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URBAN HOUSEHOLD ADAPTIVE CAPACITY TO FLOODING IN ACCRA: ANALYSIS OF RISK TRANSFER

BY

MELISSA NANA ADJOA WUSUA FORSON (11358395)

This thesis/dissertation is submitted to the University of Ghana, Legon in partial fulfillment of the requirement for the award of **MPHIL IN GEOGRAPHY AND RESOURCE DEVELOPMENT DEGREE.**

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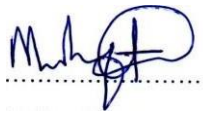
DECLARATION

I, **Melissa Nana Adjoa Wusua Forson**, declare that this dissertation is a result of my own research carried out at the Department of Geography and Resource Development, University of Ghana. All references cited in this research have been duly acknowledged.

I am solely responsible for any error that may be found in this research.



20/02/2025

Melissa Nana Adjoa Wusua Forson

(Student)

11358395

20/02/2025

Dr. Ebenezer Forkuo Amankwaa

(Supervisor)

20/02/2025

Dr. Kwabena Gyekye Awere

(Co-Supervisor)

DEDICATION

I dedicate this work to my family for their immense support, prayers and encouragement.

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ABSTRACT

Floods occur naturally, however human activities are responsible for the damage and losses experienced after flood events. To reduce vulnerability, households and communities must adopt adaptive strategies that will help them cope with the impacts of climate-related natural hazards, and insurance can play a critical role in this regard. This study assessed the perceptions of urban households on flood insurance in Accra, ascertained determinant factors for flood insurance for vulnerable households in Accra and examined how flood insurance can enhance the adaptive capacity of vulnerable residents in Accra. The purpose of the research was to expose the gaps and barriers to flood risk management in relation to risk transfer in Ghana. Household questionnaire interviews (120) and in-depth interviews with local government officials and the head of an insurance company were drawn on to collect and analyze data within the study area. Findings from the study revealed that Accra's urban residents had a generally low awareness and comprehension of flood insurance. A sizable fraction of respondents either did not know flood insurance products existed or did not completely comprehend their advantages. In relation to the factors impacting households' decisions to get flood insurance, the degree of knowledge regarding flood hazards and the perception of the affordability of insurance rates emerged as the most important. The study emphasized how flood insurance might greatly improve the ability of households in Accra that are at risk of flooding to adapt, however, significant efforts are required to raise awareness, lower insurance premiums, and foster trust between consumers and insurance companies for this potential to be achieved. These findings indicate the need for interventions such as; increase in awareness and education, policy interventions to reduce insurance costs, strengthen trust between households and insurance service providers, promote risk reduction measures and improve access to flood risk information.

CHAPTER 1

GENERAL INTRODUCTION

1.1 BACKGROUND OF STUDY

Flooding is one of the most significant hazards to human populations and a major obstacle to national development. Climate change and rapid urbanization exacerbate flood risks in flood-prone zones (Rentschler et al., 2024). When urbanization is not properly managed, it can lead to floodwater accumulation by modifying the land surface with structures like roads and pavements (Douglas et al.,2008). Heavy rainfall and storm surges lead to flooding in urban areas which could result in damage to physical assets, pollution of water sources and destruction to businesses and livelihoods (IPCC, 2014). According to the World Meteorological Organization (2020), flash floods make up about 85% of flooding cases and claim more than 5000 lives every year, securing its place among the world's deadliest disasters. Droughts, floods, avalanches heatwaves and windstorms pose significant threats to human well-being and natural systems, causing widespread damage, hardship, and loss of life. Nevertheless, adapting to climate change can greatly mitigate its catastrophic impacts (IPCC, 2001).

Adaptive capacity refers to the ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses so as to reduce the likelihood of the occurrence and/or the magnitude of harmful outcomes resulting from climate related hazards (Brooks and Adger, 2005). It is determined by economic and natural resources, social networks, entitlements, institutions and governance, human resources and technology (Adger et al., 2007).

To reduce the effects of flooding, strategies can be broadly classified into structural measures and non-structural measures. The following are considered structural measures: embankments, flood walls, flood levees, dams and reservoirs, natural detention basin, channel improvement, drainage improvement, diversion of flood water, afforestation and anti-erosion works (Islam et al., 2016). Examples of non-structural measures are: flood plain zoning, flood proofing, flood forecasting and warning, regulation of reservoirs and flood insurance (Islam et al., 2016). According to Jarzabkowski et al. (2019), a comprehensive approach to climate adaptation must consider both physical resilience and financial resilience, leveraging insurance as a key strategy for managing residual risks. Inadequate insurance leaves a significant financial gap, forcing individuals, governments, and humanitarian organizations to absorb the costs of disasters, which can have devastating economic and social consequences. The absence of resilience and adaptive capacity exacerbates vulnerability, making it more apparent and severe in the face of extreme changes (Cardona et al., 2012).

The United Nations General Assembly (2016), describes risk transfer as a mechanism for reallocating financial risks between parties, where one party receives resources from another in exchange for providing social and financial support to help cope with disaster-related losses. It comprises of insurance and reinsurance contracts, catastrophe bonds, contingent credit facilities and reserve funds. Previous studies have paid little attention to the use of risk transfer as an adaptive measure to climate-related disasters in Ghana (Jegede et al., 2020, Antwi-Bosiako, 2016). This study aims to analyse flood risk transfer as an urban household adaptive capacity to flooding in Accra to build the resilience of urban households.

1.2 RESEARCH PROBLEM

Floods occur naturally, however human activities are responsible for the damage and losses experienced after flood events. The number of people who lose their lives and property due to flooding keeps rising globally (Kundzewicz et al., 2013). Floods affect individuals and society and cause social, environmental and economic issues. Flooding can lead to health hazards such as cholera when sewage water mixes with fresh water and malaria due to the breeding of mosquitoes in stagnant floodwater (UNEP, 2022). Flooding has resulted in poor health, injuries and animal bites with the poor suffering the most (Codjoe et al., 2020; Mensah and Ahadzie, 2020).

In recent times, certain European countries; Germany, Belgium and The Netherlands encountered a severe flooding incident which occurred during the summer of 2021 which resulted in the death of over 180 people, the injury of 750 people and the massive destruction of buildings (Lehmkuhl et al., 2022). According to UNISDR (2015), floods claimed the lives of 3,300 people in India and Bangladesh in 2007; 2100 people died in Pakistan due to flooding in 2010 and in India 6,500 people perished due to floods in 2013. The 2022 floods in Pakistan were the most devastating in the country's history, claiming over 1,100 lives, destroying a million homes, and affecting 33 million people (Clarke et al., 2022).

Africa is extremely vulnerable to the negative impacts of climate change (UNDRR, 2022). African cities are affected by flooding from torrential rains, groundwater, overflowing drains and channels and major rivers (Douglas, 2017). Abnormally high temperatures over the Indian Ocean led to intense rainfall in 2002, causing floods and landslides that killed more than 112 people and forced many from their homes in five countries (Douglas et al., 2008). West Africa became a victim of unprecedented flooding which destroyed agriculture, livestock, sources of freshwater, infrastructure and homes between 2008 and 2020 (UNESCO, 2023). In October 2012, Nigeria

suffered its worst flooding in 50 years, claiming 363 lives, displacing 2 million people, and destroying 618,000 houses. (UN-Africa Renewal, 2013).

Ghana has encountered its worst floods in the last 20 years; in the years 2007, 2010, 2011, 2015, and 2020 across the country especially in big urban areas (Owusu and Obour, 2021). In Accra, more than 25% of the residents reside on fluvial flood plains or areas prone to fluvial flooding and half of the people living in the Greater-Accra live on the floodplain of the Densu and tributaries of other rivers (Karley, 2009). The causes of flood hazards in Accra can be summed up into three issues: intensity of rainfall events and management of Accra's surface water resources, uncontrolled urbanisation and ineffective urban planning; and the possible impacts of climate variability and changes (Amoako & Boamah, 2015). Accra's flood aftermath is exacerbated by inadequate residential area planning and insufficient early warning systems, leaving residents vulnerable to devastating consequences (Okyere et al., 2013). An example of a major flooding event occurred in Ghana in 2015. In June 2015, widespread flooding in Ghana including Accra rendered many homeless and thousands without power; over 152 lives were lost due to an explosion at a petrol station in Accra (Asumadu-Sarkodie et al., 2015). Flooding severely disrupts the daily lives of Accra's residents, limiting their ability to commute, participate in economic activities, and access essential services and infrastructure such as transportation (Amankwaa and Gough, 2022). Flood events also impact vulnerable populations through the loss of goods and property, reduced incomes, restricted mobility, poorer health as well as interrupted and increasingly overstretched services (Gough et al., 2019).

To reduce vulnerability, households and communities must adopt adaptive strategies that will help them cope with the consequences of climate-associated natural hazards (Amankwaa et al., 2024). Insurance can be a vital tool in managing risks, leveraging its specialized knowledge and expertise

in risk assessment, modelling, and pricing to provide effective risk pooling solutions (Scholer and Schuermans, 2022). The absence of insurance coverage and insufficient financial resources for flood recovery can have far-reaching consequences, affecting not only individuals' well-being but also the national budget and the overall economic (Jongman, 2018). Insurance is being utilized more in developed countries than in developing countries (Cashman et al., 2018). In Ghana, 9 million people were covered by microinsurance as of 2020, mainly for life and health risk (UNDP, 2021). From October 2015 to June 2019, Ghana and Munich Climate Insurance Initiative implemented a project to promote integrated climate risk management and transfer in Ghana. The project aimed to provide the agriculture market in Ghana with more options such as insurance and sovereign risk transfer solutions to hedge against weather risk derived from flooding and droughts. African Risk Capacity Group launched a Flood Risk Insurance Product in June 2023 to help African countries cope with the devastating effects of flooding, and Ghana is a participant to this initiative (African Union, 2023). Despite the known advantages of insurance solutions especially to vulnerable communities, Ghana seems to be lagging behind in promoting flood insurance as a non-structural adaptation measure for residents in the vulnerable and marginalised communities especially in low-income urban areas.

The existing literature on adaptive capacities to flooding in Ghana tends to focus on the choices of adaptation strategies, coping strategies and level of effectiveness (Amankwaa et al., 2024; Boafo et al. 2025a, 2025b; Mensah and Ahadzie, 2020; Owusu and Obour, 2021; Twerefou et al., 2020). Very few studies have paid attention to flood insurance as a non-structural adaptation strategy to flood risk in Accra. Antwi-Bosiako (2016) focused on how home insurance providers responded to spending on flood prevention measures. Jegede et al. (2020) assessed how effectively adaptation policies provide a framework for developing and implementing insurance programs that reduce

climate-related risks. However, these studies did not analyse risk transfer as a way of building the adaptive capacity of vulnerable households to flooding. This study will assess the perceptions of urban households on flood insurance in Accra, ascertain determinant factors for flood insurance for vulnerable households in Accra and examine how flood insurance can enhance the adaptive capacity of vulnerable residents in Accra. The study will add to knowledge by exposing the gaps and barriers to flood risk management in relation to risk transfer in Ghana. Closing these gaps will help vulnerable households especially in low-income communities build resilience against flooding.

1.3 OBJECTIVES OF THE STUDY

Main Objective

To analyse flood risk transfer as an urban household adaptive capacity to flooding in Accra to build the resilience of urban households.

Sub-Objectives

1. To assess the perceptions of urban households on flood insurance.
2. To ascertain determinant factors for flood insurance for vulnerable households in Accra.
3. Examine how flood insurance can enhance the adaptive capacity of vulnerable residents in Accra.

1.4 RESEARCH QUESTIONS

1. What perceptions do urban households have about flood insurance?

2. What is the nexus between perceptions of flood insurance and the adoption of flood insurance?
3. What barriers do insurance companies in Ghana face in providing flood risk policies for vulnerable households?
4. What factors will influence the provision of flood insurance for vulnerable households?
5. How can flood insurance enhance the adaptive capacity of vulnerable residents in Accra?

1.5 HYPOTHESIS

1. There is a significant relationship between perceptions of flood insurance and the willingness to adopt a flood insurance policy.
2. There is no significant relationship between the perceptions of flood insurance and the willingness to adopt a flood insurance policy.

1.6 JUSTIFICATION OF THE STUDY

Climate change is already having devastating effects in various regions around the globe. These effects range from intense heatwaves, wild fires, frequent storms, hurricanes and flooding events. The impacts of climate change are further worsened by human activities. Vulnerable people living in low-income communities are greatly impacted during disasters but have low capacities to adapt. Many vulnerable people have adopted coping mechanisms which do not offer lasting solutions to the hazards they face. Adaptation is key to building the resilience of vulnerable people living in low-income communities. Individuals tend to focus on structural adaptation measures when dealing with floods in Ghana. Very little attention has been given to flood insurance an adaptation measure to floods in Ghana hence the significance of this study. This study hopes to initiate a

conservation about the development of flood insurance policies for vulnerable households living in low-income communities in Accra. The study will add to knowledge by exposing the gaps and barriers to flood risk management in relation to risk transfer in Ghana. Closing these gaps will help vulnerable households especially in low-income communities build resilience against flooding.

1.7 ORGANISATION OF THE STUDY

This study is presented in five chapters. It begins with Chapter One which provides an introductory overview of the study. Chapter Two reviews relevant literature and presents the conceptual framework. The study area and methodology are outlined in Chapter Three. Chapter four presents the results accompanied by a comprehensive discussion. Chapter Five concludes the study with a detailed summary of the finding and recommendations for future consideration.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

This chapter reviews existing literature on urban household adaptive capacity to flooding, risk transfer, and related concepts. It examines empirical studies to identify key factors influencing household vulnerability and resilience. The chapter also outlines conceptual framework guiding this research, providing a foundation for analysing urban household adaptive capacity to flooding and risk transfer.

2.2 GENERAL OVERVIEW OF FLOODING

Amankwaa and Gough (2023), investigated the impact of extreme weather events on the mobility of low-income urban residents in Ghana, focusing on how flooding affects their daily lives and navigation of Accra and Tamale. The study employed a qualitative approach, utilizing a combination of research methods, including semi-structured interviews, focus group discussions, and follow along participant observation to gather data from selected communities in Accra and Tamale. Their study exposed the challenges posed by flooding, which hindered residents' ability to commute, access employment opportunities, utilize transportation services, and reach essential infrastructure, severely impacting their daily lives. The analysis showed that mobility patterns vary significantly by age and gender, with notable findings including: women, particularly, facing delayed mobility; youth adopting makeshift mobility strategies; and children and the elderly requiring assisted mobility, highlighting their heightened vulnerability.

Kayaga et al (2021), investigated the effects of extreme heat and flooding on water and electricity services in Accra and Tamale, Ghana. Using a mixed-methods approach, they collected data

through interviews with utility providers, water quality assessments, household surveys, focus group discussions, and observational studies in eight low-income urban communities. The study highlighted the intricate relationships between service provisions during extreme weather events, demonstrating how challenges in one sector can cascade into others, exacerbating accessibility issues. Key findings included: households' reliance on rainwater during flooding is comprised by high risks of faecal contamination, electricity supplies are often disrupted, and extreme events trigger a surge in demand for water and electricity, outstripping available supplies.

Gough et al (2019), focused on severe heat and extreme water flooding and explored how these extreme weather events impact on infrastructure provision and livelihoods in low-income urban communities in Ghana. The study used climate series, including temperature data recorded in people's homes and workplaces. Also, qualitative interviews were conducted in eight neighbourhoods within the cities of Accra and Tamale in 2018. Additional information was collected through key informant interviews with health service, water and electricity supply officials. Findings from the study show that, heat and flooding events are causing disruptions to the infrastructure provision. Heat and flooding events also impact vulnerable populations through the loss of goods and property, reduced incomes, restricted mobility, poorer health as well as interrupted and increasingly overstretched services.

Codjoe et al. (2020), investigated the vulnerabilities of health systems linked to flooding and extreme heat. The study investigated methods used by service providers and community members in Accra and Tamale to enhance community resilience. The study adopted field observations, rainfall records, temperature measurements, and semi-structured interviews in health facilities within selected areas of both cities. The outcomes of the study reveals that substandard building conditions, unreliable power supply, inadequate sanitation and hygiene, and poorly designed built

environments restrict access to healthcare for impoverished urban populations. The research highlighted that flooding and extreme heat, when combined with socioeconomic factors, pose significant risks to physical infrastructure, community health, and the functioning of healthcare facilities. The study identified various infrastructural and operational adjustments implemented by community members and health facilities to mitigate the impacts of extreme weather events and improve healthcare delivery. Adjustments implemented include resident mobilization for waste management and drainage clearance, equipment elevation to prevent flood damage, enhanced ventilation during heatwaves, and utilization of alternative power sources for emergency procedures and storage during outages.

2.3 GENERAL OVERVIEW OF ADAPTATION TO FLOODING IN GHANA

Twerefou et al. (2019), investigated the psychological and socioeconomic factors that hinder the adoption of private precautionary measures to mitigate flood risks among urban households in the Greater Accra Metropolitan Area. Their study revealed that threat appraisal has mixed effects on the decisions by households to adopt a damage protection measure against flooding. The study also highlighted that households who are not extremely vulnerable to flooding in the neighbourhood resort to some structural measures such as reinforcing their house against the damage posed by floods. In addition, the study identified socio-economic factors as having an overall protective effect on protective behaviour. Moreover, structural measures adopted by the public sector to mitigate flood damage can complement and enhance the effectiveness of private protective measures, such as drain cleaning and sandbagging, adopted by households.

Owusu and Obour (2021), conducted a study to investigate the effects of flooding and identify adaptation strategies in two flood-prone residential areas in Accra. A total of 320 household heads

participated in a survey designed to investigate the local consequences of flooding and identify community-driven adaptation strategies. Key stakeholders such as personnel from ministries, departments agencies who are involved in city planning and private urban planning consultants were interviewed. Outcomes of the research show that, a main cause of floods in Accra is blocked waterways, and flawed and ad hoc engineering works. The study also revealed that adaptation at the individual level is made up of both autonomous and planned adaptation practices. The individual planned adaptation measures include; the construction of improvised channels from homes to main drains to ensure free flow of water; dredging of drainage channels by community or government before the start of rains. Centralized adaptation measures in Accra were identified to be undertaken by government or AMA through sponsored projects flooding by opting to change from building more permanent and expensive homes on or near principal waterways.

Mensah and Ahadzie (2020), provides an overview of the academic literature on urban flooding, focusing on the underlying causes, consequences, and adaptive strategies employed by urban populations. The study was conducted through a comprehensive literature review and searching academic database for recent studies. Their findings revealed that the most common coping strategies were relocation, protection of properties and construction of drains.

