34	8.17
Hawker	73	17.55
Market Structure Type		
Open Air	186	44.71
Covered Market	132	31.73
Both	98	23.56
Average Monthly Income (GH₵)		
Less than 200	5	1.20
200 3 499	120	28.85
500 3 999	149	35.82
1,000 3 2,999	79	18.99
3,000 or more	63	15.14
Other Sources of Income		
Yes	35	8.41
No	381	91.59
Distance from Home to Market (km)		
Less than 1 km	67	16.11
1 - 5 km	117	28.12
6 - 10 km	98	23.56
11 - 20 km	82	19.71
More than 20 km	52	12.50
Main Mode of Transport to Market		
Walking	194	46.63
Public Transport	182	43.75
Private Vehicle	27	6.49

Other	13	3.12

Source: Field Data, 2025.

4.3 The Knowledge of Respondents on Climate Change

The study revealed varying levels of climate change knowledge among market women in the Agona West Municipality. Of the 416 respondents, 73.80% (n=307) had heard of climate change, while 26.20% (n=109) had not. Among those aware of climate change, most respondents (36.30%) first learned about it 1-5 years ago, followed by 18.27% who became aware 6-10 years ago. Only 5.29% had known about climate change for more than 10 years.

In terms of understanding climate change causes, deforestation was the most widely recognized factor (79.81%), followed by burning of fossil fuels (75.96%) and vehicle emissions (69.71%). Industrial pollution (69.23%) and burning of refuse (61.06%) were also commonly identified as contributing factors. Fewer respondents recognized the role of air conditioning (34.38%), population growth (41.83%), use of fertilizers (44.23%), improper waste disposal (53.12%), and bush burning (59.13%) in contributing to climate change.

Regarding specific climate change effects, respondents identified rising temperatures (63.70%) and erratic/unpredictable rainfall (63.70%) as the most recognized impacts, followed by drought (38.94%), flooding (36.78%), and more intense storms/hurricanes (33.41%). Fewer respondents associated climate change with reduced water quality/availability (31.25%) and changes in crop yields (17.55%).

Clearly, respondent's low educational level as evidenced under sociodemographic information (page 28), contributes to respondents' relatively poor knowledge about climate change, its effects and adaptation practices.

Table 4.2: Knowledge and awareness of climate change

Variable	Frequency (N=416)	Percentage (%)
Heard of Climate Change		
Yes	307	73.80
No	109	26.20
First Heard About Climate Change		
Within the last year	19	4.57
1 3 5 years ago	151	36.30
6 8 10 years ago	76	18.27
More than 10 years ago	22	5.29
Can't Remember	39	9.38
Sources of Information on Climate Change		
Radio	290	69.71
Television	290	69.71
Newspapers/Magazines	277	66.59
Social Media	119	28.61
Community Meetings	130	31.25
Government Agencies	16	3.85
Friends/Family/Neighbors	36	8.65
Religious Institutions	23	5.53
Traditional Authorities	12	2.88
School/Formal Education	5	1.20
Effects of Climate Change		
Rising Temperature	265	63.70
Erratic/Unpredictable Rainfall	265	63.70
Flooding	153	36.78
Drought	162	38.94
More Intense Storms/Hurricanes	139	33.41
Changes in Crop Yields	73	17.55
Reduced Water Quality/Availability	130	31.25

Perceived Causes of Climate Change		
Deforestation	332	79.81
Burning Fossil Fuels	316	75.96
Industrial Pollution	288	69.23
Burning Refuse	254	61.06
Bush Burning	246	59.13
Vehicle Emissions	290	69.71
Improper Waste Disposal	221	53.12
Use of Fertilizers	184	44.23
Air Conditioning	143	34.38
Population Growth	174	41.83
Natural Weather Variations	151	36.30
Overall Knowledge Level		
Poor Knowledge	247	59.38
Good Knowledge	169	40.62

Source: Field Data, 2025.

Figure 4.1 below represents the levels of knowledge among respondents regarding climate change.

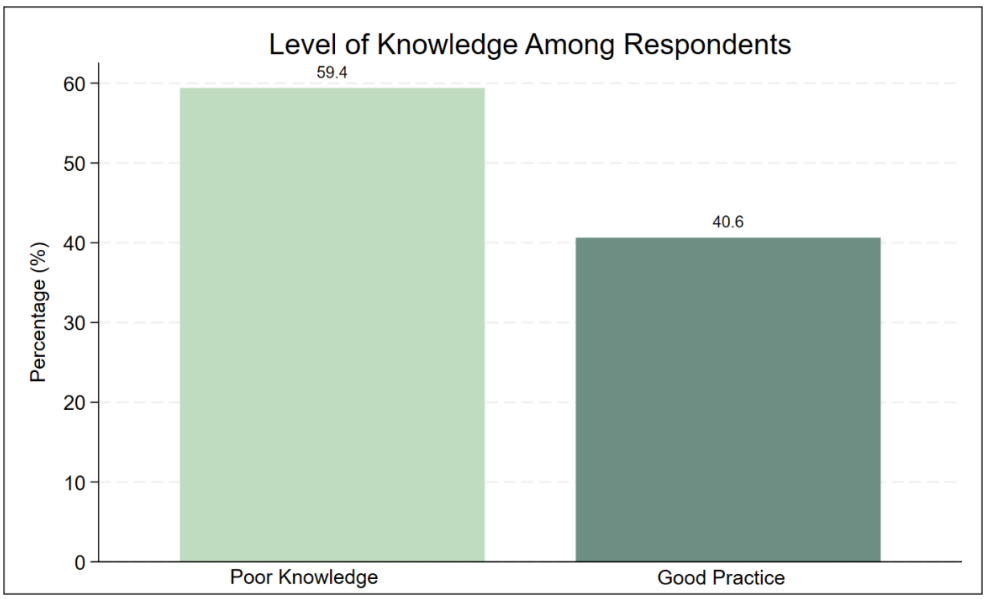

Figure 4.1: Level of knowledge among respondents

4.4 Information on Climate Change

The study examined how often respondents received information related to climate change. The results indicate that 26.44% of respondents reported receiving climate change information "sometimes," while 66.59% received it "often." However, a small proportion (5.05%) indicated that they "rarely" accessed such information, and 1.92% stated that they "never" received any information on climate change.

The study also examined respondents' sources of information regarding climate change. The most commonly reported sources were radio (69.71%), television (69.71%), and newspapers or magazines (66.59%). Social media was identified as an information source by 28.61% of respondents, while 31.25% mentioned community meetings. Government agencies had 3.85% of respondents, and information from traditional authorities, institutions, and schools was minimal, each being reported by fewer than 6% of the respondents. Personal networks, including friends, family, and neighbours, also served as information sources for 8.65% of respondents.

When examining the quality and effectiveness of climate change information dissemination, 55.53% of respondents agreed that climate change information was available to them, while 19.71% disagreed. Additionally, 19.47% maintained a neutral stance regarding information availability, and 4.57% strongly agreed that they had access to climate change information. Only 0.72% strongly disagreed with the statement about information availability. Furthermore, approximately 26% of the market women claimed that information and resources regarding climate change adaptation was accessible in their community, while 17% stated that it was not accessible at all.

The perceived reliability of climate change information varied among respondents. The majority (55.53%) considered the information they received as "reliable," while 19.71% rated it as

"somewhat reliable." Meanwhile, 19.47% remained neutral regarding its reliability, and 4.57% considered it "very reliable." A small percentage (0.72%) viewed the information as "not reliable."

When asked about the sources they trusted most for accurate climate change information, respondents' preferences were consistent with their primary information sources. Radio and television emerged as the most trusted platforms, followed by newspapers and magazines.

Regarding respondents9 interest in receiving additional information or training on climate change adaptation. A significant majority (68.27%) expressed interest in participating in such training programs, while 11.54% remained neutral. Only a small fraction (0.96%) strongly disagreed with the need for further education, and 2.64% disagreed.

The survey results indicate that a majority of respondents perceive climate change information as reliable to some degree. Specifically, 42.07% consider the information very reliable, while an additional 25.48% regard it as somewhat reliable, bringing the total percentage of those who view the information positively to 67.55%. However, a notable portion of respondents remains sceptical, with 4.57% stating that the information is not reliable and 1.68% expressing uncertainty.

The data reveal a strong preference for traditional media as sources of climate change information. Television is the most trusted source, with 56.49% of respondents selecting it as their primary channel for accurate information. Radio follows closely, being the most trusted source for 41.83% of respondents. By contrast, institutions such as government agencies (0.72%) and community leaders (0.48%) receive significantly lower trust levels.

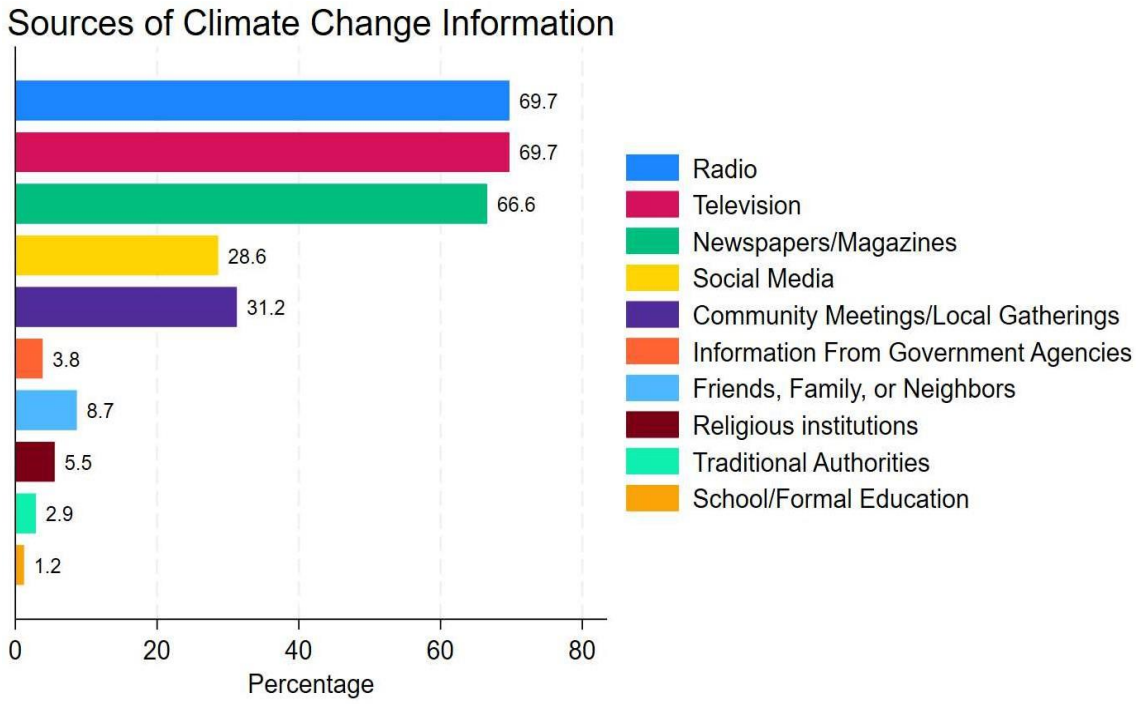

Figure 4.2: Sources of Climate Change Information

The timing of information delivery is a key factor in ensuring effective communication. The survey results show that respondents predominantly prefer receiving climate change information at mid-day (32.45%) and early morning (29.81%), followed by the evening (18.99%). A smaller percentage prefers receiving climate change information on a weekly (7.21%), monthly (4.81%), or seasonal (3.37%) basis. Additionally, 3.37% of respondents selected "Other," with specific preferences including daily updates, receiving information throughout the day, or accessing it as needed.

The frequency with which individuals receive climate change information further illustrates public engagement with the topic. The largest group of respondents (55.29%) stated that they receive information sometimes, while 23.56% rarely encounter it. Only 18.99% of respondents receive climate change information often, and 2.16% reported never receiving it.

The survey results indicate that respondents perceived that daily weather forecasts (87.7%) would be the most useful type of climate information, followed by seasonal forecasts (68.9%), and extreme weather warnings (44.1%). A smaller but notable proportion of respondents found market-specific impacts and available support Services (both 34%) useful, while information on adaptation strategies (31.8%) were the least selected.

4.5 Attitudes of Respondents Towards Climate Change

The findings indicate that a majority of respondents consider climate change an important issue. Specifically, 66.59% of respondents described climate change as "very important," while 26.44% rated it as "somewhat important." Only a small minority, 5.05%, considered it "not very important," with 1.92% viewing it as "not at all important." The study further examined respondents' level of concern regarding the impact of climate change on their trading activities. The results showed that 31.97% of respondents were "very concerned," while 28.12% were "concerned." Additionally, 19.23% were "somewhat concerned," whereas 20.67% reported that they were "not concerned."

When asked whether climate change is already affecting their community, 69.23% of respondents agreed, while 30.77% did not believe their community was currently experiencing climate change effects. Additionally, 38.94% of respondents agreed that climate change poses a significant threat to their business and community, while 17.55% strongly agreed. However, 38.94% disagreed.

Regarding climate change impacts on their businesses, 54.81% of respondents reported that climate change was already affecting their trading activities (42.31% agreed, 12.50% strongly agreed), while 38.22% disagreed with this assessment. Looking ahead, 42.55% believed they were

likely or very likely to be affected by extreme weather events in the next five years, though 35.81% considered this unlikely.

Regarding personal agency and responsibility, market women showed strong belief in individual action. A substantial 84.86% either agreed (68.27%) or strongly agreed (16.59%) that their actions could help reduce climate change. This high level of perceived self-efficacy was complemented by an even stronger belief in collective responsibility, with 95.19% either agreeing (58.17%) or strongly agreeing (37.02%) that everyone has a responsibility to act on climate change.

Respondents also strongly endorsed government intervention, with 97.84% of respondents either agreeing (23.08%) or strongly agreeing (74.76%) that government should take proactive measures against climate change. The perception of whether climate change is a present or future problem varied among respondents. While 42.31% agreed that climate change is already affecting their business, 12.50% strongly agreed. However, 25.48% disagreed with an additional 12.74% strongly disagreeing. Conversely, a considerable portion of respondents (37.98%) agree that climate change is primarily a problem for future generations, with an additional 21.15% strongly agreeing. However, a notable share disagrees (23.08%), and 14.66% strongly disagree.

When asked about concern for their families, 42.79% of respondents agreed that they were worried about the impact of climate change on their families, while 5.05% strongly agreed. However, 31.73% disagreed with 7.21% strongly disagreeing. In terms of preparedness to deal with climate change impacts, 56.97% agreed that they felt prepared, while 2.16% strongly agreed. Meanwhile, 6.73% disagreed. These suggest that while a majority of respondents feel some level of preparedness, a considerable proportion remains uncertain about their ability to cope with climate-related challenges.

Table 4.3: Attitude towards climate change

Variable	Frequency (N=416)	Percentage (%)
Importance of Climate Change		
Very Important	277	66.59
Somewhat Important	110	26.44
Not Very Important	21	5.05
Not Important At All	8	1.92
Concern About Climate Change Affecting Business		
Very Concerned	133	31.97
Concerned	117	28.12
Somewhat Concerned	80	19.23
Not Concerned	86	20.67
Belief: Climate Change is Already Affecting My Business		
Agree	176	42.31
Disagree	106	25.48
Neutral	29	6.97
Strongly Agree	52	12.50
Strongly Disagree	53	12.74
Belief That Climate Change is Already Affecting the Community		
Yes	288	69.23
No	128	30.77
Perceived Threat of Climate Change		
Strongly Agree	73	17.55
Agree	162	38.94
Neutral	19	4.57
Disagree	89	21.39
Strongly Disagree	73	17.55
Belief in Individual Responsibility for Climate Change Mitigation		
Strongly Agree	154	37.02
Agree	242	58.17
Neutral	15	3.61

Disagree	2	0.48
Strongly Disagree	3	0.72
Perceived Role of Government in Addressing Climate Change		
Strongly Agree	311	74.76
Agree	96	23.08
Neutral	5	1.20
Disagree	3	0.72
Strongly Disagree	1	0.24
Belief in Personal Influence Over Climate Change		
Strongly agree	69	16.59
Agree	284	68.27
Neutral	48	11.54
Disagree	11	2.64
Strongly Disagree	4	0.96
Self-Assessed Understanding of Climate Change		
Strongly Agree	13	3.12
Agree	228	54.81
Neutral	117	28.12
Disagree	52	12.50
Strongly Disagree	6	1.44
Perception: Climate Change is a Problem for Future Generations		
Agree	158	37.98
Disagree	96	23.08
Neutral	13	3.12
Strongly Agree	88	21.15
Strongly Disagree	61	14.66
Overall Attitude Towards Climate Change		
Good Attitude	173	41.59
Poor Attitude	243	58.41

Source: Field Data, 2025.