Frick-Trzebitzky (2017), describes how institutional bricolage shapes the distribution of adaptive capacity to urban flooding. The study employed the case study of the Densu delta in Greater Accra, Ghana. Interviews and stakeholder mapping conducted in the study revealed that institutional bricolage shapes who is likely to adapt to urban flooding and who isn't. Four new findings emerged in the study. They are; key elements of bricolage foster the decisive role of chieftaincy structures in adaptation to urban flooding in the local context of a West-African city; institutional bricolage exposes the role of culture in adaptive capacity; it offers new perspectives on both institutions and

adaptation in urban water and risk governance, and a bricolage analysis enables incorporating different forms of knowledge towards transformative adaptation.

2.4 GENERAL OVERVIEW OF INSURANCE RISK TRANSFER

Cashman et al (2018), in their paper centred on risk transfer, sought to promote a discussion between insurance and water sectors. They identified risk transfer solutions such as climate risk insurance as an adaptation measure designed for extreme events. They noted that insurance was more common in most developed countries than in developing countries. They saw insurance as a contractual transaction that guarantees financial protection against potentially large losses in return for a premium. Reinsurance was seen as a safety mechanism for insurance companies, which cushion insurance companies during times they are not able to provide cover on their own in the case of extreme catastrophe risks. Microinsurance which is characterized by low premiums was identified for lower income individuals. It can cover a wide range of risks, however, it's current focus has been on covering health and weather risks. The benefits of risk pooling were also mentioned. By aggregating risks at the regional or national level, risk pools allow individual risk holders to disperse their risks across different geographic areas. This benefits participants by allowing them to gain insurance on better terms and access collective reserves in the event of a disaster. The authors expressed the important role of government institutions in making climate insurance successful. Their importance manifests in providing support to develop the market for innovative extreme weather-insurance and adapt the regulatory and institutional frameworks. This will allow the promotion of climate insurance products.

A study by Jegede et al (2020), explored the role of national policy environment in enabling climate risk reduction initiatives in South Africa and Ghana, with a focus on adaptation policy.

Additionally, they explored the potential of climate change insurance in supporting adaptation efforts and proposed strategies to address the legal and policy challenges that hinder African governments and insurance companies. Their research involved analysing and reflecting on existing relevant legal frameworks, official documents, and literature to examine global and domestic developments. Their findings reveal that, even though legal and policy frameworks on climate change adaptation exist in both countries, insurance measures as an adaptation response have not been clearly voiced out. Also, through their analysis of scholarly literature and best practices, they demonstrate how the existing framework can be leveraged to incorporate risk insurance as a key adaptation measure in Ghana and South Africa. The literature also highlights the critical role that insurance and risk management sectors can play in helping communities, individuals, and businesses in developing countries like Ghana and South Africa adapt to the effects of climate change.

Jarzabkowski et al (2019), conducted a critical analysis of existing insurance-based mechanisms, highlighting both the opportunities and challenges of leveraging insurance as a tool to enhance climate change resilience. Their work revealed that insurance can be a key tool in adapting to climate change by reducing vulnerability and promoting resilience. Some key opportunities in using insurance mechanisms include; it plays a vital role in supporting communities and infrastructure recovery after disasters by providing a flow of capital. Additionally, it enhances awareness of climate change risks and encourages individuals and communities to adopt measures that strengthen their resilience to climate-related disasters. Insurance was recognized as a key strategy for shifting from crisis response to proactive risk management, ultimately enhancing socio-economic resilience in the face of a changing climate. Barriers identified to using insurance

in climate adaptation include; increasing insurance penetration, enhanced risk reduction, balancing short-term insurance products with long-term adaptation measure and financial and risk literacy.

Antwi-Bosiako (2016), investigated how home insurers in Ghana price flood risk by presenting them with four identical buildings, half of which had flood risk reduction measures in place, and asking them to provide premium quotes. The author employed a correspondence design (a type of audit study). The results showed that homeowners who invested in risk reduction measures were not offered lower premiums. Instead, insurers tended to charge them higher premiums. The author suggests that insurers may have viewed investments in risk reduction as an indicator of increased risk, rather than decreased risk. By not rewarding proactive measures, insurers may inadvertently discourage investments in prevention, potentially increasing Ghana's vulnerability to natural disasters.

OECD (2016), presented an overview of strategies employed by economies with varying flood risk exposure and economic development to mitigate the financial consequences of flooding. The report was compiled by the OECD Secretariat, drawing on data gathered from an OECD survey questionnaire and supplemented by research conducted by the OECD and other global institutions. The findings revealed broad availability and affordability of coverage, solidarity in terms of loss-sharing across regions, the establishment of clear incentives for risk reduction and/or significant transfer of risks to private markets as approaches countries are using to protect households and businesses against the financial impacts of flooding. They also identified some important obstacles that prevent flood risk from being insured. These are the size of potential loss from a flood event, the ability to establish a diverse pool of insured risks as well as the level of uncertainty in estimating potential losses, particularly in the context of a changing climate. They further mentioned some innovative approaches a number of countries were using to address the challenges

stated above. These approaches are: investing in risk reduction at the community and household level, improving the quality and availability of flood risk maps, and enhancing public awareness of the risk of flooding and the need for financial protection.

2.5 CONCEPTUAL FRAMEWORK

1. THE INSURANCE VALUE CHAIN

According to Jarzabkowski et al (2019), the essence of insurance is to transfer a specified risk from one party, an insured, to another party in order to increase the insured party's capability to withstand financial loss. The risk transfer process and the principles underlying the process is explained below.

Risk Transfer Process

Figure 1 below depicts the insurance value chain. Climate change worsens catastrophic risks that could lead to loss for citizens and businesses. Individuals, citizens can mitigate potential losses by obtaining insurance coverage. This means they pass on a portion of this risk via the risk transfer value chain. In exchange for a premium, the insurer assumes the risk from the insured. According to the policy's terms and conditions, insurers bear the responsibility for covering future financial losses. In the event of a loss, insurers will settle claims made under the terms of the insurance policy. To mitigate their own risk, insurers must also safeguard themselves against a surge in claims after a disaster. Therefore, to safeguard their capital reserves and maintain solvency, insurers transfer risks to reinsurers, ensuring they can fulfil claims obligations following a catastrophic event. Reinsurers derive the capital to pay claims from different actors and they are; private market reinsurers that accept insurance risk for a profit, other capital market providers who also accept

risk for a process such as hedge funds, mutual funds, sovereign wealth funds, pension funds and institutional investors, and public sector or government legislated reinsurers operating as non-profits to address a specific protection gap. Governments also engage in risk transfer, with their balance sheets and publicly owned assets also vulnerable to natural disasters.

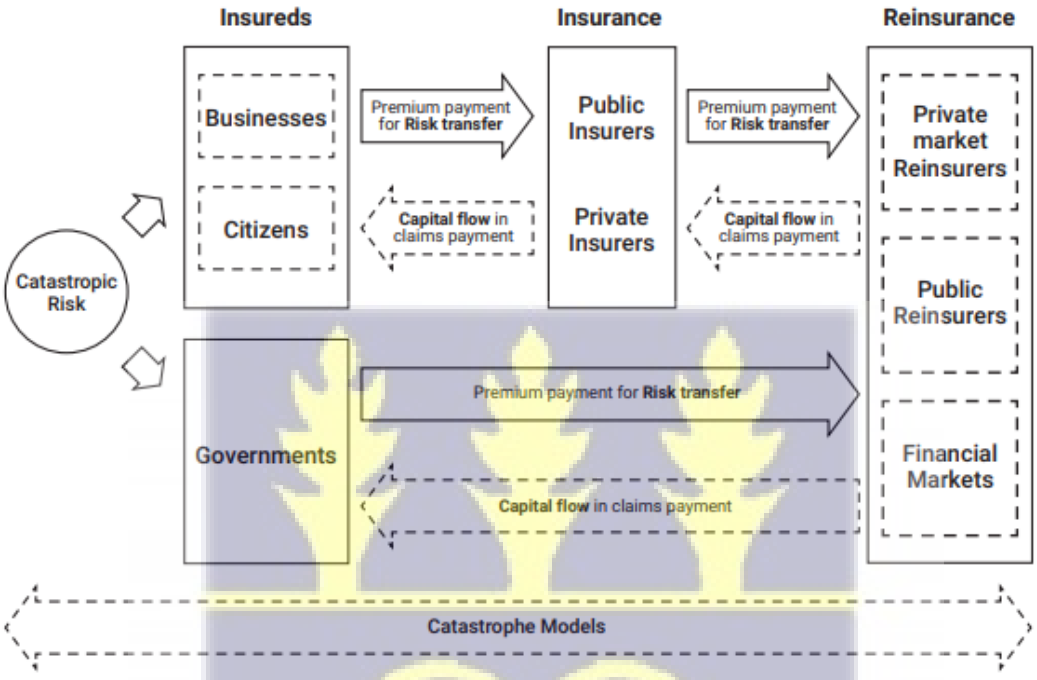


Figure 1: The insurance value chain: Trading in catastrophic risk.

Source: The insurance value chain (Jarzabkowski et al., 2019)

To facilitate risk transfer, catastrophe models are utilized at various stages of the value chain for risk evaluation and analysis. They allow insurers and reinsurers, corporations, governments and other public agencies to evaluate and manage their exposure to catastrophe risk, including pricing any risk they will transfer. Catastrophe models are made of three parts; hazard, exposure and vulnerability. Hazard refers to the probabilities of occurrence and severity of any particular potential disaster such as a tropical storm or flood, at a given location and within a specified time

period. Exposure is the inventory of elements to be insured such as property values of location. Vulnerability assesses the level of damage which would be expected at different levels of intensity of a hazard.

Risk =Hazard x Exposure x Vulnerability.

Models calculate the possible losses for any particular portfolio for insureds' properties in any specified location. These calculations make it possible for insurance (re)insurance to decide on the appropriate premium prices to charge to ensure an acceptable level of return for the risks being transferred.

Brokers serve as an important reservoir of expertise in risk. They act as market intermediaries, facilitating risk transfer from insureds to insurers (or from insurers to reinsurers). They do not provide the capital or hold the risk however they are mostly involved in a wide range of industry activities, from analysis to pricing, from claims to capital provision.

1.1 The Three Principles: Risk pooling, Risk pricing and Risk diversification.

The risk transfer value chain functions to accumulate premiums across all the insured to enable the few affected insured receive a pay out to support their recovery. The three principles guarantee that all stakeholders in the value chain maintain adequate capital reserves to cover potential claims in the aftermath of a disaster. By pooling risks, insurers can share the potential costs of expensive claims among many insured individuals, reducing their financial exposure. The goal of risk pricing is to align insurance costs with the level of risk assumed, so that those

with greater exposure to risk pay accordingly. Risk diversification is a technique used by re(insurers) to spread loss exposures. By dispersing a diverse array of risks across a broad geographic area, the interdependence between those risks is minimized.

The World Bank undertook a study to explore the potential of insurance market development in driving sustainable and inclusive economic growth in Ghana (World Bank, 2018). The study pinpointed crucial factors that have shaped the insurance market in Ghana, influencing its current state of development. It includes the following:

i. Poverty and illiteracy are a constraint on insurance sales but a growing middle class and improving educational levels offers an opportunity.
ii. Stabilising environment creating potential for longer-term business strategies and investments.
iii. Well respected regulator and committed policy maker (National Insurance Commission)
iv. Lack of digital payments a challenge for premium collection.
v. Low trust and poor perceptions of insurance
vi. Focus on compulsion limiting the ability and incentive to innovate,
vii. High costs affecting business sustainability and client value.
viii. Lack of available skills and technical capacity reducing insurer's ability to provide value to customers
ix. Growing alternative distribution channels (Agents and brokers)
x. Localisation requirements potentially having unintended consequences.

The study also looked at the role insurance plays in individual and household resilience. The findings are listed below:

i. Insurance is contributing to the resilience of some Ghanaians but many remain unserved.
ii. Microinsurance is growing and predominantly distributed through mobile.
iii. Education savings a significant driver of voluntary retail premiums.
iv. NHIS covers majority but out of pocket expenses indicates additional need.

2. INSURANCE RESILIENCE FRAMEWORK

The insurance resilience framework shows how insurance can support financial resilience and other activities crucial to climate change adaptation, including risk reduction, resilient reconstruction and preparedness.

1.1 Identifying climatic risks

The climate hazards and health risks that Accra faces include flooding, extreme or increased precipitation, sea level rise, drought, heatwaves or increased temperatures, heat-related illnesses, mental and psychosocial health, vector-borne and infectious diseases, effects on health systems including healthcare facilities, non-communicable diseases, water security and waterborne diseases, and food security, malnutrition and food borne diseases (WHO, 2022)

According to UNDP (2021), a diagnostic study conducted on Ghana's insurance industry by the UNDP revealed that, approximately 70% of Ghana's population remains uninsured even though

the country has a favourable environment for insurance and risk financing. Moreover, the insurance industry has failed to offer products that adequately address the needs of the population. The report highlighted the critical role inclusive insurance and risk finance plays in closing the protection gap through 3 components; a better understanding of the market, a supportive enabling environment and a stronger offer from suppliers that develop better access for individuals, institutions and governments.

Generating an insurance product involves identifying and analysing risks through rigorous modelling. This is illustrated by the thick arrow between financial resilience and risk identification in figure 2 below. Risk identification is a fundamental precursor to developing effective disaster resilience strategies. Insurance companies' expertise in risk identification can be a vital asset for local communities and governments in emerging markets, where risk data and analysis were previously unavailable. The sharing of risk information and expertise by insurance companies can assist countries and local communities to better identify risks related to climate change to enable them make adaptations. Insurance-driven risk identification can catalyse a broader resilience planning effort, triggering proactive measures for climate change adaptation that extend beyond financial protection. Risk modelling expertise allows both risk pools and their government members to understand and quantify the natural hazards that can cause disaster, the exposure to the natural hazard and the level of vulnerability of communities to a potential disaster. This modelling expertise can then guide adaptation measures. It should influence decision making and policy about unsustainable development, improving resilient structure and enhancing disaster preparedness.

1.2 Signalling unsustainable development

A study by Aryee et al. (2018) on the sustainability of Accra Metropolitan Area showed the environment to be the weakest dimension of Accra's sustainable development. According to them, the environmental sustainability of Accra showed poor performance. It fell from 0.23 in 2012 to 0.21 in 2013. The dimension increased again in 2014 to 0.25 due to the implementation of government policies on decongestion but it decreased again in 2015. The decrease in 2015 was caused by the major flooding event in June 2015 that destroyed agricultural and vegetative lands. They further highlighted how poor waste management, air pollution and inadequate access to approved toilet facilities negatively contributed to the poor performance of the environment dimension. The study also revealed that, weak governance in Accra led to poor institutional performance of the city. There was no budget allocated to the conservation of natural resources, which is the weakest sustainability indicator for this dimension. Moreover, the city authorities allocate low budget for disaster risk reduction (0.30% of total budget in 2012) in a city where flood and fire are predominant. In addition, poor sanitation which was reflected in the environmental dimension, is as a result of low budget allocation to waste management by the city (between 4.7% in 2012 to 6.5% in 2015). According to the authors, it provided clarification to why 20% of solid waste was still not collected daily in the city. The study further highlighted the social dimension performance of Accra as below average. The low areas in the social dimension were credited to the difficulty of the Accra Metropolitan Assembly to provide adequate social services and infrastructure for the increasing population. This has resulted in the growth of squatter zones and slums as well as poor supply of pipe water.

The insurance market signal of high prices can be perceived as the prompt to improve risk mitigation in risk prone areas. Insurers may be able to lower the premiums to these policyholders if suitable risk reduction measures are taken. Even though insurers cannot control the legislation to change planning permissions over where to build, or construction regulations on how to build, they can influence risk reduction using by using the price signal in diverse ways. Insurers can reward individual risk reduction behaviours by reducing policy premiums. Also, pricing signals can motivate governments to implement changes in planning permission and policy over land-use planning and building codes for high-risk areas. In addition, insurers can increase premiums or refuse to insure properties in a high region. This could serve a motivation or force a government to reduce risk in the natural or built environment for the whole region.

1.3 Preparedness

Oteng-Ababio (2013), in his study on Ghana's capacity and preparedness to respond to disasters revealed that, the National Disaster Management Organisation (NADMO) has continually failed to protect Ghanaians against disaster events. The findings of the study show how the organisation is riddled with many challenges and these include; staff, transport, communication and financial constraints as well as low collaboration with major stakeholders. NADMO struggles to develop the capacity to implement adaptation and mitigation strategies. How it responds to disaster events especially in the case of perennial flooding remains catastrophic. The organisation is more reactive (top-down approach), where catastrophic events occur before action is taken. The study also noted how current policies and decisions of NADMO have resulted in unintended consequences including poor governance, selfishness, apathy and lack of entitlement. They mostly neglect

communities' perceptions in building capacity to deal with extreme events and this often exacerbate potential hazards.

Catastrophe models in insurance can encourage disaster preparedness involving early warning systems and contingency planning. An insurance company can develop an understanding of how to prepare for a disaster because it may be equipped with the data to specify the likelihood of loss. However, it may not have the authority to enforce active preparedness steps. An insurance company can suggest and provide incentives to their policyholders for better ways to prepare for disaster such as preparedness guides and checklists that may help reduce the risks to them and their properties.

1.4 Building Back Better: Resilient Reconstruction

The Accra Resilience Strategy developed by the Accra Metropolitan Assembly (AMA) includes an integrated approach to infrastructure planning and service provision. The goal of this approach is to design and adapt infrastructure to maximise co-benefits and simultaneously address Accra's flooding, waste, sanitation and climate challenges. The Accra Metropolitan Assembly intends to achieve this by: strengthen drain design and performance through an assessment of existing and proposed road and drainage infrastructure, incorporating meaningful community engagement, construct new micro and large waste transfer stations and launch the Sustainable Greening and Beautification of Accra Project (AMA, 2019).

Building back better is a philosophy which integrates risk reduction into reconstruction after disaster. Insurance expertise in risk assessment and evaluation needs to be included in policy considerations because risk reduction makes insurance more affordable and cost-effective. For

reconstruction to be funded by insurance pay outs, the pay outs need to reflect the necessary improved building standards. Insurers can influence decision making around risk reduction and resilient construction when they are invited on to working parties that comprise of all government departments concerned with development planning.