4.5.1 Overall level of attitude towards climate change

The overall attitude assessment revealed that 58.41% of respondents demonstrated poor attitudes towards climate change, while 41.59% showed good attitudes. To quantify respondents9 attitudes toward climate change, an overall attitude score was computed and categorized into two levels: Good Attitude and Poor Attitude**.** This was measured by adding all responses and determining the mean score between responses given per the knowledge assessment (Good knowledge is scored as ≥2.21, Poor knowledge is a score of <2.21). Figure 4.3 below represents the levels of attitude among respondents regarding climate change.

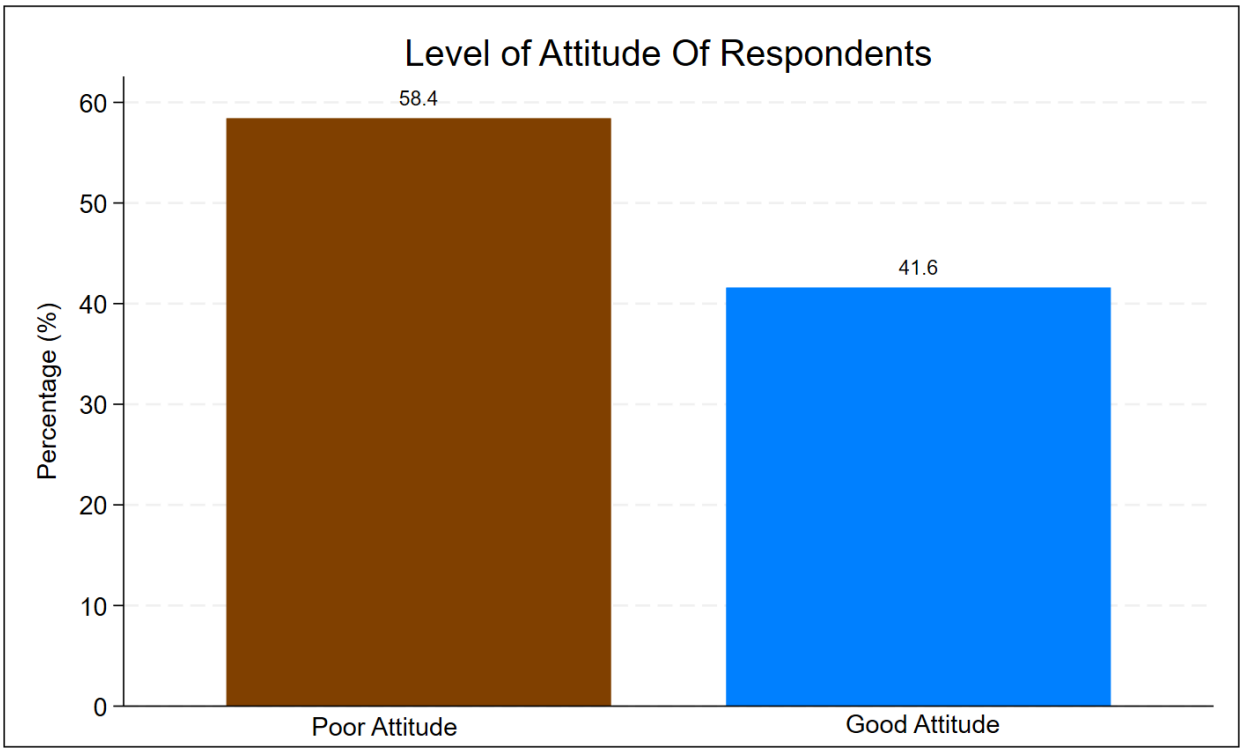

Figure 4.3: Respondents Attitudinal levels

4.6 Practices of respondents towards climate change

The study identified several key adaptation measures adopted by the market women. Table 4.4 reveals that 57.93% of respondents had taken steps to adapt their trading practices in response to climate change. Among those who adopted adaptation measures, 44.47% adjusted their trading hours or days to avoid extreme weather conditions, 43.75% used protective coverings such as tarps or canopies for their goods, and 40.62% changed the location of their stalls. However, more substantial adaptations, such as diversifying the types of goods sold (15.87%) or investing in improved storage infrastructure (23.32%), were less common, likely due to financial constraints, as evidenced by the strong statistical association between financial barriers and adaptation practices ($\chi 2 = 38.86$, $p < 0.001$ for storage infrastructure).

The study further explored whether respondents engaged in environmentally friendly business practices. A majority (62.98%) reported adopting at least one eco-friendly practice, while 37.02% did not engage in any such practices. The most common environmentally friendly actions included proper waste disposal (96.54% of those who engaged in eco-friendly practices) Additionally, 41.15% of respondents reported reducing their use of non-biodegradable items, and 82.31% utilized energy-efficient equipment such as LED lighting. However, participation in other eco-friendly initiatives remained low, with only 1.54% reporting engagement in additional sustainable business practices beyond those listed.

In terms of engagement in environmentally friendly business practices, majority of respondents (62.98%) reported adopting environmentally friendly business practices, while 37.02% had not implemented any such measures. The most common environmentally friendly practices included proper waste disposal (reported by 88% of respondents) and energy-efficient equipment (60.3%), Very few respondents reported additional practices including clean-up exercise.

When asked to assess the effectiveness of their adaptation strategies, 32.21% of respondents considered them somewhat effective, while 29.57% rated them as very effective. However, 23.80% of respondents were unsure of the effectiveness of their measures, 6.49% found them not very effective, and 7.93% considered them ineffective.

Despite these adaptation efforts, several barriers hinder respondents from fully implementing climate change adaptation measures. The most commonly reported barrier was a lack of information or knowledge, affecting 87.50% of respondents. Additionally, 78.61% cited inadequate government or local authority support as a significant obstacle. Limited financial resources or access to credit was also a major challenge, affecting 59.38% of respondents. Other notable barriers included lack of access to improved technology and infrastructure (55.53%), inadequate government or local authority support **(**78.61%**),** and limited community or market support (43.27%).

Table 4.4: Climate change adaptation practices

Variable	Category	Frequency (N=416)	Percentage (%)
Taken Steps to Adjust Trading Practices In Response To Climate Change			
Yes		241	57.93
No		175	42.07
Types of Adaptation Strategies Used			
Adjusting trading hours/days		185	44.47
Using protective coverings (tarps, canopies)		182	43.75
Changing stall location		169	40.62
Diversifying types of goods sold		66	15.87
Investing in improved storage/infrastructure		97	23.32

Barriers to Climate Change Adaptation		
Lack of information/knowledge	364	87.50
Limited financial resources/credit	247	59.38
Inadequate support from government/local authorities	327	78.61
Lack of access to improved technology/infrastructure	231	55.53
Limited community/market support	180	43.27
Perceived Effectiveness of Adaptation Measures and Eco-Friendly Practices		
Not effective at all	33	7.93
Not sure	99	23.80
Not very effective	27	6.49
Somewhat effective	134	32.21
Very effective	123	29.57
Overall Practice Level		
Good Practice	284	68.27
Poor Practice	132	31.73

Source: Field Data, 2025.

4.6.1 Overall Level of Practice Towards Climate Change

Overall, 68.27% of respondents demonstrated good practices towards climate change adaptation, while 31.73% showed poor practice levels. Figure 4.4 below represents the levels of attitude among respondents regarding climate change

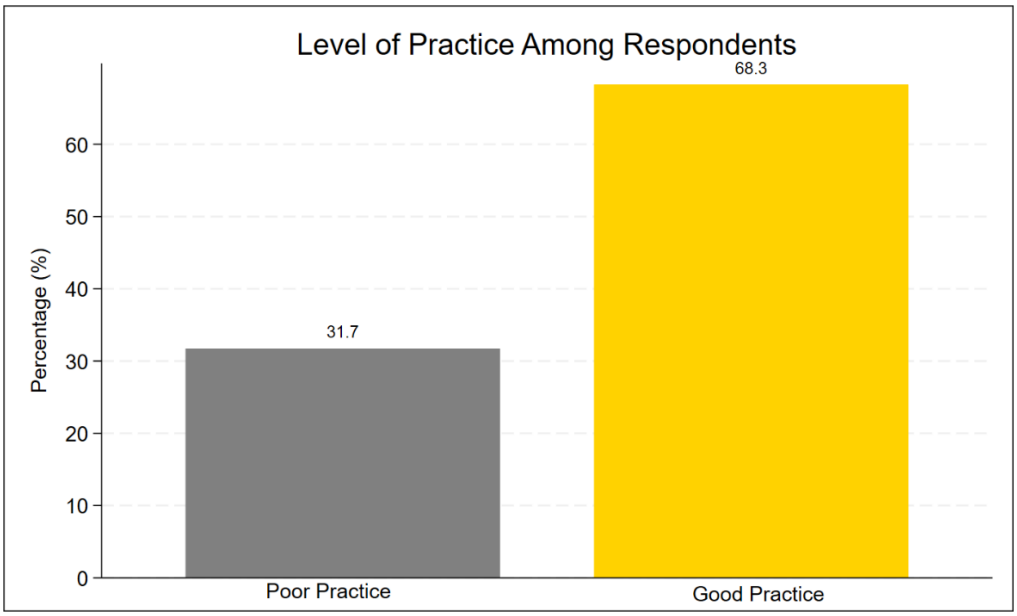

Figure 4.4: Respondents level of practice

4.7 Bivariate analysis of knowledge of climate change among respondents (Sociodemographic characteristics)

Age demonstrated a significant association with climate change knowledge ($\chi^2 = 30.43$, $p < 0.001$). The analysis revealed a declining trend in good knowledge levels as age increased. Younger age groups showed higher proportions of good knowledge, with 59.38% of those aged 18-24 years and 57.61% of those aged 25-34 years demonstrating good knowledge. This proportion decreased substantially in older age groups, with only 31.03% of those aged 45-54 years and 26.32% of those aged 55-64 years showing good knowledge. Notably, none of the respondents aged 65 years and above demonstrated good knowledge of climate change. This suggests that younger market women may have greater exposure to climate change information, possibly due to increased media consumption or formal education.

Educational level showed the strongest association with climate change knowledge ($\chi^2 = 59.60$, $p < 0.001$). A clear gradient was observed, with higher education levels associated with better knowledge. Among those with tertiary education, 67.39% demonstrated good knowledge,

followed by 57.63% of those with Senior High School education. In contrast, only 12.50% of those with no formal education and 17.24% of those with primary education showed good knowledge of climate change.

Years of market trading experience also showed a significant association ($\chi^2 = 21.46$, $p < 0.001$). Interestingly, traders with moderate experience (6-10 years) showed the highest proportion of good knowledge (50.98%), followed by those with 1-5 years experience (47.83%). Those with more than 10 years of trading experience showed lower levels of good knowledge (25.40%), while those with less than 1 year of experience had 29.63% demonstrating good knowledge.

Marital status emerged as another significant factor ($\chi^2 = 14.04$, $p = 0.003$). Single respondents showed the highest proportion of good knowledge (57.83%), while divorced/separated (26.92%) and widowed (31.82%) respondents demonstrated lower levels of good knowledge. Married respondents showed intermediate levels, with 37.54% demonstrating good knowledge.

Household size did not show a statistically significant relationship with climate change knowledge ($\chi^2 = 2.79$, $p = 0.247$). However, a slight trend was observed where respondents from smaller households exhibited higher knowledge levels (47.76%) compared to those from medium (41.55%) and large households (35.92%).

Similarly, the type of trading setup also showed some variation in climate change knowledge ($\chi^2 = 9.77$, $p = 0.082$), though the association was not statistically significant. Market women operating multiple stalls exhibited the highest knowledge levels (58.82%), followed by mobile vendors (57.14%). Respondents with permanent stalls (38.07%) and temporary stalls (39.34%) had lower knowledge levels. These differences may be linked to varying levels of mobility and exposure to diverse sources of climate change information.

A logistic regression model incorporating these sociodemographic factors revealed that education level was positively associated with climate change knowledge (OR = 1.40, $p < 0.001$), while years of trading experience was negatively associated (OR = 0.69, $p < 0.001$). Household size showed a marginally positive association (OR = 1.09, $p = 0.068$). These findings suggest that formal education plays a necessary role in climate change awareness and understanding among market women, while longer trading experience may be associated with less exposure to climate change information.

Table 4.5: Bivariate analysis of knowledge of climate change and sociodemographic characteristics

Variable	Knowledge Level (N=416)		χ^2 (p-value)
	Poor Knowledge (N, %)	Good Knowledge (N, %)	
Age Groups (years)			
18324 years	13 (40.63)	19 (59.38)	30.43 (0.000)
25334 years	39 (42.39)	53 (57.61)	
35344 years	65 (58.56)	46 (41.44)	
45354 years	80 (68.97)	36 (31.03)	
55364 years	42 (73.68)	15 (26.32)	
65+ years	8 (100.00)	0 (0.00)	
Level of Education			
No Formal Education	49 (87.50)	7 (12.50)	
Junior High	85 (61.59)	53 (38.41)	
Primary	48 (82.76)	10 (17.24)	
Senior High	50 (42.37)	68 (57.63)	59.60 (0.000)

Tertiary	15 (32.61)	31 (67.39)	
Years of Market Trading			
1 – 5 years	84 (52.17)	77 (47.83)	21.46 (0.000)
6 – 10 years	50 (49.02)	52 (50.98)	
Less than 1 year	19 (70.37)	8 (29.63)	
More than 10 years	94 (74.60)	32 (25.40)	
Marital Status			
Divorced	19 (73.08)	7 (26.92)	14.04 (0.003**)**
Married	178 (62.46)	107 (37.54)	
Single	35 (42.17)	48 (57.83)	
Widowed	15 (68.18)	7 (31.82)	
Household Size			
Small (1–2)	35 (52.24)	32 (47.76)	2.79 (0.247)
Medium (3–5)	121 (58.45)	86 (41.55)	
Large (6+)	91 (64.08)	51 (35.92)	
Trading Setup			
Hawker	48 (65.75)	25 (34.25)	9.77 (0.082**)**
Mobile Stall	12 (42.86)	16 (57.14)	
Multiple Stalls	14 (41.18)	20 (58.82)	
Other	1 (50.00)	1 (50.00)	
Permanent Stall	135 (61.93)	83 (38.07)	
Temporary Stall	37 (60.66)	24 (39.34)	

Source: Field Data, 2025.

4.8 Bivariate analysis of the awareness of climate change among respondents (Sociodemographic characteristics)

The bivariate analysis revealed significant associations between several sociodemographic characteristics and awareness of climate change among market women. Education level showed a strong significant association with climate change awareness ($\chi 2 = 160.35$, $p < 0.001$). The data revealed a clear positive relationship between educational attainment and climate change awareness. Market women with tertiary education demonstrated the highest awareness (97.83%), followed by those with senior high school education (92.37%) and junior high school education (86.23%). In contrast, those with no formal education showed markedly lower awareness levels (26.79%).

Years of market trading experience also showed a significant association with climate change awareness ($\chi^2 = 114.17$, $p < 0.001$). Interestingly, traders with fewer years of experience demonstrated higher awareness levels. Among those with 1-5 years of experience, 90.06% were aware of climate change, similar to those with 6-10 years (87.25%) and less than 1 year (88.89%) of experience. However, awareness dropped significantly among those with more than 10 years of trading experience (38.89%).

The analysis also revealed a significant association between climate change awareness and business concern levels ($\chi 2 = 33.09$, $p < 0.001$). Among those aware of climate change, there was a more even distribution across concern levels: 22.8% were concerned, 24.8% were not concerned, 23.1% were somewhat concerned, and 29.3% were very concerned. In contrast, among those unaware of climate change, the distribution was more skewed, with 43.1% being concerned and 39.4% being very concerned.

Age demonstrated a strong significant association with climate change awareness ($\chi^2 = 33.27$, $p < 0.001$). Younger market women showed notably higher awareness levels, with 90.63% of those

aged 18-24 years and 86.96% of those aged 25-34 years being aware of climate change. In contrast, awareness decreased with age, dropping to 66.38% among those aged 45-54 years and reaching its lowest level of 12.50% among those aged 65 years and above.