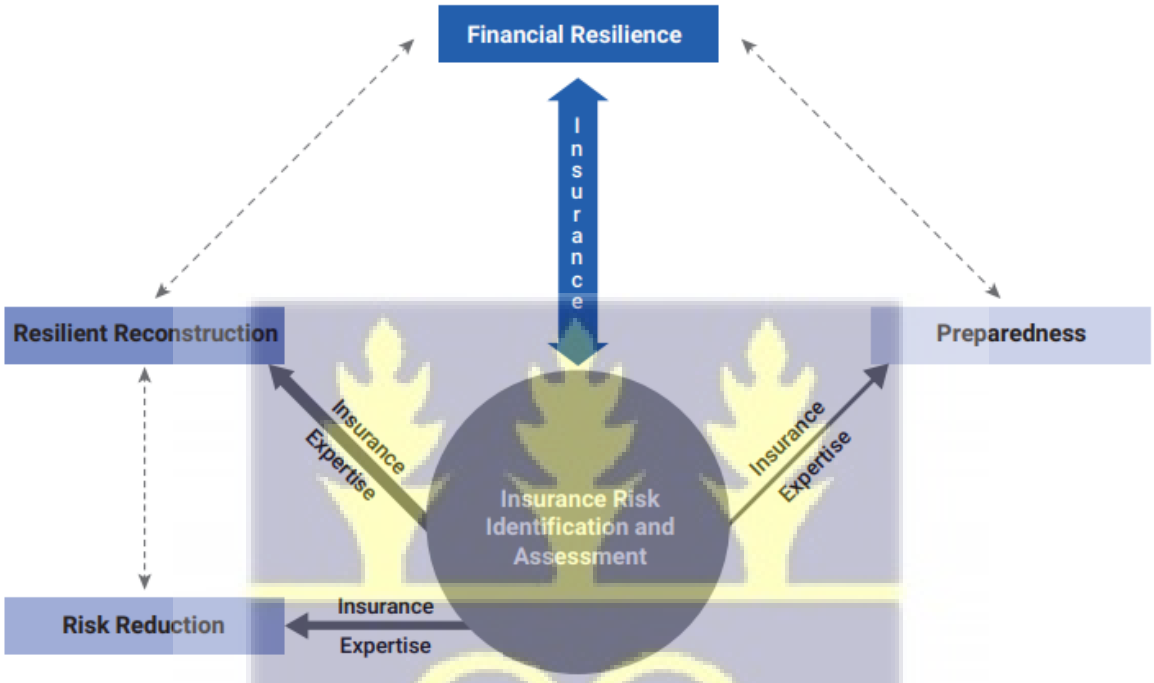


Figure 2: The insurance resilience framework

Source: The insurance resilience framework (Jarzabkowski et al., 2019).

The insurance value chain (figure 2.1) and insurance resilience framework (figure 2.2) by Jarzabkowski et al. 2019 was adopted in this study to provide an understanding of the various stages involved in the insurance process, from risk assessment to claims settlement. It helps identify potential vulnerabilities in the system that could impact the effectiveness of flood insurance in Ghana. The insurance resilience framework demonstrates how using flood insurance as an adaptive strategy to flooding in Ghana can help manage financial risks associated with

flooding especially for low-income households in flood prone areas. Both frameworks complement each other due to their implications for resilience building. They enable us to identify opportunities to build resilience in communities vulnerable to flooding in Ghana, and also helps to map out gaps that hinder the successful implementation of flood insurance as an adaptive mechanism especially for low-income flood prone communities.

CHAPTER 3

STUDY AREA AND METHODOLOGY

3.1 INTRODUCTION

This chapter describes the study area; Accra, and outlines the methodology used to investigate urban household adaptive capacity to flooding and risk transfer. It provides an overview of the city's flood-prone areas. The chapter also details the research design, data collection methods, sampling technique, data analysis techniques, and ethical considerations employed in this study.

3.2 STUDY AREA

According to the last population census by the Ghana Statistical Service (2021), the total population of Ghana stands at 30,832,019. This is five times higher than the population in 1960 which stood at 6,726,815. The urban population keeps increasing with almost half of it occurring in the Greater Accra and Ashanti regions (47.8%) It rose from 12,545,229 (50.9%) in 2010 to 17,472,530 (56.7%) in 2021. The Accra Metropolitan Area is the most urbanised area within the Greater Accra region and forms part of the Accra-City region (a newly designated functional area made up of the AMA and 12 neighbouring administrative districts) (Acheampong, 2021). It shares boundary with the Ga West Municipal to the North, Ga South Municipal to the West, La Dadekotopon to the East and the Gulf of Guinea to the South (GSS, 2010).

Accra receives a lot of internal migrants due to the economic opportunities present in the city and this has led to rapid urbanisation. The population of Accra is currently estimated at 2,660,072, with a population density of approximately 1,300 people per square kilometre (World Population review, 2023). According to Accra Metropolitan Assembly (AMA) (2019), planning and the

provision of services and infrastructure cannot catch up with urbanisation. This affects the living conditions of residents especially in low-income communities. Low-income communities end up in informal and overcrowded housing with limited or no access to urban services.

The Accra Metropolitan Area lies in the dry equatorial climatic zone and has two rainy seasons. The first season starts in May and ends in mid-July while the second season begins in mid-August and ends in October (GSS, 2010). The rise in physical settlement in Accra is outpacing the construction of drainage networks and this has resulted to seasonal flooding during the rainy season (UN-Habitat, 2009). The main causes for the seasonal flooding in the Accra Metropolitan Area are insufficient local feeder canals, uncompleted drainage network, inadequate capacity to accommodate intensive storm-water runoff (UN-Habitat, 2009), and drains blocked with solid waste or silt (AMA, 2019). Accra's drainage system is mainly responsible for the intense perennial flooding especially in low-lying areas (AMA, 2019).

The study settlements prone to flooding within the study area are Adabraka, Aslyum Down, Glefe and Santa-Maria as displayed in **figure 3.**

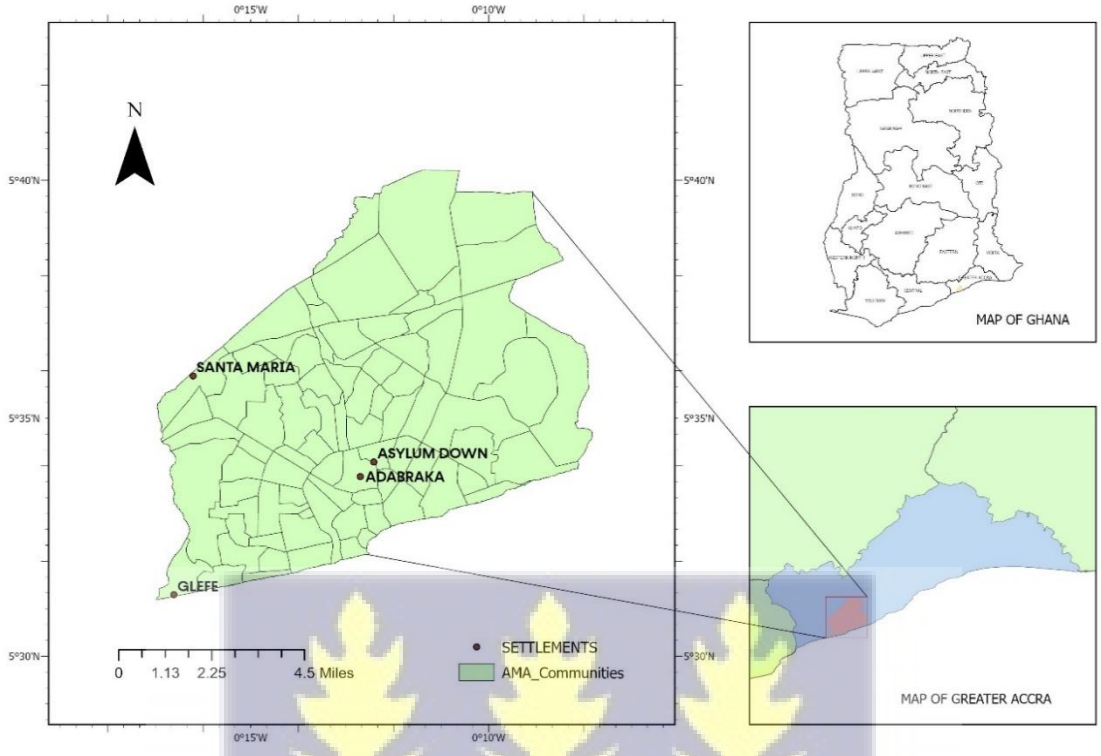


Figure 3: Map of Accra Metropolitan Assembly showing flood prone areas

Source: Author's construct (2025)

3.3 RESEARCH DESIGN

This study employed a case study- mixed method design. A case study has been defined by Crowe et al., (2011) as an approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context. The use of mixed methods involves the collection and interpretation of both quantitative and qualitative data and the use of distinct designs that may involve philosophical assumptions and theoretical frameworks (Creswell & Creswell, 2017). This research design was used for the study because carrying out a case study that utilizes quantitative and qualitative methods will be beneficial in attaining significant integration of the two forms of data to develop a more complete understanding (Guetterman et al., 2018).

Through the quantitative approach, I collected data from a large number of participants which helped me generalize the findings to a wider population while the qualitative approach ensured a deeper understanding of the issue being investigated (Dawadi et al., 2021). A challenge of a case study approach is that suitable cases studies sites may be restricted because businesses and other organizations may not be willing to participate in case study research (Darke et al, 1998). Another challenge is, conducting a case study to ensure that the research question(s) can be answered thoroughly can be difficult and collecting data can be time consuming and tedious (Yin, 1994; Cavaye, 1996 as cited in Darke et al., 1998).

3.4 DATA COLLECTION

This research involved the collection of quantitative and qualitative data from the heads of households in low-income urban communities, local government officials and the heads of selected insurance companies. The method of quantitative data collection was through surveys using self-administered questionnaires. The questionnaires were administered to the heads of households of low-income urban communities. The survey method is used for sampling data from respondents that represent a population (Williams, 2007) and it provides a numerical description of trends, attitudes, or opinions of a group by investigating a sample of that population (Creswell & Creswell, 2017). In-depth interviews were used to collect data qualitatively from the heads of selected insurance companies. In-depth interviews were also used to collect data from a local government official working in the National Disaster Management Office (NADMO) in selected municipal offices of the study communities. In-depth interviews involve conducting intensive individual interviews with a small number of respondents to gain their insights on a particular idea, program or situation and it is useful for obtaining detailed information about a person's thoughts and

behaviours or exploring new issues in-depth (Boyce and Neale, 2006). The study followed ethical guidelines. I obtained verbal permission from participants before collecting data and assured their information would be kept private. Participation was also voluntary.

3.5 SAMPLING TECHNIQUES

Purposive sampling, to be specific critical case purposive sampling was be used to select 1 insurance company in Ghana. The insurance company was chosen based on its years of experience and visibility in the low-income communities. 30 respondents were selected from each of the selected flood prone areas for the study. A systematic random sampling technique was used. By selecting household heads in four flood-prone communities through systematic random sampling, the study captured diverse perspectives and experiences of households in different flood-prone areas. Each of the communities selected was divided into four clusters to prevent collecting data from one cluster or area. Seven respondents were sampled from the first and second cluster while eight respondents was sampled from the third and fourth cluster in each study community. The basis for selecting the number of respondents in clusters was due to anticipated differences in flood exposure and socioeconomic status. The basis for the selection can be based either on the previous date or evidence or community members assertion on flood exposure and socio-economic status.

Purposive sampling also known as judgemental, selective or subjective sampling is a non-probability sampling technique that relies on the judgement of the researcher when selecting the units such as people and organisations to be studied (Sharma, 2017). Critical case purposive sampling is especially useful in exploratory qualitative research, research with limited resources and research where a single case (or small number of cases) can be decisive in explaining the phenomenon of interest (Rai and Thapa, 2015). Systematic sampling is a method used when the

population to be studied is arranged in some order and in such cases drawing a random sample in a systematic way may be easier than generating a simple random sample (Elsayir, 2014).

3.6 DATA ANALYSIS

The quantitative data obtained from the study was analysed using IBM SPSS Statistics Version 21. (Statistical Package for the Social Sciences). SPSS provides data analysis for descriptive and bivariate statistics, numeral outcome predictions and predictions for identifying groups (TechTarget, 2018). Bivariate analysis was conducted for the variables of the study specifically correlation analysis to see how they are related to each other. Bivariate analysis helps to identify patterns or trends between the variables, which can further inform research or analysis. Correlation was used to determine the relationship between the perceptions of flood insurance among low-income urban households and the adoption of flood insurance. The strength of the relationship between these variables was also tested. Bivariate analysis focuses on how two variables are related to one other and in the case of two quantitative variables, correlation analysis and simple linear regression is the most suitable technique to use (Bertani et al, 2018).

All interviews with the head of the insurance company and local government were manually transcribed, thematically analysed bring to light key themes and trend.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter reports and discusses findings from the field survey carried out in four flood-prone low-income communities in Accra. The four communities are Adabraka, Asylum Down, Glefe and Santa-Maria. One hundred and twenty household heads were interviewed with the aid of self-administered questionnaires designed to meet the research objectives and in-depth interviews were held with local government officials in Korle Klottey Municipal Assembly, Ga Central Municipal Assembly as well the heads of selected insurance companies in Ghana in order to obtain the findings revealed in this chapter. This chapter is divided into four sections and they are: socio-demographic characteristics of respondents; awareness, knowledge, and experience of flood risk; perceptions of urban households on flood insurance; and determinant factors for flood insurance households in Accra.

4.2 KEY SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The information reveals the key sociodemographic characteristics of interviewed household heads in Adabraka, Asylum Down, Glefe and Santa Maria; flood-prone communities in Accra. These sociodemographic characteristics include; gender, age distribution, level of education, level of employment and estimated monthly income.

4.2.1 Gender

In the selected flood-prone communities in Accra, 120 household heads were interviewed. Eighty-five respondents representing 70.8% were females while thirty-five representing 29.2% were males (**Table 1**). The wide differences between females and males may be attributed to changing household dynamics in Ghana, with more females taking on headship roles due to various factors like migration, economic empowerment or social changes (Fakir & Abedin, 2020). In contrast, the random selection process might have introduced bias, resulting in an overrepresentation of female-headed households.

Table 4.1 Gender of surveyed respondents

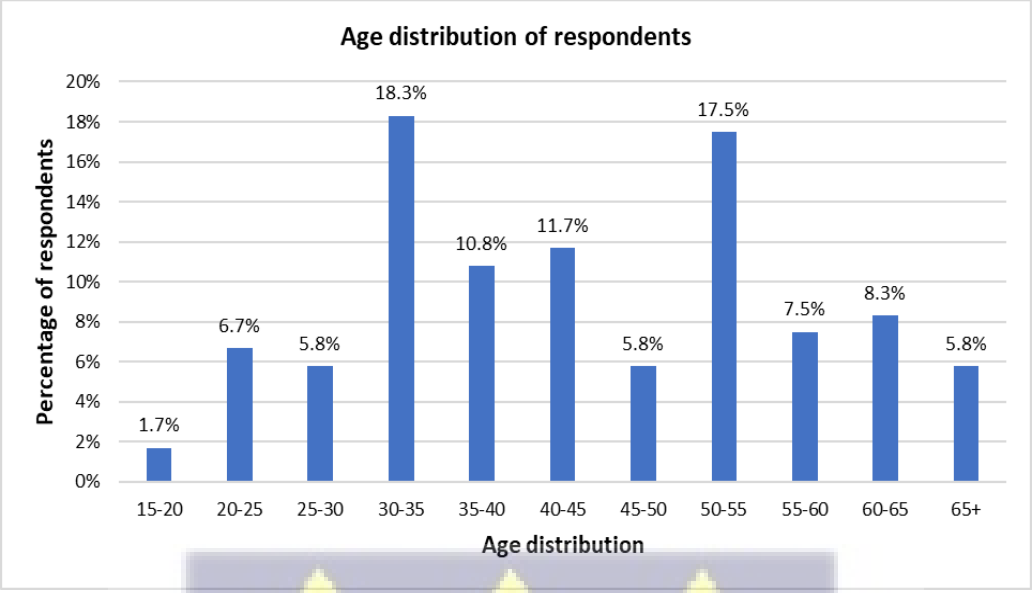
Gender	Number of people	Percentage
Female	85	70.8%
Male	35	29.2%
Total	**120**	**100%**

Source: Field Survey, March 2024

4.2.2 Age distribution

Majority of the household heads were within the age group of 30-35 years, which represented 18.3% of the total number. Household heads within the age group of 50-55 years accounted for 17.5% of the total number while household heads 65 years and above accounted for 5.8% of the total number. **(Figure 4)**

Figure 4: Age distribution of respondents

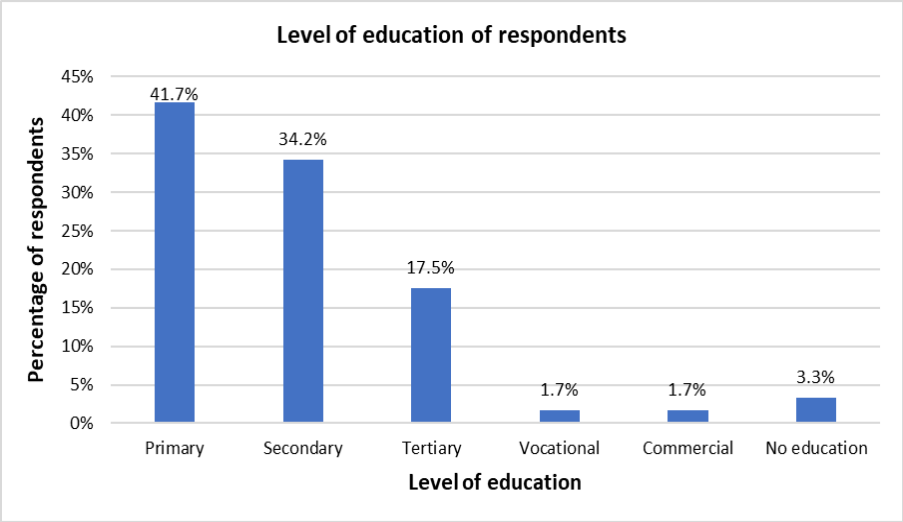


Source: Field Survey, March 2024.

4.2.3 Level of education

From the survey, majority of the respondents constituting 41.7% of the total population attained primary level of education whereas respondents with no education accounted for 3.3% of the total population. A substantial number of respondents constituting 34.2% and 17.5% of the total population attained secondary and tertiary level of education respectively. This is illustrated graphically in **figure 5**

Figure 5: Level of education of respondents

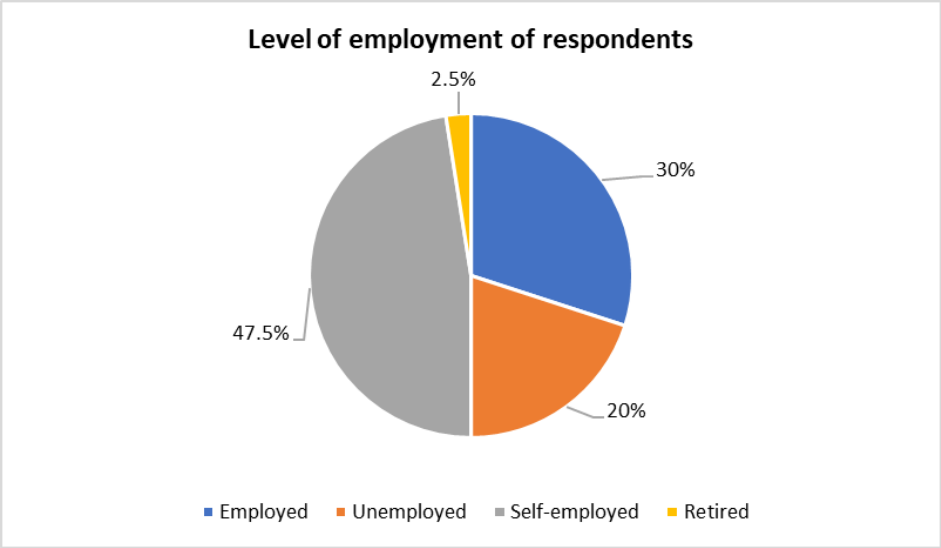


Source: Field Survey, March 2024.