The type of trading setup also showed no significant association with climate change awareness ($\chi^2 = 9.77$, $p = 0.082$), indicating that the physical structure or arrangement of trading activities did not significantly influence awareness levels among the market women. Similarly, marital status showed no significant association with climate change awareness ($\chi^2 = 4.34$, $p = 0.227$), suggesting that marital status did not substantially influence awareness levels among the market women. Similarly, household size did not demonstrate a significant relationship with climate change awareness ($\chi^2 = 2.79$, $p = 0.247$).

This analysis also used logistic regression to further examine these relationships, controlling for multiple variables simultaneously. The results confirmed education level as a significant predictor of climate change knowledge (OR = 1.40, 95% CI: 1.21-1.62, $p < 0.001$), while years of trading experience showed a negative association (OR = 0.69, 95% CI: 0.58-0.83, $p < 0.001$).

Table 4.6: Bivariate analysis of awareness of climate change and sociodemographic characteristics

Variable	Awareness of Climate Change (N=416)		χ^2 (p-value)
	No (N, %)	Yes (N, %)	
Groups (years)			33.27 (0.000)
18–24 years	3 (9.38)	29 (90.63)	
25–34 years	12 (13.04)	80 (86.96)	
35–44 years	29 (26.13)	82 (73.87)	
45–54 years	39 (33.62)	77 (66.38)	
55–64 years	19 (33.33)	38 (66.67)	
65+ years	7 (87.50)	1 (12.50)	
Level of Education			160.35 (0.000)
Junior High	19 (13.77)	119 (86.23)	
No Formal Education	41 (73.21)	15 (26.79)	
Primary	39 (67.24)	19 (32.76)	
Senior High	9 (7.63)	109 (92.37)	
Tertiary	1 (2.17)	45 (97.83)	
Years of Trading			114.17 (0.000)
1 3 5 years	16 (9.94)	145 (90.06)	
6 3 10 years	13 (12.75)	89 (87.25)	
Less than 1 year	3 (11.11)	24 (88.89)	
More than 10 years	77 (61.11)	49 (38.89)	
Marital Status			4.34 (0.227)
Divorced	9 (34.62)	17 (65.38)	

Married	73 (25.61)	212 (74.39)	
Single	18 (21.69)	65 (78.31)	
Widowed	9 (40.91)	13 (59.09)	
Household Size			
Small (132)	35 (52.24)	32 (47.76)	2.79 (0.247)
Medium (335)	121 (58.45)	86 (41.55)	
Large (6+)	91 (64.08)	51 (35.92)	
Trading Setup			
Hawker	48 (65.75)	25 (34.25)	9.77 (0.082)
Mobile Stall	12 (42.86)	16 (57.14)	
Multiple Stalls	14 (41.18)	20 (58.82)	
Other	1 (50.00)	1 (50.00)	
Permanent Stall	135 (61.93)	83 (38.07)	
Temporary Stall	37 (60.66)	24 (39.34)	

Source: Field Data, 2025.

4.9 Bivariate analysis of levels of attitude toward climate change among respondents (sociodemographic characteristics)

The bivariate analysis revealed several significant associations between sociodemographic characteristics and attitudes toward climate change among market women in the Agona West Municipality. Age demonstrated a significant relationship with climate change attitudes (χ^2 = 11.73, p = 0.039). Respondents aged 65 years and above exhibited the highest proportion of positive attitudes (75.00%), followed by those aged 55364 years (49.12%). Conversely, younger respondents, particularly those aged 35344 years (35.14%) and 25334 years (38.04%), had

comparatively lower levels of positive attitudes. This suggests that older respondents may be more inclined to acknowledge the seriousness of climate change, possibly due to their direct experiences with environmental changes over time.

Level of Education significantly associated with attitudes toward climate change ($\chi^2 = 160.35$, $p = 0.000$). Respondents with tertiary education exhibited the highest level of positive attitudes (97.83%), followed by those with senior high school (92.37%). Respondents with junior high school education (86.23%) also demonstrated a high level of positive attitudes. However, attitudes were considerably lower among those with only primary education (32.76%) and those with no formal education (26.79%).

Years of market trading experience was another significant predictor of climate change attitudes ($\chi^2 = 8.48$, $p = 0.037$). Respondents with fewer years of trading experience exhibited higher levels of positive attitudes, with 48.45% of those trading for 135 years demonstrating a positive attitude. However, the proportion of respondents with positive attitudes declined among those trading for 6310 years (30.39%) and those with more than 10 years of trading experience (41.27%).

Marital status did not exhibit a statistically significant association with attitudes toward climate change ($\chi^2 = 0.19$, $p = 0.980$). However, slight variations were observed, with single respondents (42.17%) and divorced respondents (42.31%) exhibiting slightly more positive attitudes compared to married (40.95%) and widowed respondents (45.45%). This suggests that while marital status may not be a strong determinant of climate change attitudes, personal circumstances could still influence perceptions.

Household size did not show a statistically significant relationship with climate change attitudes ($\chi^2 = 1.76$, $p = 0.415$). However, respondents from smaller households (41.79%) exhibited slightly

higher levels of positive attitudes compared to those from medium-sized (44.44%) and larger households (37.32%).

Monthly income levels were also examined, though no statistically significant relationship was found ($\chi^2 = 3.66$, $p = 0.454$). However, respondents earning GH₵3,000 or more exhibited the highest proportion of positive attitudes (50.79%), followed by those earning less than GH₵200 (60.00%). The lowest levels of positive attitudes were observed among those earning between GH₵5003GH₵999 (39.60%) and GH₵2003GH₵499 (38.33%). Additionally, the type of trading setup also did not show a statistically significant association with climate change attitudes ($\chi^2 = 6.83$, $p = 0.233$). However, respondents operating mobile stalls exhibited slightly higher levels of positive attitudes (60.71%) compared to those with permanent stalls (38.07%) or temporary stalls (42.62%).

Table 4.7: Bivariate analysis of attitudes towards climate change and sociodemographic characteristics

Variable	**Good Attitude Towards Climate Change N =(416)**		**χ^2 (p-value)**
	No (N, %)	**Yes (N, %)**	
Age Groups (years)			11.73 (0.039)
18324 years	13 (40.63)	19 (59.38)	
25334 years	57 (61.96)	35 (38.04)	
35344 years	72 (64.86)	39 (35.14)	
45354 years	70 (60.34)	46 (39.66)	
55364 years	29 (50.88)	28 (49.12)	
65+ years	2 (25.00)	6 (75.00)	

Level of Education			160.35 (0.000)
Junior High	19 (13.77)	119 (86.23)	
No Formal Education	41 (73.21)	15 (26.79)	
Primary	39 (67.24)	19 (32.76)	
Senior High	9 (7.63)	109 (92.37)	
Tertiary	1 (2.17)	45 (97.83)	
Years of Market Trading			8.48 (0.037)
1 3 5 years	83 (51.55)	78 (48.45)	
6 3 10 years	71 (69.61)	31 (30.39)	
Less than 1 year	15 (55.56)	12 (44.44)	
More than 10 years	74 (58.73)	52 (41.27)	
Marital Status			0.19 (0.980)
Divorced	15 (57.69)	11 (42.31)	
Married	168 (59.05)	117 (40.95)	
Single	48 (57.83)	35 (42.17)	
Widowed	12 (54.55)	10 (45.45)	
Household Size			
Small (1-2)	39 (58.21)	28 (41.79)	1.76 (0.415)
Medium (3-5)	115 (55.56)	92 (44.44)	
Large (6+)	89 (62.68)	53 (37.32)	
Monthly Income (GHC)			3.66 (0.454)

GH₵1,000+	46 (58.23)	33 (41.77)	
GH₵200 3 499	74 (61.67)	46 (38.33)	
GH₵3,000+	31 (49.21)	32 (50.79)	
GH₵500 3 999	90 (60.40)	59 (39.60)	
Less than GH₵200	2 (40.00)	3 (60.00)	
Trading Setup			
Hawker	34 (46.58)	39 (53.42)	6.83 (0.233)
Mobile Stall	17 (60.71)	11 (39.29)	
Multiple Stalls	20 (58.82)	14 (41.18)	
Other Setup	2 (100.00)	0 (0.00)	
Permanent Stall	135 (61.93)	83 (38.07)	
Temporary Stall	35 (57.38)	26 (42.62)	

Source: Field Data, 2025.

4.10 Bivariate analysis of levels of practice of climate change among respondents on knowledge, attitude, and covariates (sociodemographic characteristics)

The bivariate analysis revealed several significant associations between climate change practices and various sociodemographic factors among market women in the Agona West Municipality. Age showed a significant association with climate change practices ($\chi^2 = 20.16$, $p = 0.001$). The highest level of good practices was observed among market women aged 25-34 years (79.35%), while those aged 65 years and above demonstrated the lowest level of good practices (12.50%).

Educational level exhibited a significant relationship with climate change practices ($\chi^2 = 14.71$, $p = 0.005$). Market women with tertiary education showed the highest proportion of good practices

(78.26%), followed by those with senior high school education (74.58%). Those with no formal education demonstrated the lowest proportion of good practices (48.21%), indicating that higher educational attainment generally corresponded with better climate change practices.

Marital status was significantly associated with climate change practices ($\chi^2 = 12.12$, $p = 0.007$). Single market women showed a higher proportion of good practices (74.70%) compared to married women (69.12%), while widowed traders demonstrated the lowest proportion of good practices (36.36%).

Household size also showed a significant association with climate change practices ($\chi^2 = 8.75$, $p = 0.013$). Market women from small households (1-2 members) demonstrated the highest proportion of good practices (80.60%), followed by those from medium-sized households (69.57%), while those from large households (6+ members) showed the lowest proportion (60.56%).

Notably, years of market trading experience did not show a statistically significant association with climate change practices ($\chi^2 = 3.40$, $p = 0.334$). Similarly, trading setup ($\chi^2 = 7.55$, $p = 0.183$) and monthly income ($\chi^2 = 6.60$, $p = 0.159$) did not demonstrate significant associations with climate change practices among the market women.

Table 4.8: Bivariate analysis of climate change practices and sociodemographic characteristics

Variable	Practices Towards Climate Change (N=416)		χ^2 (p-value)
	No (N, %)	Yes (N, %)	
Age Groups (years)			**20.16 (0.001)**
18324 years	15 (46.88)	17 (53.12)	
25334 years	19 (20.65)	73 (79.35)	
35344 years	35 (31.53)	76 (68.47)	
45354 years	37 (31.90)	79 (68.10)	
55364 years	19 (33.33)	38 (66.67)	
65+ years	7 (87.50)	1 (12.50)	
Level of Education			**14.71 (0.005)**
Junior High	44 (31.88)	94 (68.12)	
No Formal Education	29 (51.79)	27 (48.21)	
Primary	19 (32.76)	39 (67.24)	
Senior High	30 (25.42)	88 (74.58)	
Tertiary	10 (21.74)	36 (78.26)	
Years of Market Trading			**3.40 (0.334)**
1 3 5 years	47 (29.19)	114 (70.81)	
6 3 10 years	29 (28.43)	73 (71.57)	
Less than 1 year	8 (29.63)	19 (70.37)	
More than 10 years	48 (38.10)	78 (61.90)	
Marital Status			**12.12 (0.007)**
Divorced	9 (34.62)	17 (65.38)	

Married	88 (30.88)	197 (69.12)	
Single	21 (25.30)	62 (74.70)	
Widowed	14 (63.64)	8 (36.36)	
Household Size			**8.75 (0.013)**
Small (1-2)	13 (19.40)	54 (80.60)	
Medium (3-5)	63 (30.43)	144 (69.57)	
Large (6+)	56 (39.44)	86 (60.56)	
Monthly Income (GHC)			**6.60 (0.159)**
GH₵1,000+	19 (24.05)	60 (75.95)	
GH₵200 3 499	48 (40.00)	72 (60.00)	
GH₵3,000+	18 (28.57)	45 (71.43)	
GH₵500 3 999	46 (30.87)	103 (69.13)	
Less than GH₵200	1 (20.00)	4 (80.00)	
Trading Setup			**7.55 (0.183)**
Hawker	24 (32.88)	49 (67.12)	
Mobile Stall	5 (17.86)	23 (82.14)	
Multiple Stalls	13 (38.24)	21 (61.76)	
Other Setup	1 (50.00)	1 (50.00)	
Permanent Stall	76 (34.86)	142 (65.14)	
Temporary Stall	13 (21.31)	48 (78.69)	

Source: Field Data, 2025

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This chapter provides a comprehensive discussion of the findings presented in Chapter 4, focusing on the knowledge, attitudes, and practices (KAP) regarding climate change among market women in the Agona West Municipality. The discussion integrates the study's specific objectives with relevant literature to provide a broader perspective on the implications of the results.

5.2 Knowledge and Awareness of Climate Change

The study revealed that a majority (73.80%) of market women have heard of climate change, suggesting a relatively high level of awareness. However, despite this awareness, the depth of knowledge was limited, with only 40.62% demonstrating good knowledge. These findings align with studies conducted in other developing regions, where awareness of climate change often exists, but detailed understanding of its causes and effects remains weak (Houser et al., 2019).

Educational attainment emerged as a significant predictor of climate change knowledge. Market women with higher education levels, particularly those with tertiary education, exhibited the highest levels of knowledge, whereas those with no formal education demonstrated the lowest. This finding is consistent with studies showing that formal education enhances the ability to comprehend and retain climate-related information (Jorgenson et al., 2019).

Sources of information also played a key role in shaping knowledge. Traditional media, particularly radio and television, were the most cited sources of climate change information, whereas social media, newspapers, and community meetings had lower influence. Interestingly, government agencies were reported as a minimal source of information, suggesting a gap in formal

Climate Change education and outreach efforts targeted at traders. Similar studies in West Africa have highlighted the importance of improving government-led climate communication strategies to enhance public understanding (Etana et al., 2020; Tesfahun and Chawla 2020; Ahmed et al., 2021; Nalau and Verrall, 2021).

The misconceptions observed among respondents, such as the underestimation of factors like air conditioning and fertilizer use as contributors to climate change, suggest that knowledge dissemination efforts need to be more comprehensive. The limited recognition of agricultural-related climate change drivers indicates that market women may not fully understand the indirect but significant link between farming practices and climate change (Simane et al., 2016; Asare-Nuamah and Botchway, 2019).

5.3 Attitude Towards Climate Change

The study found that a majority of market women perceived climate change as an important issue, with 66.59% rating it as "very important" and 31.97% expressing concern about its impact on their businesses. However, despite this concern, 58.41% of respondents exhibited poor attitudes towards climate change, suggesting a disconnect between awareness and proactive engagement.

The perception that climate change is a distant problem rather than an immediate threat was prevalent among respondents. While 69.23% agreed that climate change is already affecting their community, only 42.31% believed that it was directly affecting their businesses. This disparity indicates that although traders recognize broader environmental changes, they may not yet fully associate these changes with their daily economic activities. Similar findings have been observed in studies on climate risk perception among small-scale traders in Sub-Saharan Africa, where immediate financial concerns often take precedence over long-term environmental threats (Abid et al., 2016). Consequently, farmers are in a favorable position to offer first-hand observations,

while providing a deeper understanding of climate change manifestation, relevance, effects, and narratives

Beliefs about personal and collective responsibility towards climate change were strong. Most respondents (84.86%) believed that their individual actions could contribute to mitigating climate change, and an even larger proportion (95.19%) believed that society as a whole has a responsibility to act. However, despite this positive perception, a significant proportion of market women expected the government to take the lead in addressing climate issues, with 97.84% agreeing that proactive government action is necessary. This reflects the common expectation in many developing countries that environmental governance is primarily the responsibility of state institutions rather than individuals (de Matos et al., 2020; Talanow et al., 2021).

Sociodemographic factors significantly influenced attitudes towards climate change. Age was positively associated with good attitudes, with older respondents exhibiting stronger concern and willingness to act. This may be attributed to their longer exposure to environmental changes and first-hand experiences of climate-related disruptions. Additionally, higher education levels correlated with better attitudes, reinforcing the role of education in shaping climate-related perspectives.

5.4 Climate Change Adaptation Practices and Barriers

Adaptation practices among market women varied, with 57.93% of respondents reporting that they had taken measures to adjust their trading practices in response to climate change. Common strategies included adjusting trading hours (44.47%), using protective coverings for goods (43.75%), and changing stall locations (40.62%). However, more long-term adaptations, such as diversifying goods or investing in improved storage infrastructure, were less commonly practiced. These findings align with studies on informal sector adaptation, where financial constraints often

limit traders' ability to implement more sustainable, long-term strategies (Bayard et al., 2007; Olajide et al., 2011).