4.2.4 Level of employment

Out of the one hundred and twenty respondents interviewed, fifty-seven household heads representing 47.5% of the total number are self-employed whereas three household heads representing 2.5% of the total number are retired. Thirty-six household heads accounting for 30% of the total number are employed while twenty-four household heads accounting for 20% of the total number are unemployed. This is shown in **figure 6**.

Figure 6: Level of employment of respondents



Source: Field Survey, March 2024

4.2.5 Estimated Monthly Income

Table 4.2 below shows the estimated monthly income of respondents. Thirty-two respondents representing 26.7% of the total number did not have a monthly income while 23 respondents representing 19.25% could not estimate their monthly income. Thirty-three respondents constituting 27.5% of the total number earn between GHC100-1000 monthly.

Table 4.2 Estimated monthly income of surveyed respondents.

Estimated Monthly Income	Number of people	Percentage
None	32	26.7%
Can't tell	23	19.2%
GHC 100-1000	33	27.5%
GHC1000-2000	15	12.5%
GHC2000-3000	7	5.8%
GHC3000- 4000	1	0.8%

GHC4000- 5000	3	2.5%
GHC10,000	2	1.7%
GHC12000	1	0.8%
No response	2	1.7%
Total	120	100%

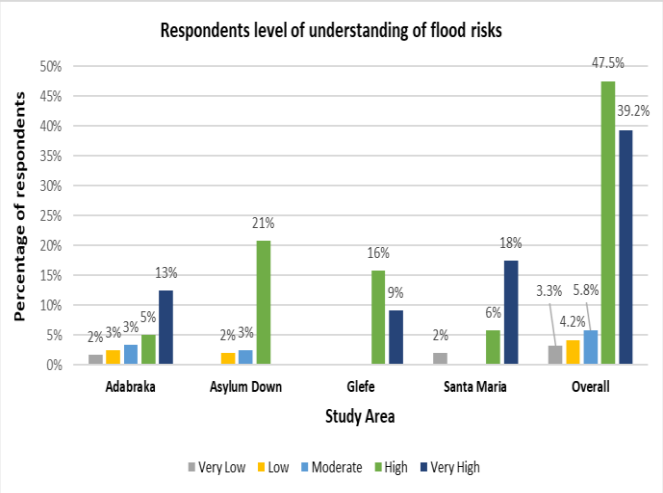
Source: Field Survey, March 2024

4.3 AWARENESS, KNOWLEDGE, AND EXPERIENCE OF FLOOD RISK

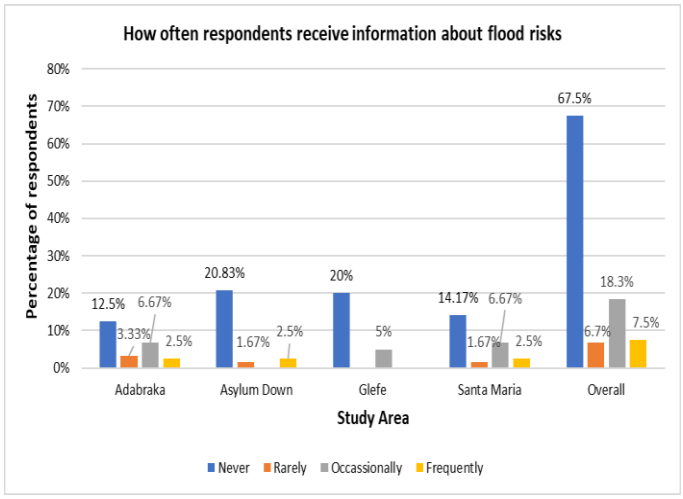
4.3.1 Awareness of Flood Risk

Household heads were interviewed to determine their level of understanding and access to information about flood risks in their communities. Among the total number of household heads interviewed (120), 57 of them representing 47.5% have a high understanding of flood risks in their area, 7 of them representing 5.8% have a moderate understanding of flood risks and five of them representing 4.2% have a low understanding of flood risks in their area. See **figure 7**. Over two-thirds (67.5%) of the respondents interviewed constituting 81 household heads have never received information about flood risks in their area, 18.3% representing 22 household heads occasionally receive information and 7.5% accounting for 9 household heads frequently receive information about flood risks in their area. See **figure 7**

Figure 7: Level of understanding and access to information about flood risks



a) Respondents' level of understanding of flood risks

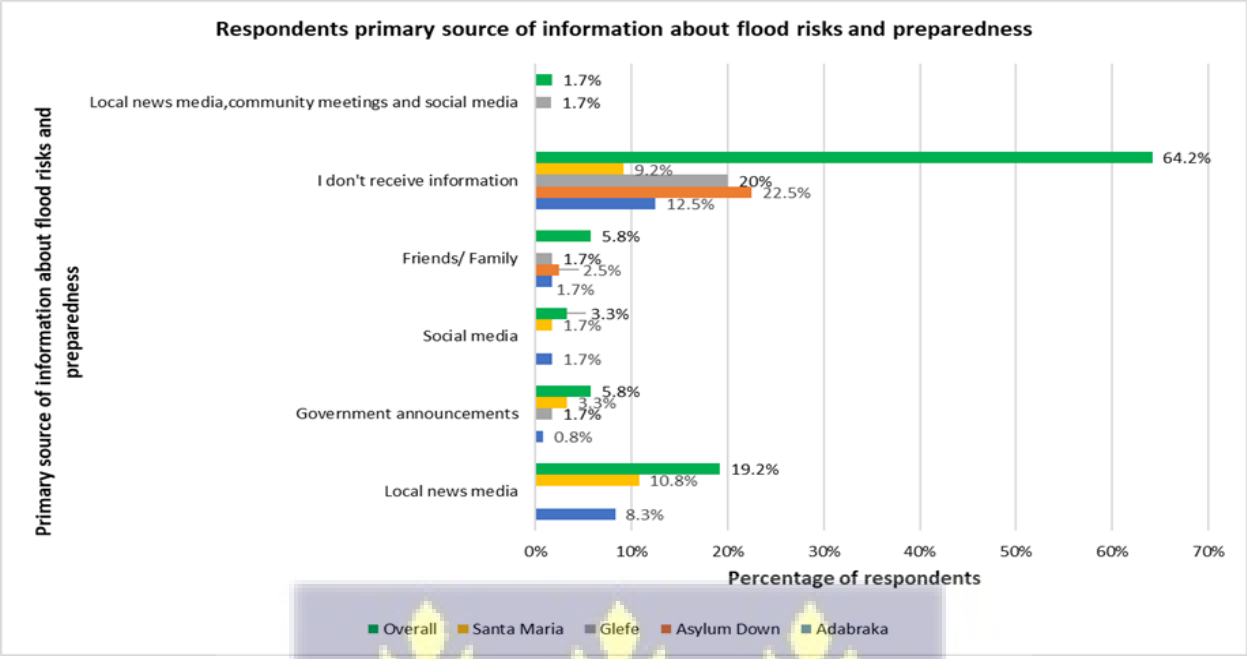


b) Access to information about flood risks

Source: Field Survey, March 2024

In terms of sources of information, 64.2% of the total respondents accounting for 77 household heads do not receive information about flood risks and preparedness, 19.2% representing 23 household heads receive information from the local news media and 5.8% constituting 7 household heads receive information from government announcements and friends/family respectively. This is illustrated in **figure 8**

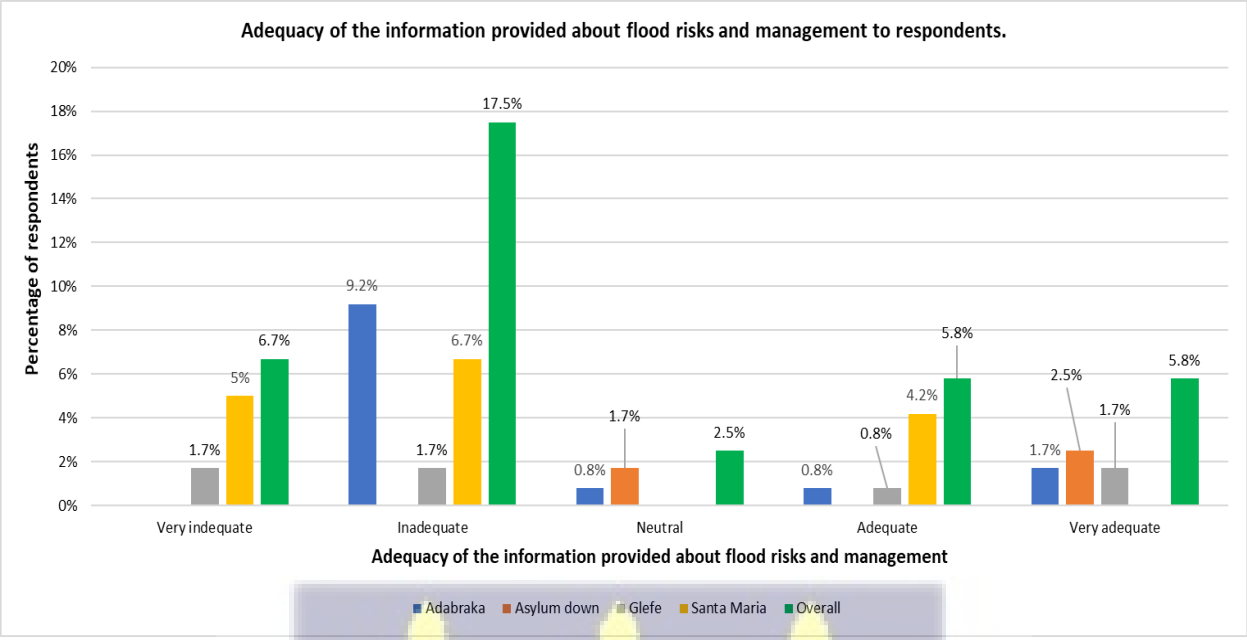
Figure 8: Respondents primary source of information about flood risks and preparedness



Source: Field Survey, March 2024.

With regards to the adequacy of information provided about flood risks and management, 17.5% constituting 21 household heads out of the total number of household heads interviewed rated the information provided about flood risks and preparedness as inadequate. 6.7% representing 8 household heads rated the information provided as very inadequate and 5.8% accounting for 7 household heads rated the information provided as adequate. This is illustrated in **figure 9**

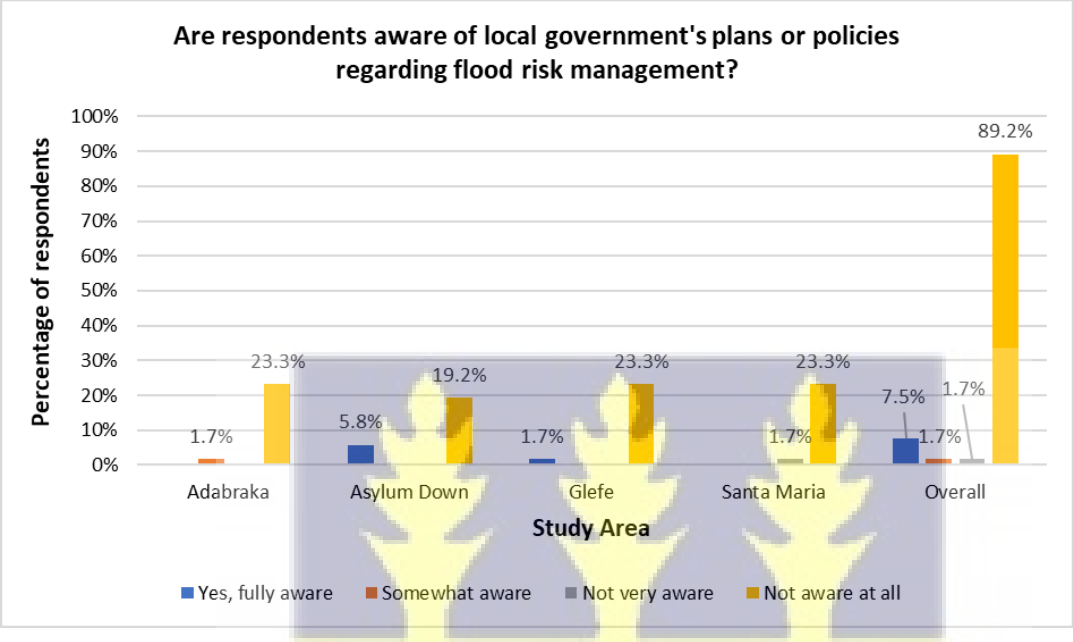
Figure 9: Adequacy of the information provided about flood risks and management to respondents



Source: Field Survey, March 2024.

When asked about their awareness of local government's plans or policies regarding flood risk management, majority of the respondents making up 89.2% of the total number are not aware of local government's plans or policies regarding flood risk management and 7.5% of the respondents are fully aware. This is shown in **figure 10**,

Figure 10: Respondents' awareness of local government's plans or policies regarding flood risk management



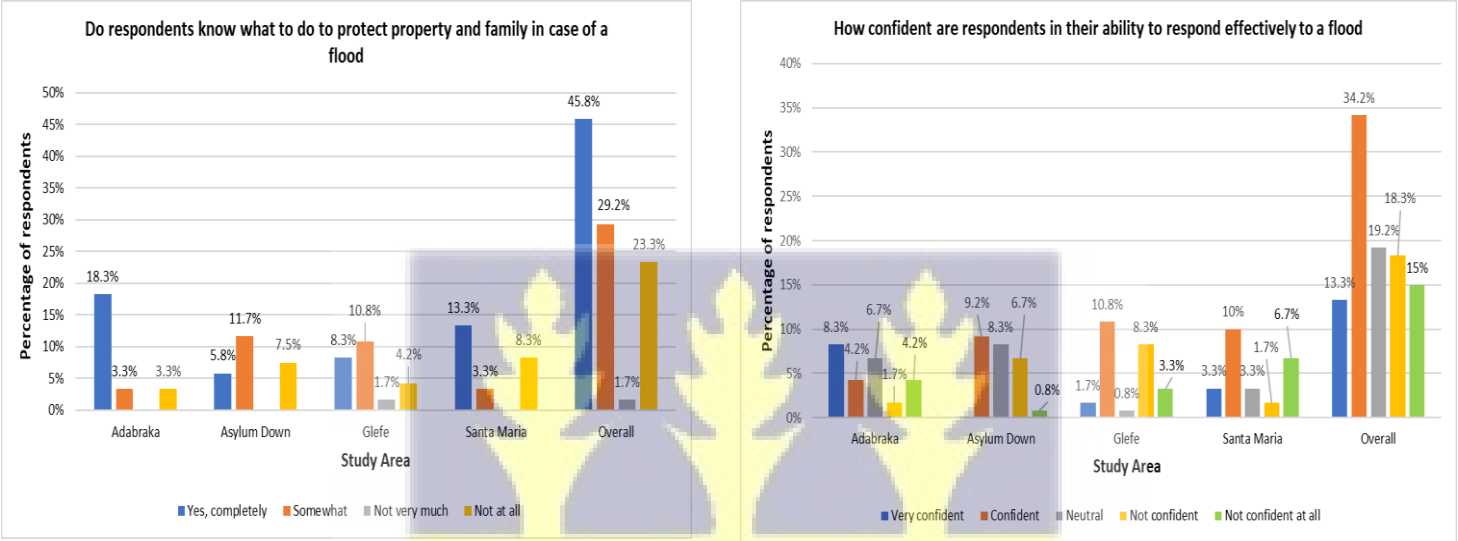
Source: Field Survey, March 2024.

4.3.2 Knowledge of Flood Risk

In relation to respondents' ability to respond effectively to a flood and how confident they are in their ability to respond, 55 of them constituting 45.8% completely know what to do to protect their property and family in case of a flood and 23.3% representing 28 household heads do not know what to do to protect their property and family in case of a flood. This is displayed in **figure 11**. 34.2% accounting for 41 household heads interviewed are confident in their ability to respond effectively to a flood. 13.3% representing 16 household heads are very confident and 15%

constituting 18 household heads are not confident at all in their ability to respond effectively to a flood. This is displayed in **figure 11**.

Figure 11: Respondents' ability to respond effectively to a flood and how confident are they in their ability



a) Flood knowledge of respondents on protection of property.

b) Confidence level of respondents' abilities to respond effectively to floods.

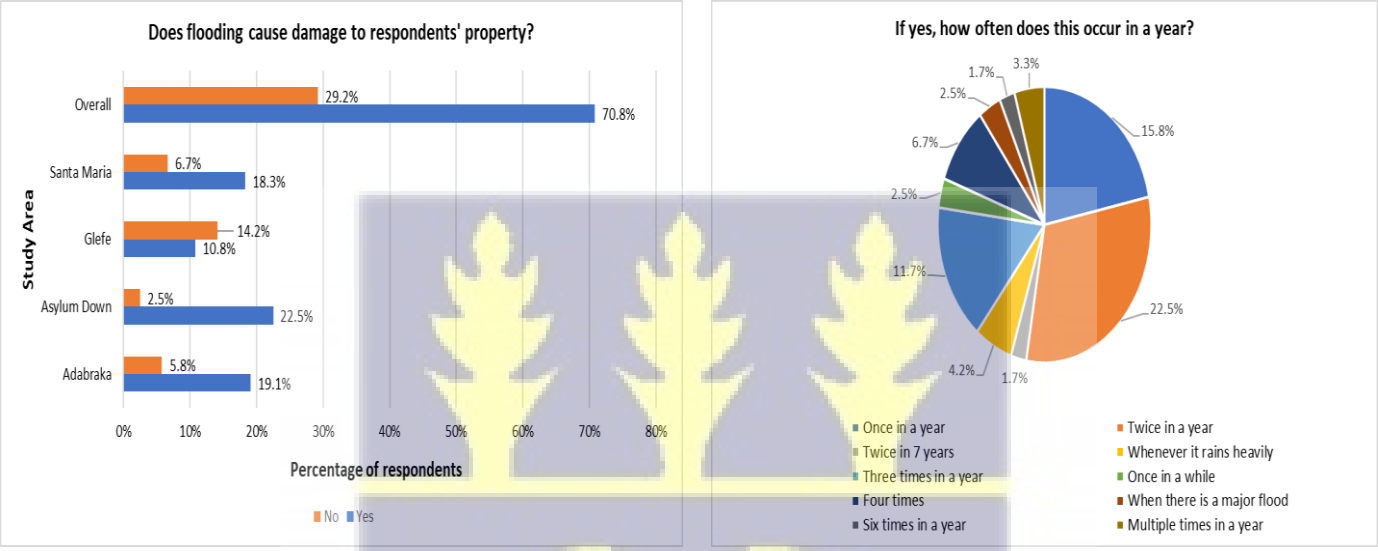
Source: Field Survey, March 2024.

4.3.3 Experience of flood risk

In terms of damage to property caused by flooding, majority of the respondents representing 70.8% of the total population interviewed experience damage to property due to flooding and 29.2% of the respondents do not experience damage to property due to flooding. See **figure 12**. Twenty-

seven household heads constituting 22.5% of respondents experience damage to property due to flooding twice in a year, nineteen household heads accounting for 15.8% experience damage to property once in a year, fourteen household heads representing 11.7% experience damage to property three times in a year and three household heads representing 2.5% of respondents experience damage to property when there is a major flood. See **figure 12.**

Figure 12: Does flooding cause damage to respondents' property and how often does it occur.



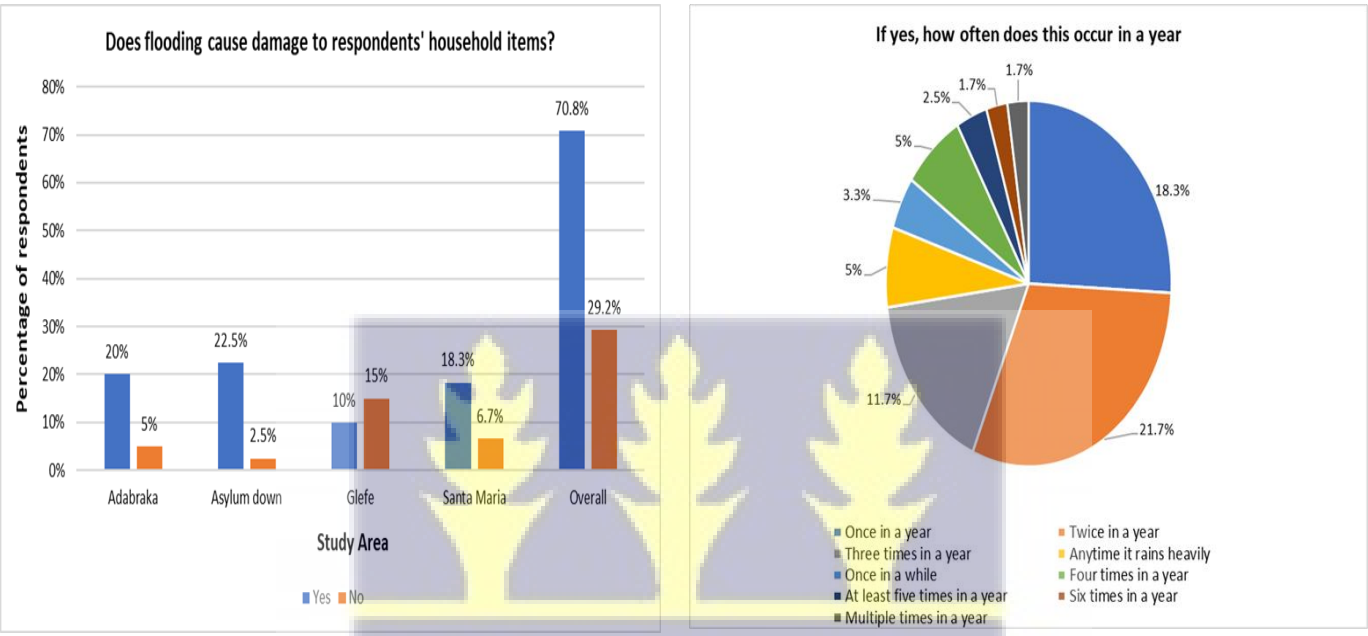
a) Does flooding cause damage to respondents' property b) If yes, how often does this occur in a year.

Source: Field Survey, March 2024.

With reference to damage caused by flooding to household items, majority of household heads interviewed comprising 70.8% experience damage to household items caused by flooding. 29.2% of the total population interviewed do not experience damage to household items. This is illustrated in **figure 13**. Twenty-six household heads interviewed representing 21.7% of the total number experience damage to household items caused by flooding twice in a year, twenty-two household heads accounting for 18.3% experience damage to household items once in a year and six

household heads constituting 5% experience damage to household items anytime it rains heavily. This is illustrated in **figure 13**:

Figure 13: Does flooding cause damage to respondents' household items and how often does it occur

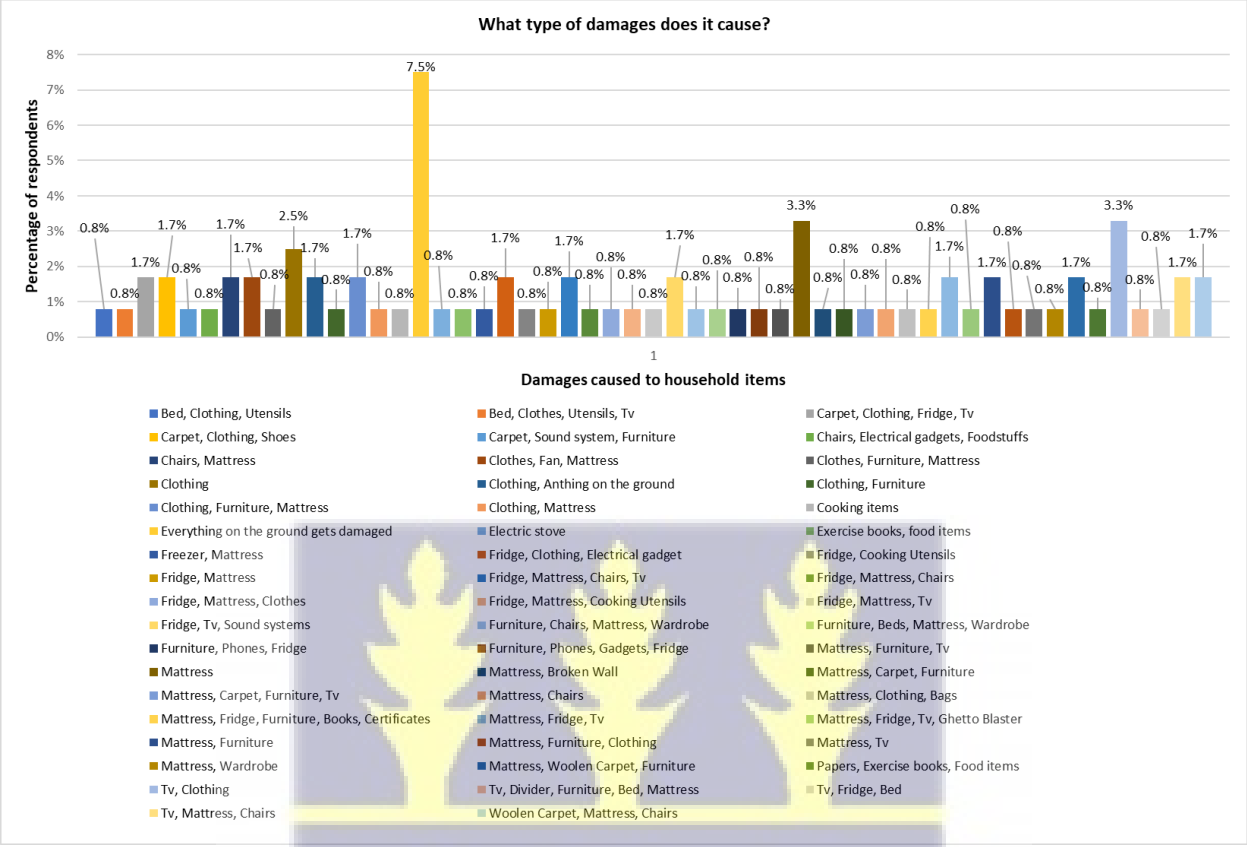


a) Does flooding cause damage to respondents' household items b) If yes, how often does this occur in a year.

Source: Field Survey, March 2024.

In connection with the types of damages caused by flooding to household items, nine household heads representing 7.5% of the total number interviewed mentioned that flooding causes damage to everything on the ground, four household heads accounting for 3.3% experience damage to their mattresses and three household heads constituting 2.5% reported damage to their clothes, fan and mattress due to flooding. This is shown in **figure 14**.

Figure 14: Types of damages caused by flooding to household items

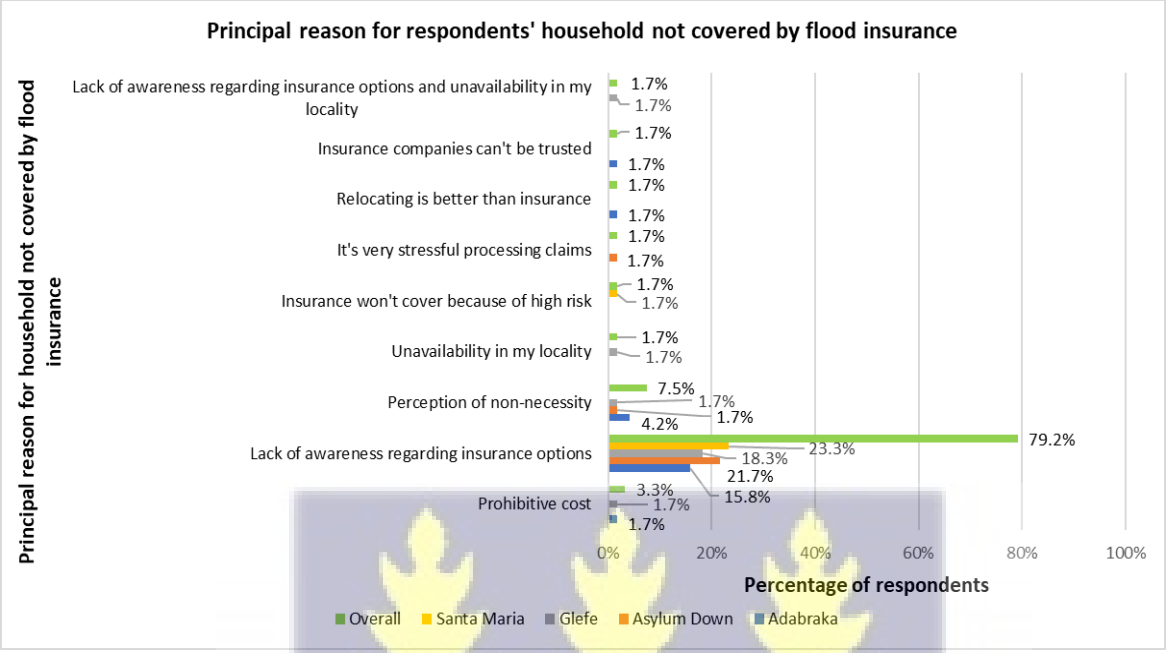


Source: Field Survey, March 2024

4.4 PERCEPTIONS OF FLOOD INSURANCE

In relation to respondents possessing a flood insurance policy, none of them constituting 100% of the total number possessed a flood insurance policy. Majority of the respondents representing 79.2% of the total number are not covered by flood insurance because of the lack of awareness regarding insurance options. This was followed by the perception of non-necessity accounting for 7.5% of the total number and 3.3% of the total number mentioned prohibitive cost at the principal reason for not being covered by flood insurance. See **figure 15**.

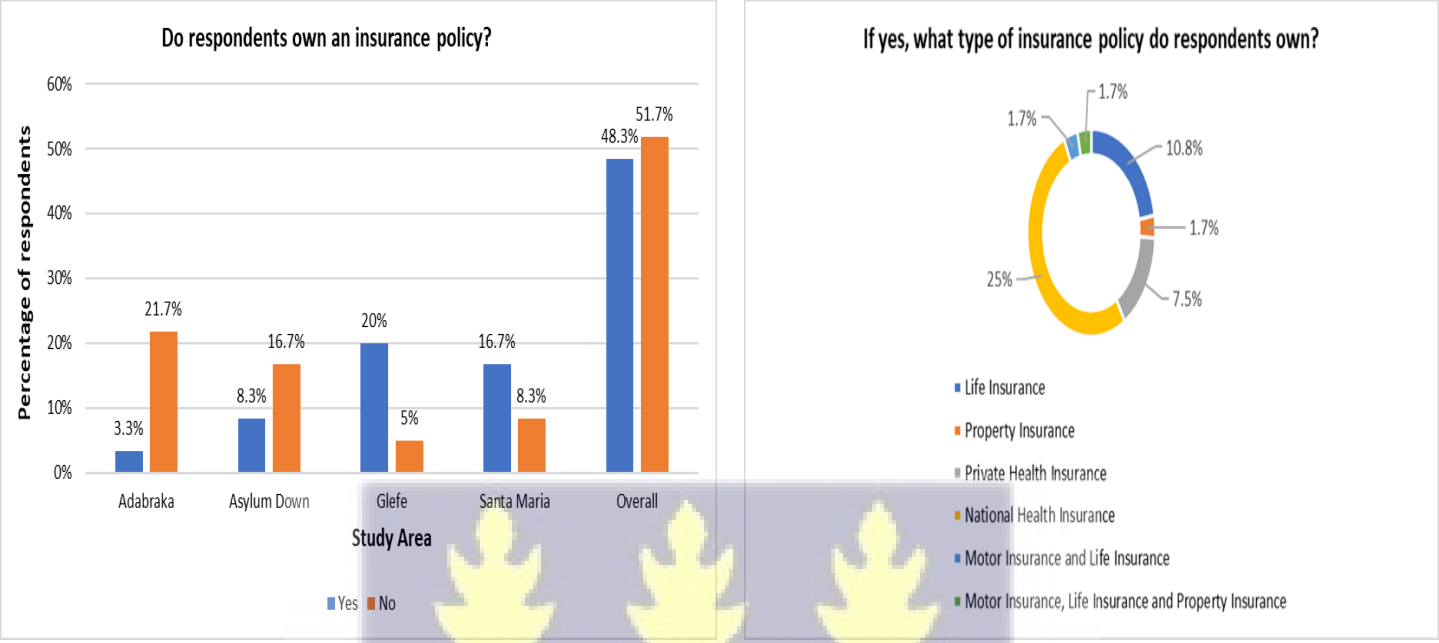
Figure 15: Principal reason for respondents' household not covered by flood insurance.



Source: Field Survey, March 2024.

In connection to respondents owning an insurance policy, 58 household heads accounting for 48.3% of the total number own an insurance policy while 62 household heads constituting 51.7% of the total number do not own an insurance policy. This is displayed in **figure 16**. 25% of the respondents who own an insurance policy are covered on the National Health Insurance, 10.8% of them possess a life insurance policy and 7.5% of them have a private health insurance policy. This is displayed in **figure 16.**

Figure 16: Respondents ownership of an insurance policy and the type of insurance policy respondents own

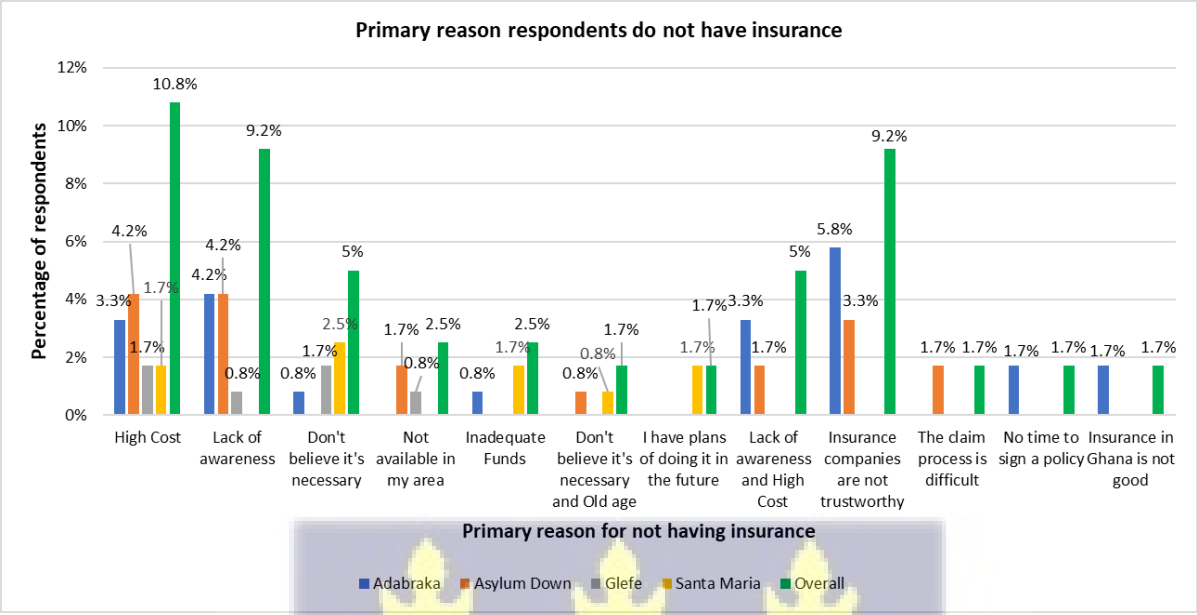


a) Do respondents own an insurance policy? b) If yes, what type of insurance policy do respondents own?

Source: Field Survey, March 2024.

In terms of the primary reason why respondents do not own an insurance policy, 10.8% of the respondents reported high cost as the primary reason they do not have insurance, 9.2% of the respondents each reported the lack of awareness and the lack of trust for insurance companies, 5% of the respondents do not believe it's necessary and 2.5% of the respondents reported inadequate funds as their primary reason for not having insurance. See **figure 17.**

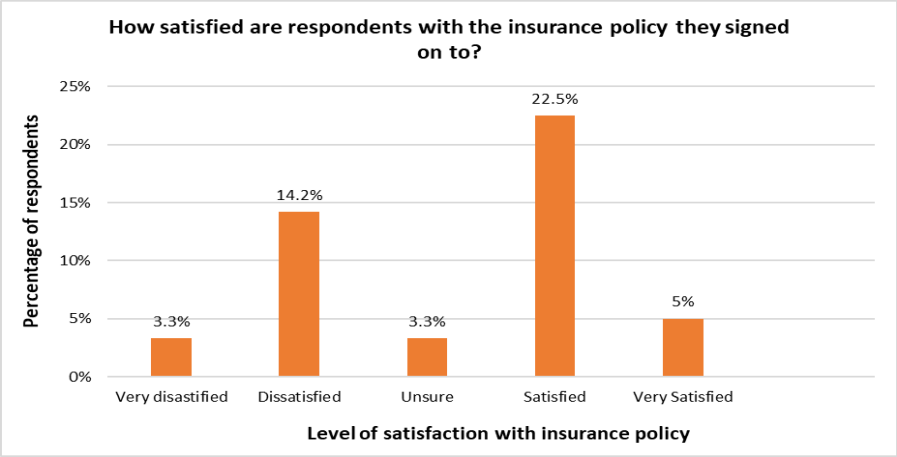
Figure 17: Primary reason respondents do not have insurance.



Source: Field Survey, March 2024.