The study also identified significant barriers to climate change adaptation. A lack of information and knowledge emerged as the most cited barrier (87.50%), followed by inadequate financial resources (59.38%) and lack of government support (78.61%). These findings highlight structural challenges that impede climate resilience among market women. Previous studies have similarly noted that financial constraints and inadequate policy interventions are key limitations to climate adaptation in the informal sector (Satterthwaite et al., 2020; Dodman et al., 2022).

Despite the challenges, a substantial proportion (68.27%) of market women demonstrated good adaptation practices, indicating a willingness to engage in climate-responsive behaviours when feasible. This suggests that targeted interventions, such as capacity-building programs and access to financial support, could further enhance adaptive capacity among traders (Kuthe et al., 2019; Metag et al. , 2017).

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CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study assessed the knowledge, attitude, and adaptation practices of market women in the Agona West Municipality regarding climate change. The findings reveal that while the majority of market women (73.8%) had heard of climate change, only 40.62% demonstrated good knowledge of its causes and effects. Educational attainment and years of trading experience were significant predictors of climate change awareness. Attitudinal analysis showed that 58.41% of respondents exhibited poor attitudes, indicating a gap between awareness and proactive engagement in climate adaptation.

In terms of adaptation, 57.93% of respondents had taken measures to adjust their trading practices, but financial constraints (59.38%), inadequate government support (78.61%), and lack of climate- related information (87.5%) remained major barriers to effective adaptation. These findings underscore the urgent need for targeted interventions to enhance climate resilience among market women, who play a crucial role in food security and economic stability in Ghana.

6.2 Recommendations

Based on the study's findings, the following three key recommendations are proposed to improve climate change knowledge, attitudes, and adaptation practices in the various markets across the country.

1. **Strengthening Climate Change Education and Awareness Programs**

Given the significant knowledge gaps identified in this study, targeted climate education programs should be developed for market women. These programs should focus on increasing understanding of climate change causes, impacts, and adaptation strategies. The government, NGOs, and municipal authorities should collaborate to integrate climate education into community meetings, market associations, and local radio programs to ensure accessibility.

2. **Enhancing Access to Financial and Technological Resources**

Financial constraints emerged as a major barrier to adaptation. Government agencies, financial institutions, and development organizations should establish microfinance schemes and low-interest loans specifically designed for informal traders to invest in climate adaptation measures such as improved storage facilities and resilient infrastructure. Additionally, providing access to climate-smart technologies, such as weather forecasting tools, can help market women make informed decisions about their trade practices.

3. **Implementing Policy Support for Market Infrastructure Resilience**

Local authorities should prioritize investments in climate-resilient market infrastructure, including improved drainage systems, sheltered trading areas, and waste management solutions. Policies should also be formulated to integrate market traders into Ghana's National Adaptation Plan, ensuring that informal traders receive government support to enhance their resilience against climate-related disruptions.

By addressing these key areas, traders will be better equipped to mitigate climate risks, protect their livelihoods, and contribute to broader climate adaptation efforts in Ghana.

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APPENDICES

APPENDIX I: INFORMED CONSENT

CONSENT FORM (for adults or parents/guardians):

Introduction:

You are invited to participate in a research study conducted by Mr. Richard Roland Acquaah from Ensign Global University. The purpose of this study is to assess the knowledge, attitude, and practices regarding climate change and its environmental effects among market women in the Agona West Municipality, Ghana. Your participation is entirely voluntary, and you may withdraw at any time without any consequences.

Purpose of the Study:

The study aims to:

1. Evaluate the level of knowledge and awareness of climate change, its causes, and environmental effects among market women in the Agona West Municipality.
2. Examine market women's attitudes and risk perceptions towards climate change impacts on their trading activities and livelihoods.
3. Identify current adaptation practices and barriers to climate change response among market women in the Agona West Municipality.

Procedures

If you agree to participate, you will be asked to complete a structured questionnaire administered by a trained interviewer. The questionnaire will cover topics such as your understanding of climate change, its perceived impact on your business, and any adaptation strategies you employ. The

interview will take approximately 30 minutes and will be conducted at a time and place convenient for you within the market premises.

Potential Risks and Discomforts

There are no anticipated risks or discomforts associated with participating in this study. However, if any question makes you uncomfortable, you may choose not to answer it or terminate the interview at any point.

Potential Benefits

While there may be no direct benefits to you, your participation will contribute to a better understanding of how climate change affects market women. This information may inform policies and programs aimed at supporting traders like you in adapting to environmental changes.

Confidentiality

All information collected will be kept strictly confidential. Your responses will be anonymized, and no personally identifiable information will be linked to your data. The data will be stored securely for a duration of five (5) years and accessible only to the research team. Findings from the study will be reported in aggregate form, ensuring that individual participants cannot be identified.

Voluntary Participation and Withdrawal

Your participation is voluntary. You have the right to refuse to participate or withdraw from the study at any time without any penalty or loss of benefits to which you are otherwise entitled.

Compensation

There is no monetary compensation for participating in this study. However, your contribution is valuable and appreciated.

Questions and Contacts:

If you have any question about the study, please contact:

Principal Researcher:

Richard Roland Acquaah

Ensign Global University, Kpong

Eastern Region, Ghana

richard.acquaah@st.ensign.edu.gh

0541150671

This research has been reviewed and approved by Institutional Review Board of Ensign Global University, Kpong. If you have any question about your rights as a research participant, you can contact the IRB Office of the school between the hours of 8:00 am-5:00pm through the office mobile phone: 0245762229 or through the school9s email address: registrar@ensign.edu.gh

Statement of Consent:

I have read the above information, and have received answers to all the questions I asked. I consent to participate in this study.

Participant's Name: _____Date: _____

Participant's Signature: _____

Researcher Signature: _____Date: _____

APPENDIX II: SURVEY QUESTIONNAIRE

KNOWLEDGE, ATTITUDE, AND PRACTICES REGARDING CLIMATE CHANGE AMONG MARKET WOMEN IN THE AGONA WEST MUNICIPALITY, GHANA

Participant ID: …… Date: …/…/….

Introduction & Consent:

Hello. You are invited to participate in a survey designed to assess your knowledge, attitudes, and practices regarding climate change and its effects on the environment and your trading activities. Your responses are completely confidential and will be used solely for research purposes. Participation is entirely voluntary, and you may skip any question that makes you uncomfortable. The survey should take approximately 25-30 minutes. By proceeding, you are giving your informed consent to participate. Thank you for your time and cooperation.

SECTION 1: DEMOGRAPHIC & BACKGROUND INFORMATION

Age: (Please select the appropriate range) (Select one)

- 18 3 24 years
- 25 3 34 years
- 35 3 44 years
- 45 3 54 years
- 55 years and above

Marital Status (Select one)

- Single
- Married
- Divorced / Separated
- Widowed

Level of Education (Select one)

- No formal education
- Primary education
- Junior High School
- Senior High School
- Tertiary education (certificate/diploma, degree, etc.)