In relation to how satisfied respondents are with the insurance policy they signed on to, 27 household heads representing 22.5% of the total number are satisfied with the insurance policy they signed on to, 17 household heads accounting for 14.2% of the total number are dissatisfied and 4 household heads constituting 3.3% are unsure. See **figure 18**.

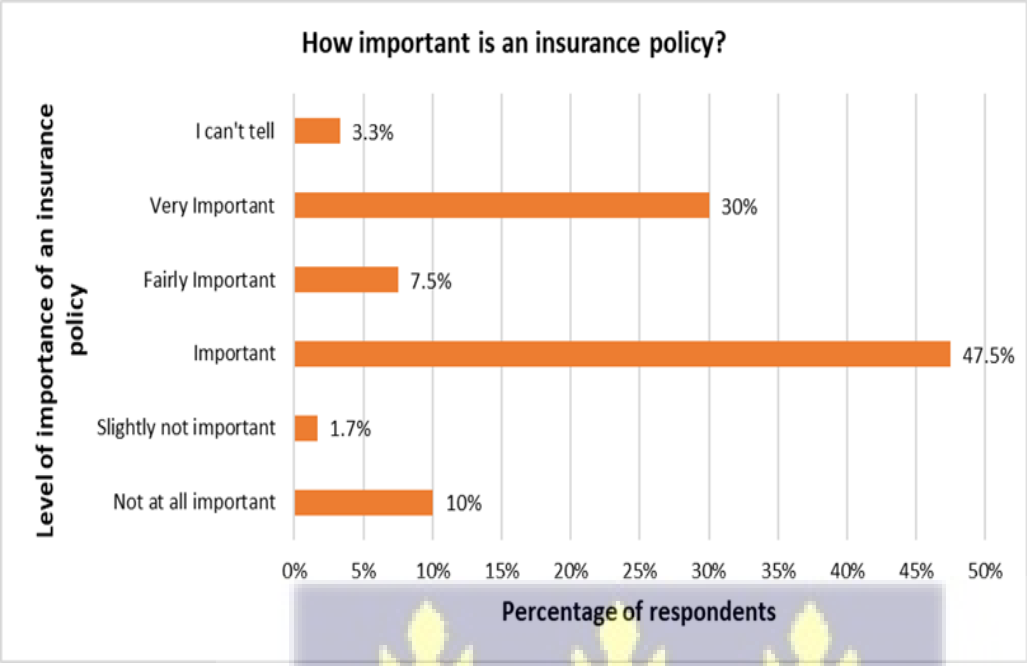
Figure 18: How satisfied are respondents with the insurance policy they signed on to.



Source: Field Survey, March 2024.

In terms of how important an insurance policy is, fifty-seven respondents representing 47.5% of the total number view an insurance policy as important, twelve of them accounting for 10% of the total number view an insurance policy as not important at all and four of them constituting 3.3% of the total number can't tell. See **figure 19**.

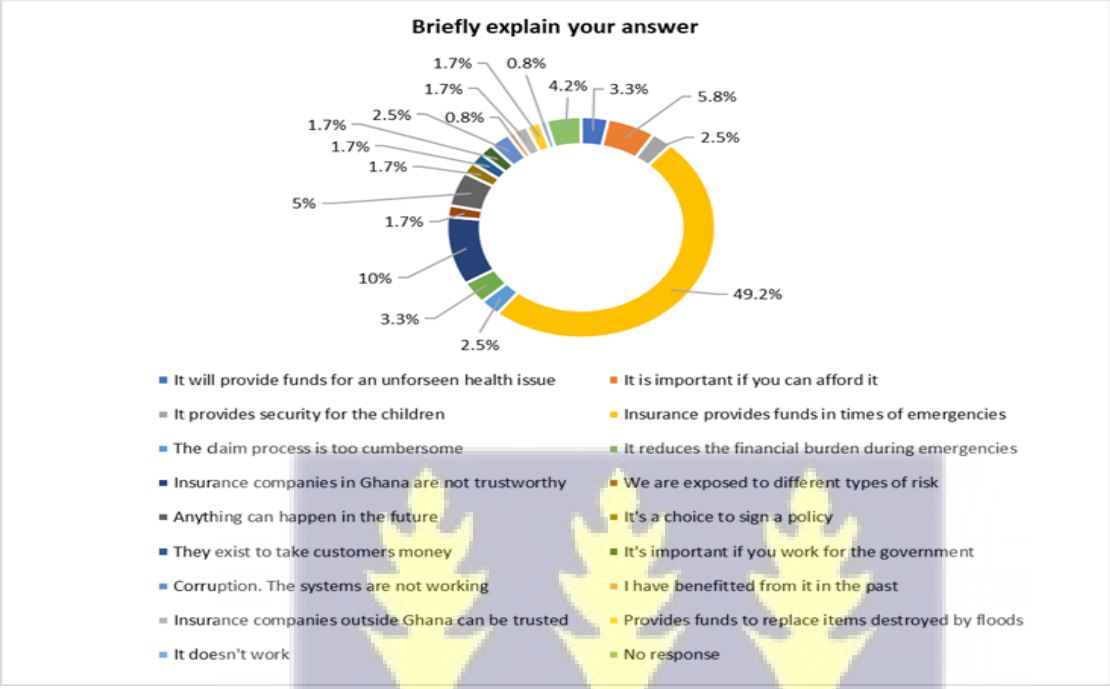
Figure 19: How important is an insurance policy



Source: Field Survey, March 2024.

In connection to the reasons given for how important an insurance policy is, 49.2% of the total number of respondents mentioned that insurance provides funds in times of emergencies, 10% of the respondents said insurance companies in Ghana are not trustworthy and 5.8% of the respondents reported that, it is important if you can afford it. See **figure 20**.

Figure 20: Brief answers that explain why respondents may or may not be willing to sign a flood insurance policy.

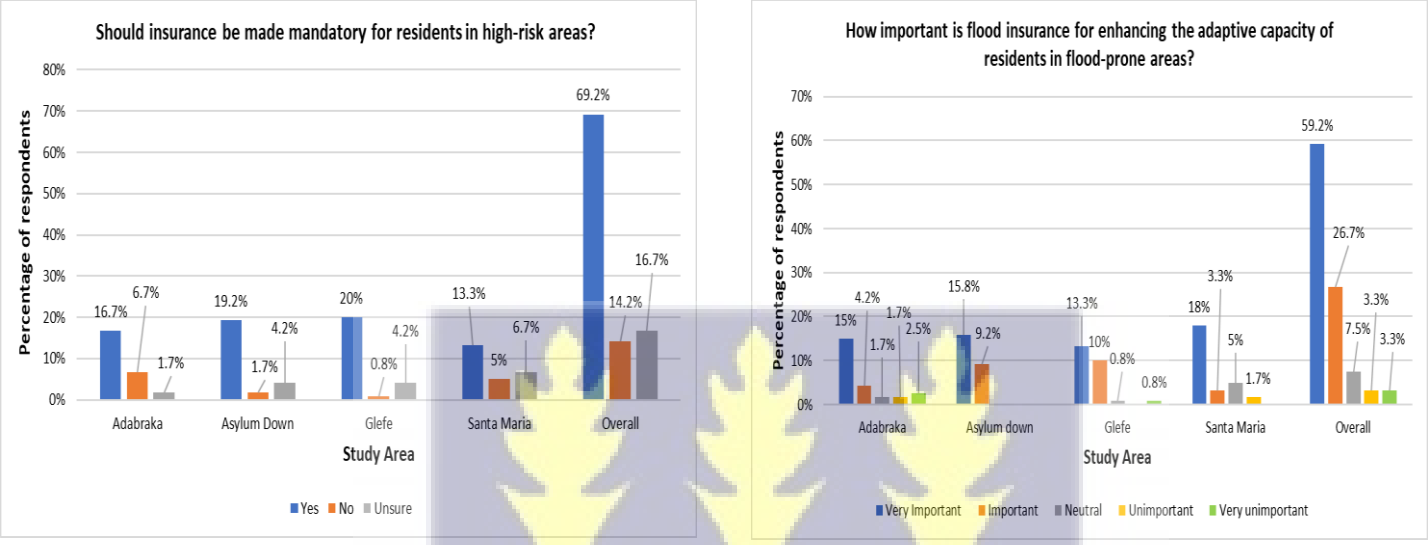


Source: Field Survey, March 2024.

In relation to making insurance mandatory for residents in high-risk areas, 69.2% of the total respondents accounting for 83 household heads mentioned that insurance should be made mandatory for residents in high-risk areas, 14.2% representing 17 household heads did not agree to making insurance mandatory for residents in high-risk areas and 16.6% comprising of 20 household heads are unsure. See **figure 21**. In terms of how important flood insurance is for enhancing the adaptive capacity of residents in flood prone areas, 71 of the respondents accounting for 59.2% of the total number mentioned that flood insurance is very important for enhancing the adaptive capacity of residents in flood prone areas, 9 household heads representing 7.5% gave a neutral response and 4 household heads constituting 3.3% of the total number reported that flood

insurance is very unimportant for enhancing the adaptive capacity of residents in flood prone areas. See **figure 21**.

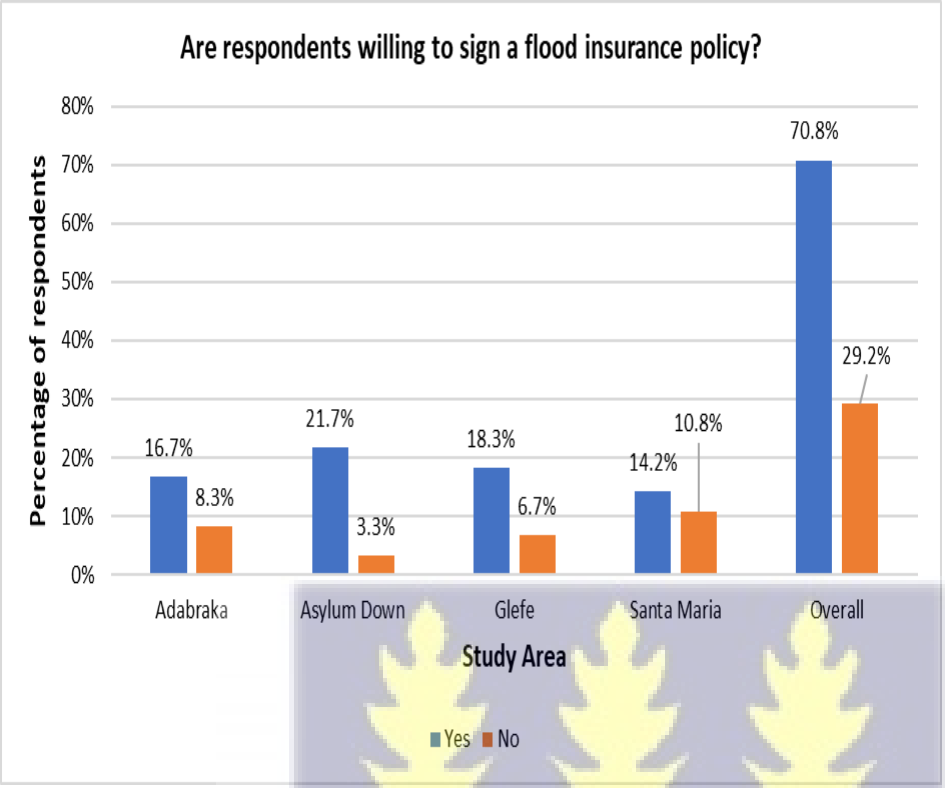
Figure 21: Should insurance be made mandatory for residents in high-risk areas and how important is flood insurance for enhancing the adaptive capacity of residents in flood-prone areas.



Source: Field Survey, March 2024.

In relation to respondents' willingness to sign a flood insurance policy, 70.8% of the total number accounting for 85 household heads are willing to sign a flood insurance policy and 29.2% comprising of 35 household heads are not willing to sign a flood insurance policy. This is shown in **figure 22**.

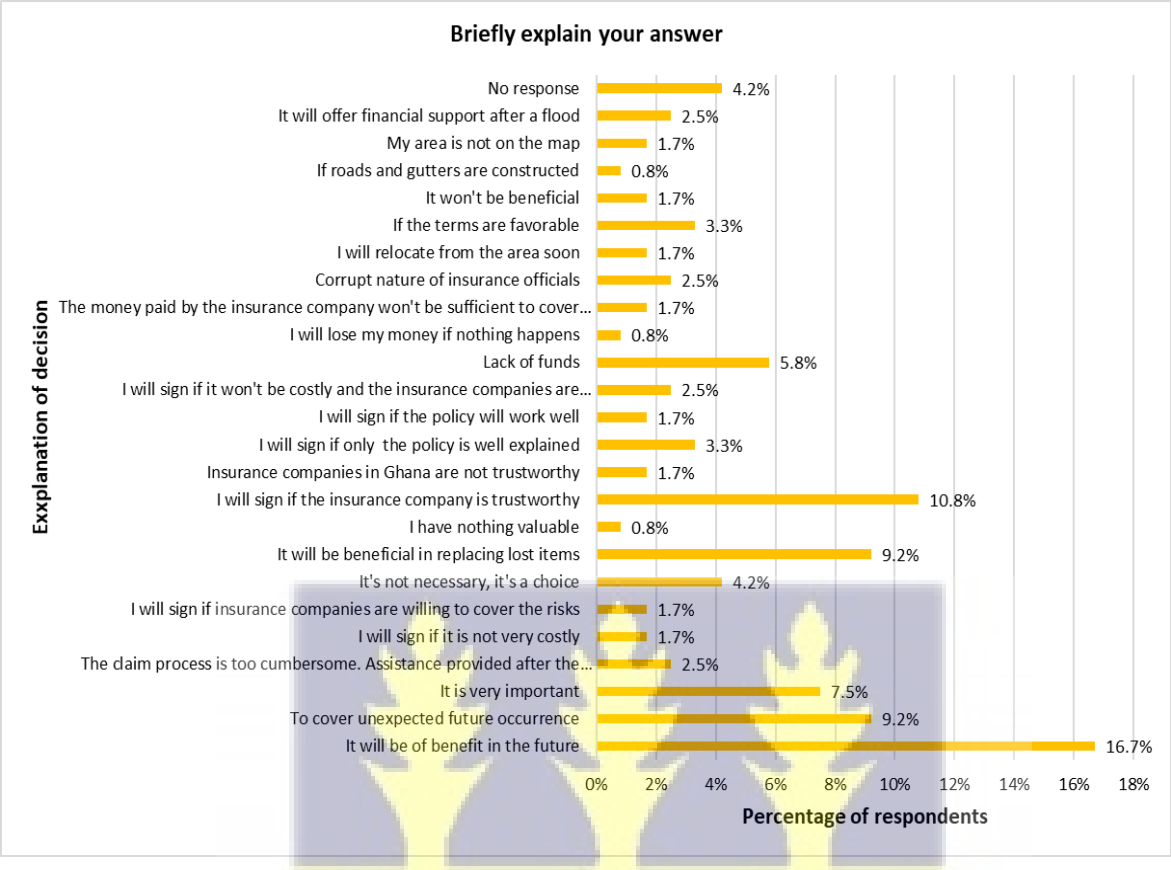
Figure 22: Are respondents willing to sign a flood insurance policy?



Source: Field Survey, March 2024.

In connection to why respondents are willing to sign a flood insurance policy, 16.7% of the respondents are willing to sign a flood insurance policy because it will be of benefit in the future, 9.2% of the respondents believe it will be beneficial in replacing lost items, 10.8% of the respondents said they are willing to sign if the insurance company is trustworthy. 4.2% of the respondents believe signing a flood insurance policy is not necessary but rather a choice and 5.8% of the respondents are not willing to sign a flood insurance policy due to lack of funds. See **figure 23**.

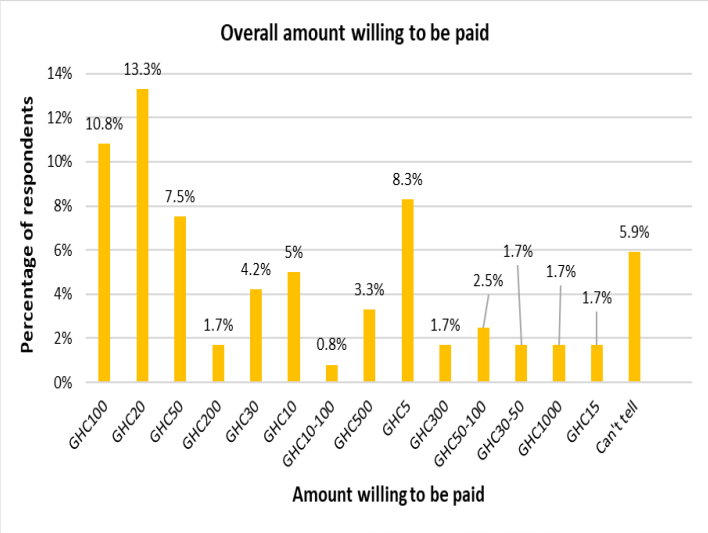
Figure 23: Briefly explain your answer

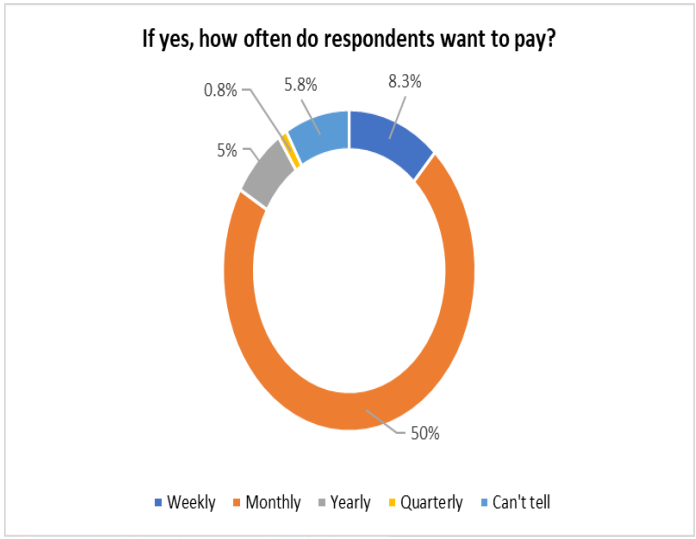


Source: Field Survey, March 2024.

In terms of the amount respondents are willing to pay and how often they want to pay, 16 household heads representing 13.3% of the total number are willing to pay 20 Ghana Cedis, 6 household heads accounting for 5% are willing to pay 10 Ghana Cedis and constituting 7.5% are willing to pay Fifty Ghana Cedis. 50% of the respondents representing 60 household heads want to pay monthly, 8.3% accounting for 10 household heads want to pay weekly and 5% constituting six household heads want to pay yearly. This is displayed in **figure 24**.

Figure 24: Amount respondents are willing to pay and how often they want to pay.





Source: Field Survey, March 2024.

Table 4.3 Correlation matrix between the perceptions of flood insurance and the willingness to adopt a flood insurance policy.

	Principal reason for house not covered by flood insurance	Do you own an insurance policy	Satisfaction with signed insurance policy	How important is an insurance policy	Should flood insurance be made mandatory for residents in high- risk areas	Importance of flood insurance for enhancing adaptive capacity	Willingness to sign a flood insurance policy
Principal reason for your house not covered by flood insurance	1						
Do you own an insurance policy	.072	1					
Satisfaction with signed insurance policy	.007	.860**	1				
How important is an insurance policy	-.051	-.201**	-.091	1			
Should flood insurance be made mandatory for residents in high- risk areas	-.050	.099	.082	-.319**	1		
Importance of flood insurance for enhancing adaptive capacity	.057	.248**	.231*	-.504**	.298**	1	
Willingness to sign a flood insurance policy	.026	.144	.088	-.446**	.249**	.450**	1

***Correlation is significant at the 0.01 level (2-tailed)*

**Correlation is significant at the 0.05 level (2-tailed)*

Source: Field Survey, March 2024.

Table 4.3 shows the results of a Pearson correlation analysis performed to test the significance of the relationship between the perceptions of flood insurance and the willingness of respondents to sign a flood insurance policy.

H1: There is a significant relationship between the perceptions of flood insurance and the willingness to adopt a flood insurance policy

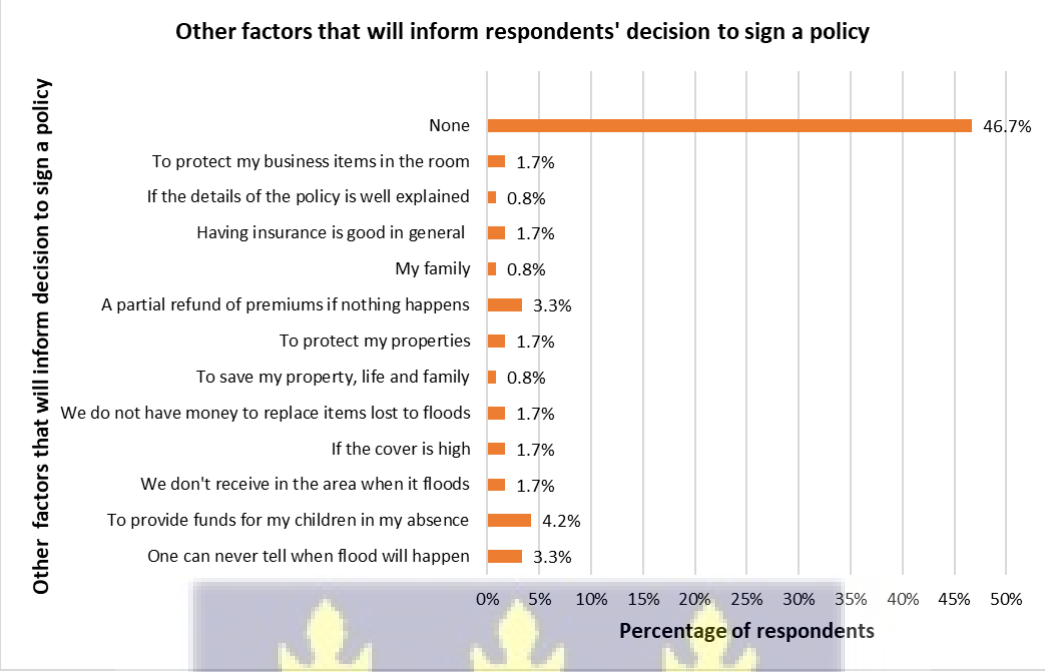
Pearson product correlation of the principal reason for respondents' houses not covered by flood insurance and the willingness to sign a flood insurance policy was found to be statistically insignificant **(*r*=.026, p>0.01**). Hence H1 was rejected. This shows that the principal reason for respondents' houses not covered by flood insurance does not influence their willingness to sign a flood insurance policy. Moreover, the relationship between respondents owning an insurance policy and the willingness to adopt a flood insurance policy was found to be statistically insignificant ***(r*=.144, p>0.01).** Hence H1 was rejected. This means that whether or not respondents own an insurance policy would not lead to an increase in the willingness to sign a flood insurance policy.

In terms of how satisfied respondents are with the insurance policy they signed on to and the willingness to sign a flood insurance policy revealed a statistically insignificant relationship **(*r*= .088, p>0.01).** Hence H1 was rejected. This means that the respondents' level of satisfaction with the insurance policy they signed on to would not lead to an increase in the willingness to sign a flood insurance policy. However, there is a statistically significant relationship **(r= -.446, p<0.01)** between how respondents perceive the importance of an insurance policy and their willingness to sign a flood insurance policy**)**. Hence H1 was accepted. This means that an increase in how respondents perceive the importance of flood insurance would lead to a decrease in the willingness to sign a flood insurance policy.

With regards to whether flood insurance should be made mandatory for high-risk areas and the willingness to sign a flood insurance policy, a statistically significant relationship was derived **(*r*=.249, p< 0.01**). Hence H1 was supported. This shows that making flood insurance mandatory for high-risk areas would lead to an increase in the willingness to sign a flood insurance policy. In addition, the relationship between how important flood insurance is for enhancing adaptive capacity and the willingness to sign a flood insurance policy was found to be statistically significant ***(r*=.450, p< 0.01)**. Hence H1 was supported. This shows that an increase in the importance of flood insurance for enhancing adaptive capacity would lead to an increase in the willingness to sign a flood insurance policy.

In relation to other factors that will inform respondents' decision to sign a policy, fifty-six respondents accounting for 46.7% of the total number mentioned that no other factor will inform their decision to sign a policy. Five respondents accounting for 4.2% of the total number reported "to provide funds for my children in my absence" as another factor that will inform their decision to sign a policy, four respondents representing 3.3% of the total number each stated a partial refund of premiums if nothing happens and one can never tell when flood will happen respectively. This is illustrated in **figure 25**.

Figure 25: Other factors that will inform respondents' decision to sign a policy.



Source: Field Survey, March 2024.

Table 4.4 displays the household items and appliances willing to be covered by respondents. 14.2% of the respondents are willing to cover chairs, tables, sofa, fan, iron, television, radio, microwave, rice cooker, fridges, deep freezers, beds/mattresses/other sleeping mats, cooking utensils, food items, house/structure.

Table 4.4 Household items and appliances willing to be covered

Household items and appliances willing to be covered	Number of people	Percentage
Beds/Mattress/Other sleeping mats. Food items, House/structure Cooking Utensils Chairs Tables Sofa Fan Iron Television Radio Microwave Rice Cooker Fridges Deep Freezers	114	95%
Child's Health	1	0.8%
Family	1	0.8%
Health	1	0.80%
House/structure, Children's health	1	0.8%
Human Life	2	1.70%
Total	**120**	**100%**

Source: Field Survey, March 2024

4.5 DISCUSSION OF RESULTS

4.5.1 Awareness of Flood Risk

Based on the interviews of household heads in Accra, 47.5% of respondents had a good level of understanding of the risks of flooding in their area. This degree of awareness is essential since research indicates that comprehension of flood hazards is critical to improving adaptive capacity and lowering susceptibility (Kuhlicke et al., 2020). According to Bubeck, Botzen, and Aerts (2012), homes with higher awareness are typically more prepared and take proactive steps to lessen the effects of flooding. 10% of respondents, however, indicate a gap that may jeopardize the community's overall resilience: either a low (4.2%) or moderate (5.8%) understanding.

Furthermore, according to the data, more than two thirds (67.5%) of the respondents said they had never been informed about the risk of flooding in their neighborhood. This is concerning because disaster risk reduction (DRR) initiatives depend heavily on the efficient dissemination of flood risks (Delgado et al., 2023). An interview with the director of the National Disaster Management Office (NADMO) of the Korle Klottey Municipal Assembly revealed that there are planned activities in place for every year known as "Disaster Preparedness Action Plan". He also shared that the department organizes disaster risk reduction engagements in communities through education and sensitization.

"We have flood risk within the municipality given that our area is a low-lying area so at every given rainy season, we are saddled with flood situations. As a department in the municipality (NADMO), we have planned activities in place for every year called Disaster Preparedness Action Plan. From the beginning of the year, we started some training programs related to disaster risk reduction so we organized such training among staff, relevant agencies and also relevant officers in the Assembly because when it comes to disaster management, we play a coordination role. We

coordinate relevant institutions and officers to manage emergency situations. We also go into the communities to organize disaster risk reduction engagements. We also do disaster risk reduction education and sensitization"- **Nadmo Director, Korle Klottey Municipal Assembly.**

The slow information flow raises the possibility that there are gaps in the local government's outreach programs or that there aren't enough easily available channels for providing homes with up-to-date, reliable information about flood threats. Aerts et al. (2018) state that communities' ability to respond to and recover from flood occurrences is severely hampered when they lack sufficient information. Moreover, the low proportion of homes (7.5%) that regularly receive information about flood risk highlights the need for more comprehensive data. It has been demonstrated that providing information on a regular and consistent basis improves community engagement and flood risk management strategy implementation (Miceli, Sotgiu, & Settanni, 2008). 18.3% of households receive information occasionally, which suggests some degree of participation, but the irregularity may lessen the impact of whatever adaptive measures these households take.

4.5.2 Knowledge of Flood Risk

Out of the total number of household heads surveyed, 45.8% of them fully understood what steps to take to safeguard their family and property in the event of a flood. For efficient flood preparedness and response, this high degree of understanding is necessary. Prior research indicates that households possessing a comprehensive comprehension of flood risk and preventative measures are more capable of executing suitable activities, consequently diminishing their susceptibility (Wachinger et al., 2013). Communities' ability to adapt can be greatly increased by having knowledge about protective measures, which empowers them to take preventive action and

make educated decisions (Dushkova & Ivlieva, 2024). In contrast, 28% of respondents said they were unsure of how to safeguard their family and belongings in the event of flooding. This ignorance is a serious risk since it can result in insufficient planning and elevated danger during floods. A lack of knowledge can worsen the effects of disasters and frequently lead to poorer levels of preparedness as highlighted by Lindell and Perry (2004). Improving overall flood resilience requires addressing this gap through focused educational programs and community outreach.

Additionally, the data shows that respondents' confidence in their capacity to react to a flood efficiently varies. Fifteen percent of the respondents are unconfident in their capacity to handle flood scenarios, compared to thirty-four percent who are confident in their response skills and thirteen percent who are extremely confident. As a measure of perceived preparedness, the range of confidence levels might affect the effectiveness of the actual reaction. Study conducted in 2009 by Terpstra et al. indicates a strong correlation between preparatory behaviors and confidence in flood response. As opposed to people who lack confidence, who could put off or postpone taking required action, those who feel confident are more inclined to take proactive steps (Lindell & Perry, 2004). Household heads' high levels of confidence and considerable ambiguity highlight the necessity for thorough instruction and resources. Across all levels, confidence and readiness can be increased with the provision of clear instructions and useful activities. According to Morss et al. (2011), programs that increase confidence and understanding can lower overall risk and result in a more successful flood response.

4.5.3 Experience of Flood Risk

According to the findings, a sizable majority of respondents (70.8%) reported having had flooding-related property damage. This high proportion shows how much flooding affects Accra's urban

households and emphasizes how urgently adequate flood risk control measures are needed. According to Holleman et al. (2020), frequent flooding-related property damage has larger effects on community resilience and economic stability in addition to affecting household safety.

Respondents reported varying frequencies of damage: 22.5% reported twice a year, 15.8% once a year, 11.7% three times a year, and 2.5% during significant floods. The variance in frequency might be attributed to varying degrees of vulnerability to flooding as well as the various effects that flooding can have on families. A considerable proportion of participants indicated that frequent exposure to flooding can result in elevated levels of stress and financial strain, along with diminished ability to adapt (Mechler et al., 2016). Several factors, such as poor drainage infrastructure, shifting land uses, and climate unpredictability, are linked to frequent flood damage. Studies show that areas prone to flooding frequently encounter difficulties in the areas of infrastructure development and urban planning. Insufficient drainage systems and urbanization, for instance, are linked to a higher risk of flooding and property damage, according to Ghosh et al. (2018). Planning thoroughly and investing in resilient infrastructure are necessary to address these problems and lessen the effects of flooding. Although most damage is ascribed to less severe and more regular incidents, massive floods also have a significant impact, according to 2.5% of respondents who experienced damage during huge floods. The experiences of persons impacted by major flood events show that these occurrences can inflict significant property damage as well as upheaval communities (Smith, 1996). For such large-scale occurrences to have a less impact and better recovery results, improved readiness and reaction tactics are essential.

Information obtained during in-depth interviews with the NADMO Director of the Korle Klottey Municipal Assembly and the Hydromet Officer at the NADMO department of the Ga Central Municipal Assembly revealed the main challenges they face in implementing flood risk

management strategies in their respective municipalities. They both cited challenges related to waste management and the attitudes of the local folks as seen below:

"*The challenges we face in implementing effective flood risk management strategies in Accra has to do with waste management and attitude of the local folks. We have a lot of market spaces and trading communities within our jurisdiction. Every day, from about 4 -10pm, we have people bring bulk goods to our market spaces to offload for wholesalers to buy and retail to other people. When this takes place, the wastes generated are left unattended to and wherever it goes nobody cares. Again, people who come and ply their trade during the day especially in Kingsway area gather their rubbish and dump it at a place that is not designated. The rubbish always finds its way into drains and when the drains get choked, it always induces flood. Also, people dump refuse indiscriminately in the various communities thinking that the government will come and collect it. At the moment, Accra practices the polluter pays policy so you can't be living in Accra and generate waste and expect someone to come and take care of the waste for you. You have to pay for the waste that has been generated to be managed for you. The assembly has contracted private companies to manage these wastes in our jurisdiction. They go to homes to collect but people don't want to pay for their waste to be managed for them so they put them in a sack and dump it somewhere or sometimes they put it in basket and dump it by the road side. The lunatics collect and gather rubbish from one place to another causing problems. Also, people play intermediary roles when people are caught and found culpable for committing offence. For instance, someone gets arrested for dumping refuse at the road side, people always rush in to plead on their behalf*"

– **NADMO Director, Korle Klottey Municipal Assembly.**

"*The challenges come from both sides in terms of management of flood risk in the municipality. It requires a huge sum of money to reduce flood risks in the municipality. We are talking about building storm drains and those are huge monies that burdens municipal assemblies based on that they have to take their time. The second challenge boils down to the residents in the community. Some of them based on their adamancy to building codes, they build in waterways and pour their refuse into drains and those escalate the compounding issue of flooding in the municipality. I believe these are the two major challenges; the resources to do the things that need to be done and the behavior of the residents"*- **Hydromet Officer (NADMO), Ga Central Municipal Assembly.**

These testimonies show that flooding in Accra is a big problem that needs more than just good intentions to fix. We need enough money, cooperation between different groups, and people working together to make a real difference. To make Accra more resilient to floods, we must fix infrastructure problems and change how people think and behave.

4.5.4 Perceptions of Flood Insurance

The information provides important new information on respondents' opinions about flood insurance and its coverage. Notably, the lack of knowledge about insurance choices accounts for 79.2% of respondents' non-coverage from flood insurance. According to Buehler and Maas (2018), this research identifies a significant obstacle to raising insurance uptake since successful risk management depends on consumers' knowledge of and comprehension of their alternatives for insurance. Insufficient knowledge may lead households to view insurance as an unfeasible means of safeguarding against flood hazards. Also, 3.3% of respondents believe flood insurance is unnecessarily expensive however the representative of SanlamAllianz stated otherwise during the in-depth interview; "*Insurance penetration is generally low and this trend is not different for Fire*

Insurance which has a cover against flood. It is perceived Fire/Flood Insurance is very expensive. It is rather inexpensive and affordable", and 7.5% of respondents believe it is unneeded. These attitudes mirror more general difficulties in the flood insurance market acceptance (Hung, 2009). These misconceptions lead to perceptions of non-necessity. Conversely, exorbitant expenses may provide a substantial obstacle, especially in areas of low income where access to insurance products is restricted due to financial constraints (Churchill, 2007). The interview with the representative of SanlamAllianz revealed that the institution offers competitive pricing and keeps policy wording in simple language as a strategy to make flood insurance more accessible and appealing to lower-income households.

According to the data gathered on the field, 58 respondents (48.3%) have insurance coverage of some kind; out of which 25% are covered by national health insurance, 10.8% have life insurance, and 7.5% have private health insurance. Although a sizable portion of respondents have insurance, this distribution suggests that most policies are not designed with flood risks in mind. There is currently little insurance coverage specifically for floods, indicating that to increase resilience, particular insurance products and education about flood insurance are required (Surminski & Eldridge, 2014). This finding is consistent with information received during an in-depth interview with a representative of SanlamAllianz; an insurance company in Ghana. SanlamAllianz does not have "Flood insurance" as a product, however their standard "Fire and Allied perils Insurance" provide cover against flood damage. Their claims settlement is subject to standard procedure and timelines prescribed by regulations.

The reasons given by individuals who do not hold insurance are as follows: high cost (10.8%), ignorance (9.2%), mistrust of insurance providers (9.2%), and perceived non-necessity (5%). These barriers are consistent with findings from other studies, which highlight that affordability

and trust issues are significant obstacles to insurance uptake (Kusi et al., 2015, Shewamene et al., 2021). Addressing these barriers requires both policy interventions to make insurance more affordable and efforts to build trust and awareness among potential policyholders.

Findings from the in-depth interviews carried out with the local government officials revealed that there is currently no policy in place to encourage the adoption of flood insurance among residents, particularly those in vulnerable areas. The Hydromet Officer (NADMO) at the Ga Central Municipal Assembly cited the issue of insurability due to high risk levels as a barrier. The issue of insurability was resounded during the interview with a representative of SanlamAllianz. Flooding in Accra is a perennial problem and insurance is meant to cover uncertainties. The representative of SanlamAllianz highlighted that in assessing and managing the risks associated with providing flood insurance in flood-prone areas, SanlamAllianz considers the frequency and quantum of the losses, assesses the measures put in place to mitigate losses, and the location of the risk. The Hydromet Officer at the Ga Central Municipality identified flood proofing as a measure to reduce the risks and address the barrier of insurability. According to him, flood proofing a home reduces the risk associated with that home. The cardinal point is to bring controls into the system and those controls can encourage insurers to come in. To introduce the control, we need to first get the communities on board.

The idea of getting communities on board was also reiterated by the NADMO director of the Korle Klottey Municipal Assembly. He recommended educating people to appreciate the need for insurance. According to him, they have identified a negative association of insurance with the management of disaster situations so it's imperative for them to bring the people on board. In terms of policy, he made mention of a program to engage trading communities within the jurisdiction of the Korle Klottey Municipal Assembly, especially those within the flood prone areas.