How long have you been engaged in market trading? (Select one)

- Less than 1 year
- 1 3 5 years
- 6 3 10 years
- More than 10 years

What best describes your trading setup? (Type of Market Stall) (Select one)

- Permanent shop/stall/booth
- Temporary stall
- Mobile vendor
- Multiple locations
- Hawker
- Other

Kindly specify other: _____

Type of structure: (Select one)

- Open air
- Covered market
- Both

Types of Goods Sold (Select all that apply) (Multiple response)

- Fresh produce (fruits, vegetables, etc.)
- Fish/seafood
- Meat/poultry
- Grains/cereals
- Processed foods
- Clothing and accessories
- Household items
- Other

Kindly specify other: _____

Average monthly income from trading: (Select one)

- Less than GH₵200
- GH₵200 3 GH₵499
- GH₵500 3 GH₵999
- GH₵1,000 3 GH₵2,999
- GH₵3,000 or more

Do you have other sources of income? (Select one)

○ Yes

○ No

If yes, please specify: _____

Distance from home to market (km): (Select one)

○ Less than 1 km
○ 1 - 5 km
○ 6 - 10 km
○ 11 - 20 km
○ More than 20 km

Main mode of transport to market: (Select one)

○ Walking
○ Public transport
○ Private vehicle
○ Other

Kindly specify other: _____

Household Size: _____

SECTION 2: KNOWLEDGE ABOUT CLIMATE CHANGE

Have you heard of the term "climate change"? (Select one)

○ Yes
○ No

When did you first hear about climate change? (Select one)

- Within last year
- 1-5 years ago
- 6-10 years ago
- More than 10 years ago
- Can't remember

What do you believe are the causes of climate change? (Select all that apply) (Multiple response)

- Deforestation (cutting down trees)
- Burning of fossil fuels (coal, oil, gas)
- Industrial pollution
- Burning of refuse
- Bush burning
- Vehicle emissions
- Improper waste disposal
- Use of fertilizers
- Air conditioning
- Population growth
- Natural weather variations
- Other

Kindly specify other: _____

Which of the following effects do you associate with climate change? (Select all that apply) (Multiple response)

- Rising temperatures
- Erratic or unpredictable rainfall
- Flooding
- Drought
- More intense storms/hurricanes
- Changes in crop yields
- Reduced water quality/availability

Have you noticed any of the above changes in the local weather patterns or environment in your area over the past 5-10 years? (Select one)

- Yes
- No

If yes, which of the following changes you have observed? (Select all that apply) (Multiple response)

- Rising temperatures
- Erratic or unpredictable rainfall
- Flooding
- Drought
- More intense storms/hurricanes
- Changes in crop yields
- Reduced water quality/availability
- Other

Kindly specify other: _____

Where have you obtained your information about climate change? (Select all that apply) (Multiple response)

- Radio
- Television
- Newspapers or magazines
- Social media (e.g., Facebook, WhatsApp)
- Community meetings/local gatherings
- Information from government agencies
- Friends, family, or neighbors
- Religious institutions
- Traditional authorities
- School/Formal Education
- Other

Kindly specify other: _____

Which of the following sources do you trust the most for accurate information on climate change? (Select one)

- Radio
- Television
- Community leaders
- Government agencies
- Friends and family
- Other

Kindly specify other: _____

How often do you receive information related to climate change? (Select one)

- Often
- Sometimes
- Rarely
- Never

How reliable do you consider the information on climate change that you receive? (Select one)

- Very reliable
- Somewhat reliable
- Not reliable
- Not sure

Would you be interested in receiving more information or participating in training sessions on climate change adaptation and environmental management? (Select one)

- Yes
- No
- Maybe

SECTION 3: ATTITUDES TOWARD CLIMATE CHANGE

How important is the issue of climate change to you personally? (Select one)

- Very important
- Somewhat important
- Not very important
- Not at all important

How concerned are you that climate change will affect your trading business or livelihood? (Select one)

- Very concerned
- Concerned
- Somewhat concerned
- Not concerned

Do you believe that climate change is already affecting your community? (Select one)

- Yes
- No

Please indicate your level of agreement with the following statements using a 5-point scale (1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree)

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Climate change poses a significant threat to my business and the community.	1	2	3	4	5
I feel that my actions (e.g., recycling, conserving energy) can help reduce climate change.	1	2	3	4	5
The government should take more proactive measures to address the impacts of climate change.	1	2	3	4	5
Climate change is a problem for future generations more than for me.	1	2	3	4	5

Climate change is already affecting my business.	1	2	3	4	5
I am worried about climate change impacts on my family.	1	2	3	4	5
I feel prepared to deal with climate change impacts.	1	2	3	4	5
Everyone has a responsibility to act on climate change.	1	2	3	4	5
I understand enough about climate change.	1	2	3	4	5
Climate change information is easily available.	1	2	3	4	5

How likely do you think it is that you or someone in your family will be affected by extreme weather events (e.g., floods, storms, droughts) in the next 5 years? (Select one)

- Very likely
- Likely
- Uncertain
- Unlikely
- Very unlikely

Which climate impacts worry you most? Rank your top 3 in order of priority (1 = most worried). (Ranking)

1st choice

- Extreme heat
- Drought
- Market infrastructure damage
- Heavy Rainfall
- Storms
- Transport disruption
- Flooding
- Product spoilage
- Health impacts

2nd choice

- Extreme heat
- Drought
- Market infrastructure damage

- Heavy Rainfall
- Storms
- Transport disruption
- Flooding
- Product spoilage
- Health impacts

3rd choice

- Extreme heat
- Drought
- Market infrastructure damage
- Heavy Rainfall
- Storms
- Transport disruption
- Flooding
- Product spoilage
- Health impacts

SECTION 4: PRACTICES & ADAPTATION STRATEGIES

Have you taken any steps to adjust your trading practices in response to changes in weather patterns or climate-related events? (Select one)

- Yes
- No

If yes, what specific adaptation measures have you adopted? (Select all that apply) (Multiple response)

- Adjusting trading hours or days to avoid extreme weather
- Using protective coverings (tarps, canopies) for goods
- Changing the location of your stall (e.g., moving goods indoors during heavy rain)
- Diversifying the types of goods sold to include items less affected by weather
- Investing in improved storage or infrastructure (e.g., waterproof storage)
- Other

Kindly specify other: _____

Do you engage in any environmentally friendly practices as part of your business operations? (Select one)

- Yes
- No

If yes, please indicate which practices you employ (Select all that apply) (Multiple response)

- Proper waste disposal
- Recycling materials
- Reducing use of non-biodegradable items
- Using energy-efficient equipment (e.g., LED lights)
- Other

Kindly specify other: _____

How effective do you feel your adaptation measures and environmentally friendly practices are in reducing the negative impacts of climate change on your business? (Select one)

- Very effective
- Somewhat effective
- Not very effective
- Not effective at all
- Not sure

SECTION 5: BARRIERS TO ADAPTATION & SUPPORT NEEDS

What challenges or barriers do you face in adopting adaptation measures for climate change? (Select all that apply) (Multiple response)

- Lack of sufficient information/knowledge about climate change
- Limited financial resources or credit
- Inadequate support from government or local authorities
- Lack of access to improved technology/infrastructure
- Limited community or market support
- Other

Kindly specify other: _____

Which of the following supports would help you better adapt to the impacts of climate change? (Select all that apply) (Multiple response)

- Training or workshops on climate change adaptation
- Financial assistance or microcredit schemes
- Access to timely and reliable weather information
- Improved market infrastructure (e.g., better stalls, storage facilities)
- Stronger government policies and programs targeting climate resilience
- Community support initiatives
- Other

Kindly specify other: _____

How accessible do you find information and resources regarding climate change adaptation in your community? (Select one)

- Very accessible
- Somewhat accessible
- Not very accessible
- Not accessible at all

What type of climate information would be most useful? (Select all that apply) (Multiple response)

- Daily weather forecasts
- Seasonal forecasts
- Extreme weather warnings
- Market-specific impacts
- Adaptation strategies
- Available support services
- Other

Kindly specify other: _____

When would you prefer to receive climate information? (Select one)

- Early morning
- Mid-day
- Evening
- Weekly
- Monthly
- Seasonal
- Other

Kindly specify other: _____

SECTION 6: IMPACT ON BUSINESS & LIVELIHOOD

Have you experienced any losses or disruptions in your business due to climate-related events (e.g., heavy rains, floods, storms, drought)? (Select one)

- Yes
- No
- Not sure

If yes, please indicate which events have impacted your business (Select all that apply) (Multiple response)

- Flooding

- Prolonged drought
- Heavy storms/strong winds
- Excessive heat
- Other

Kindly specify other: _____

Approximately how often have you experienced such disruptions in the past 5 years? (Select one)

- Frequently (more than 3 times a year)
- Occasionally (133 times a year)
- Rarely (once every few years)
- Never

Have you noticed any changes in customer behaviour or market demand that you believe are linked to changes in climate or weather patterns? (Select one)

- Yes
- No
- Not sure

If you have observed changes, which of the following have you noticed? (Select all that apply) (Multiple response)

- Changes in customer purchasing habits
- Seasonal fluctuations in demand
- Increased demand for climate-resilient products/services
- Decrease in foot traffic due to extreme weather events
- Other

Kindly specify other:

Thank you for taking the time to complete this survey. Your input is extremely valuable and will help us better understand and address the challenges posed by climate change for market women in the Agona West Municipality. Your responses will contribute to developing policies and support programs to build a more resilient community.