"*We will do that with the banks. We will do the facilitation and the banking institution will come and tell them about the policies available so from there we can have a road map. Out of that engagement we will draw out a road map out of the suggestions and views expressed. After that we will have a few more engagements. From there registration will be done and enroll the people on whatever policy there is for them to enroll on. If the people within these flood-prone areas buy into the idea of insurance for their businesses then we can take a step further. These residential communities will be brought on. People and their attitudes, once they are not being hit so hard say a collapsed building, they don't see the need to enroll on any insurance policy because they think every year they have to pay for insurance premium. We think if we want people to buy into it, the trading communities should be the first point of call. Thereafter other institutions like the hotels, restaurants and so on can be tackled. It's not only about floods. Sometimes there is fire, we experience flood and fire a lot. As for the insurance policy, we are looking for insurance policy for business communities for all sorts of emergency situations*" **- NADMO Director, Korle Klottey Municipal Assembly**

"*I had engagements with insurance companies in the past to ascertain if they want to insure homeowners. The thing is if they actually go through with it, insurance companies will lose more. Insurance is about maintaining a certain status quo. You can insure something if the thing is actually secured. If those controls are not in place, at the end of the day an insurer can insure but not get anything out of it so they are skeptical about doing that. The Sendai Framework developed in 2015 does not focus on management but reduction of disasters so if you are able to reduce the risk, then you can insure the person. That is what is being done in the advanced countries. We can have a large area flooded, but the homes are not flooded so based on that the insurer will have the confidence to insure because he knows the protection mechanism has already been put in place. These are the barriers restricting policymakers and government officers from encouraging residents to take up flood insurance because currently as it stands now in my municipality no insurance will take a resident because the risk is very high and there are no control mechanisms. If you*

insure the person, you are liable to compensate the person every year but if we are able to mitigate or control the risks the insurance will insure the person. However, insurance companies should not shy away from areas with no control mechanisms. Like in the advanced countries, there are other methods they can use similar to what is being done in USA. They have a national insurance that takes care of flooding and what they do is it actually engulfs a whole community. If it is done at the community level, the premiums to be paid per person will reduce however charging per household will increase the premium to be paid. I believe we will get there because insurance is something that must be done"- **Hydromet Officer (NADMO)- Ga Central Municipal Assembly.**

Regarding satisfaction with insurance policies, 22.5% of insured respondents are satisfied, while 14.2% are dissatisfied. This level of satisfaction suggests that while some respondents find value in their insurance policies, there is room for improvement in the coverage and service provided. Dissatisfaction often stems from issues such as inadequate coverage, poor customer service, or complex claim processes (Schwarcz, 2013). The survey also reveals that 47.5% of respondents view flood insurance as important, while 10% see it as unimportant, and 3.3% are uncertain. Additionally, 69.2% of respondents believe that flood insurance should be mandatory for residents in high-risk areas. This strong support for mandatory insurance indicates a recognition of the role that insurance can play in enhancing flood resilience and suggests a potential policy direction for improving coverage rates. Finally, 59.2% of respondents consider flood insurance to be very important for enhancing adaptive capacity, while 7.5% are neutral and 3.3% believe it is unimportant. This majority view underscores the perceived value of insurance in building resilience against flooding and supports the case for increasing accessibility and awareness of flood insurance options. The representative of SanlamAllianz during the interview stated "Innovation is at the heart of our business strategy to enable us to address the changing needs of our clients.

Climate Change is here with us and our response is no different. We shall partner with relevant stakeholders to deliver bespoke solutions in that direction". He further highlighted the need for stakeholders to collaborate and enforce the position of the law on compulsory insurance, and proposed governmental subsidy to help low-income households purchase insurance. According to him, SanlamAllianz is open to discuss with partners as long as the partnership is within regulation, and technology and innovation will certainly impact the industry at all fronts as the market is responding to the demands of the time.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter offers a thorough summary of the research on Accra's urban households' ability to adapt to flooding, with an emphasis on risk transfer strategies like flood insurance. The chapter provides a broad conclusion based on the study's primary results and practical recommendations to reduce the vulnerability of urban households to flooding and enhance their adaptive capacity. The suggestions are intended to provide guidance on flood risk management and resilience building for urban families, policy and decision makers, insurance companies, and community leaders.

5.2 GENERAL SUMMARY

Understanding the ability of urban households in Accra to adapt to flooding with an in-depth analysis of flood insurance was the main goal of the study. The study sought to determine the determinants factors influencing vulnerable households' adoption of flood insurance, evaluate urban households' attitudes toward flood insurance, and investigate how flood insurance can improve these residents' ability to adapt. 120 household heads in four low-income flood-prone communities in Accra; namely Adabraka, Asylum Down, Santa Maria and Glefe were interviewed during a survey. In-depth interviews were carried out with local government officials at the Ga Central Municipal Assembly and Korle Klottey Municipal Assembly as well as a representative of SanlamAllianz Insurance Company.

Despite the frequent and severe flooding occurrences that the city experiences, the findings showed a considerable gap in household awareness and understanding regarding flood risks and flood insurance. Many respondents' capacity to take preventative action to save their homes and family

was hampered by their lack of or restricted access to timely and accurate information regarding flood hazards. The research also revealed a number of obstacles to the adoption of flood insurance, such as a lack of knowledge, the perception of expensive premiums, the issue of insurability and mistrust towards insurance companies.

5.3 SUMMARY OF FINDINGS IN LINE WITH STUDY OBJECTIVES.

Objective 1: **Assessing Perceptions of Urban Households on Flood Insurance**

The study found that Accra's urban residents had a generally low awareness and comprehension of flood insurance. A sizable fraction of respondents either did not know flood insurance products existed or did not completely comprehend their advantages. This ignorance is in line with research from comparable metropolitan settings, where people frequently have little knowledge of flood risk and insurance (Oulahen et al., 2018). When people learned about flood insurance, they frequently thought it was either overly costly or needless.

Even though property damage from floods occurs frequently in Accra, many households were unaware of the importance of getting flood insurance. Several things influence this mindset, such as the belief that one will not be compensated, mistrust of insurance providers, and a general inclination toward more direct and palpable kinds of security (Botzen et al., 2019). The results point to two major obstacles to the widespread acceptance of flood insurance as an effective risk management tool: a serious knowledge gap and a general mistrust of insurance companies.

Objective 2: Determinant Factors for Flood Insurance Uptake.

The study found several important factors impacting households' decisions to get flood insurance. The two most important ones were; the degree of knowledge regarding flood hazards and the

perception of the affordability of insurance rates. In line with the findings of Kreibich et al. (2021), who observed that risk perception greatly influences insurance decisions, households with a higher awareness of their flood risk were more inclined to consider flood insurance. But for many households, especially those in lower income groups, the high cost of premiums acted as a significant disincentive. This is in line with research that demonstrates that one of the main causes of the poor insurance uptake in flood-prone areas is the financial burden of premiums (Hudson et al., 2020).

The study also discovered that, independent of risk awareness, households with unfavorable opinions of insurers were less likely to buy flood insurance, demonstrating the critical importance of trust in insurance providers. As shown in the research of Surminski and Thieken (2017), this mistrust is frequently a result of unfavorable prior experiences or rumors about the claims procedure. Moreover, households that had previously suffered flood damage were more likely to understand the value of flood insurance, however this did not always result in greater acceptance rates. This disparity can result from persistent skepticism regarding the dependability and efficacy of insurance as a preventative tool.

Objective 3: Enhancing Adaptive Capacity through Flood Insurance

The study emphasized how flood insurance might greatly improve the ability of households in Accra that are at risk of flooding to adapt. By offering a financial safety net, flood insurance can help homes recover from flooding incidents faster. However, significant efforts are required to raise awareness, lower insurance premiums, and foster trust between consumers and insurance companies for this potential to be achieved. These results are consistent with international research that recommend better communication and education tactics to boost insurance adoption in marginalized areas (Lo, 2013).

According to the research, removing these obstacles would result in a significant rise in the use of flood insurance, which would improve homes' overall flood resilience. Furthermore, Kousky's (2018) research suggests that incorporating flood insurance into larger catastrophe risk management plans may offer a more thorough method of lowering vulnerability. The report emphasizes that in order to fully utilize flood insurance as a strategy for fostering resilience among urban households in Accra, legislators, insurance providers, and community leaders must work together.

5.4 CONCLUSION

This study looked at how well households in Accra's urban areas can cope with flooding, and explored whether flood insurance can help them manage the risks. The findings from this research suggests that there is the potential for the successful adoption of flood insurance in Ghana however, there are important gaps that need to be bridged to enable the adoption of flood insurance among low-income vulnerable households in Accra. The gaps or obstacles that impede the adoption of flood insurance include; the poor level of knowledge and comprehension of flood risks and insurance, mistrust of insurance providers, perception of excessive costs. These findings reinforce existing literature that identifies financial literacy, cost concerns, and institutional credibility as central barriers to insurance adoption in low-income settings (Kusi et al., 2015; Churchill, 2007; Shewamene et al., 2021; Jarzabkowski et al., 2019). In addition to lack of knowledge and high costs, other problems like issues with systems and structures were also found. Local government and insurance officials highlighted the difficulty in insuring homes in areas that flood often. This is because the frequent and predictable flooding makes it risky for insurance companies. These concerns echo global discussions about "uninsurable" risks in climate-vulnerable areas and the

need for innovative models such as public reinsurance or community-based pooling mechanisms (Warner et al., 2013; Surminski, 2014; Jarzabkowski et al., 2019). When adequate measures are put in place to address the identified issues such as; focused awareness and education campaigns, policy interventions to lower insurance premiums, and initiatives to strengthen the bond between insurance providers and the community, flood insurance has the potential to improve Accra's urban households' ability to adapt and increase the resilience of these households. Insurance not only offers a post-disaster safety net, but also incentivizes pre-disaster risk reduction – encouraging households to flood-proof their homes and adopt resilient behaviors. This dual benefit positions insurance as both a coping mechanism and a catalyst for long-term adaptation. This dual benefit is detailed clearly in the insurance resilience framework by Jarzabkowski et al. 2019 adopted for this study. Flood insurance alone can't prevent floods, but it's a crucial part of a comprehensive approach to building resilience and reducing flood impacts.

5.5 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

- **Increase awareness and education**: Comprehensive awareness and education efforts on the dangers of flooding and the advantages of purchasing flood insurance are required. Vulnerable households in flood-prone areas should be the focus of these programs, and improving knowledge of flood hazards and promoting preventative actions, such as purchasing flood insurance, should be the main objectives. This should be implemented at the community level by the local government assemblies in partnership with insurance companies and non-governmental organizations interested in building resilience against disasters.

- **Policy interventions to reduce insurance costs:** The Government of Ghana must collaborate with stakeholders including the Ministry of Finance, local government assemblies and insurance companies to develop policy measures targeted at lowering the price of flood insurance premiums. Premium subsidies at the macro level or the development of affordable flood insurance products designed to meet the requirements of low-income families at the meso or micro level such as parametric-index insurance are two examples of this. Lowering the cost of flood insurance can promote greater adoption and offer financial security to a greater number of people.

- **Strengthen trust between households and insurance providers**: Insurance companies in Ghana must bear the responsibility of rebuilding the trust of Ghanaians concerning insurance. This involves being transparent and reliable in their operations especially in their claims process, and ensuring that their customers enjoy the best customer experience. Doing so will reduce the skepticism and suspicion that now exist. It will foster community confidence and encourage Ghanaians to adopt insurance.

- **Improve access to flood risk information:** The National Disaster Management Organization (NADMO) in Ghana must ensure that better and more timely information regarding flood hazards is made available to families living in flood-prone areas. This may entail creating community based early warning systems, engaging community members in risk mapping activities, holding frequent community meetings, and using digital platforms.

Families will be able to make educated decisions regarding insurance and flood preparedness if they are given trustworthy information.

- **Promote community-based flood risk management**: Building local resilience can be facilitated through the creation of contingency plans which are rooted in the community's disaster risk reduction and management strategy. This must be implemented by authorities in the local government assemblies. All actors must be well informed of their various tasks and responsibilities and ready to act in the event of a disaster. The local assembly authorities must also encourage the adoption of micro insurance policies among its community members and also act as a broker between the insurance companies and households under their jurisdiction.

- **Promote risk reduction measures:** The issue of insurability needs to be tackled to enable insurance companies cover residual risks once protective measures that lower flood risk has been put in place. The Government of Ghana must invest heavily in reducing flood hazards in the country. The Ministry of Finance must ensure that sufficient funds are disbursed to the local assemblies to enable them facilitate flood risk reduction projects and activities at the community and household levels.

5.6 AREAS FOR FUTURE STUDIES

Insurance is crucial in reducing and managing disaster risks, particularly for vulnerable populations affected by climate-related disasters. By providing financial protection, insurance enables these communities to adapt to climate change and build resilience. This study examined

the role of insurance in helping Accra's vulnerable households cope with flooding. However, Ghana faces other climate-related challenges, including rising temperatures and heatwaves. Future research should investigate how insurance can support low-income workers and businesses in Ghanaian cities to adapt and build financial resilience against increasing temperatures. The findings of this proposed study will contribute significantly to Ghana's climate risk management efforts, identifying key gaps and informing evidence-based policy interventions.

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APPENDICES

APPENDIX A

INTERVIEW GUIDES

UNIVERSITY OF GHANA, LEGON

DEPARTMENT OF GEOGRAPHY AND RESOURCE DEVELOPMENT

(INTERVIEW GUIDE FOR LOCAL GOVERNMENT OFFICIALS IN ACCRA)

Consent Form

My name is Melissa Forson. I am a student from the Department of Geography and Resource Development, University of Ghana and working on my Master of Philosophy degree in Climate Change and Sustainable Development. My thesis work is entitled "**Urban Households Adaptive Capacity to flooding: Analysis of Risk Transfer"**. I am collecting data for this research study that seeks to analyse flood risk transfer as an urban household adaptive capacity to flooding in Accra to build the resilience of urban households.

You have been purposively chosen as one of the participants in the study because of your role and expertise in addressing issues relating to floods or disasters in your governmental organization. I will ask you many detailed questions about how urban households are adapting to flood risks and their ability to transfer these risks, which is critical for developing effective strategies and policies to enhance adaptive capacity in urban settings with the focus on Accra. If you choose to participate in the survey, you are welcome to interrupt me to clarify the question and to ask me to repeat a question if you do not understand. The interview will last for about 30 mins. Your time, effort and contributions are highly appreciated and extremely valuable for will add to knowledge by exposing the gaps and barriers to flood risk management in relation to risk transfer in Ghana.

Before we begin, I would like to assure you that this study will not affect you in any way as the data is solely for research purposes and the data will be treated anonymously and confidential. Your name and other personalized information will be accessible only to the researcher and will never appear in any form publicly.

With your signature/thumbprint below, you agree to participate in the survey, which will take about an hour. You can decline to participate or stop at any time you want after the interview has begun. You can also stop the facilitator at any time and ask questions.

If you are in doubt or have questions concerning the survey, you are free anytime to contact me (Melissa Forson-0500323555)

Respondent Name

_____

Respondent signature/AGREEMENT/YES

_____

1. Can you describe the current state of flood risk management in Accra and the role that flood insurance plays within this framework?
2. What policies are currently in place to encourage the adoption of flood insurance among residents, particularly those in vulnerable areas?
3. How does the local government collaborate with insurance companies to promote flood insurance coverage?
4. What are the main challenges the local government faces in implementing effective flood risk management strategies in Accra?
5. How is the local government addressing the specific needs of vulnerable populations regarding flood preparedness and insurance?
6. In your opinion, what are the key barriers that hinder the uptake of flood insurance among households in Accra?
7. Any recommendations to address the barriers?

APPENDIX B

UNIVERSITY OF GHANA, LEGON

DEPARTMENT OF GEOGRAPHY AND RESOURCE DEVELOPMENT

(INTERVIEW GUIDE FOR HEADS OF INSURANCE COMPANIES IN ACCRA)

Consent Form

My name is Melissa Forson. I am a student from the Department of Geography and Resource Development, University of Ghana and working on my Master of Philosophy degree in Climate Change and Sustainable Development. My thesis work is entitled "**Urban Households Adaptive Capacity to flooding: Analysis of Risk Transfer"**. I am collecting data for this research study that seeks to analyse flood risk transfer as an urban household adaptive capacity to flooding in Accra to build the resilience of urban households.

You have been chosen purposively as one of the participants in the study. I will ask you many detailed questions about how your reputable institution is helping urban households to adapt to flood risks through risk transfer (insurance), which is critical for developing effective strategies and policies to enhance adaptive capacity in urban settings with the focus on Accra. If you choose to participate in the survey, you are welcome to interrupt me to clarify the question and to ask me to repeat a question if you do not understand. The interview will last for 60 mins. Your time, effort and contributions are highly appreciated and extremely valuable for will add to knowledge by exposing the gaps and barriers to flood risk management in relation to risk transfer in Ghana.

Before we begin, I would like to assure you that this study will not affect you in any way as the data is solely for research purposes and the data will be treated anonymously and confidential. Your name and other personalized information will be accessible only to the researcher and will never appear in any form publicly.

With your signature/thumbprint below, you agree to participate in the survey, which will take about an hour. You can decline to participate or stop at any time you want after the interview has begun. You can also stop the facilitator at any time and ask questions.

If you are in doubt or have questions concerning the survey, you are free anytime to contact me (Melissa Forson 0500323555)

Respondent Name

_____

Respondent signature/AGREEMENT/YES

---

1. Can you describe your company's current offerings in terms of (flood) insurance for households in Accra?

2. What do you perceive as the main challenges in promoting (flood) insurance among vulnerable households in Accra?

3. How does your company assess and manage the risks associated with providing flood insurance in flood-prone areas?

4. Could you share insights on the current penetration rate of flood insurance in Accra and how it has evolved over recent years? Account for the different income brackets or neighborhoods

5. What strategies does your company employ to make flood insurance more accessible and appealing to lower-income households?

6. How does your company handle claims related to flood damage, and what measures are in place to ensure timely and fair settlement?

7. In your opinion, what role does government policy and regulation play in the flood insurance market in Accra?

8. How do you envision technology and innovation impacting the flood insurance sector in the near future?

9. What partnerships or collaborations does your company engage in to enhance the effectiveness and reach of flood insurance?

10. Can you share any success stories or case studies where flood insurance has significantly benefited a household or community in Accra? Emphasize low-income communities

11. What are the most common misconceptions about flood insurance that you encounter, and how does your company address these?

12. Looking forward, what changes or developments would you like to see in the flood insurance market in Accra?

13. How does your company plan to adapt to potential changes in flood patterns due to climate change?

14. What advice would you give to policymakers to improve the uptake and impact of flood insurance in Accra

APPENDIX C

QUESTIONNAIRE

UNIVERSITY OF GHANA, LEGON

DEPARTMENT OF GEOGRAPHY AND RESOURCE DEVELOPMENT

(QUESTIONNAIRE FOR URBAN HOUSEHOLDS IN ACCRA)

Consent Form

My name is Melissa Forson. I am a student from the Department of Geography and Resource Development, University of Ghana and working on my Master of Philosophy degree in Geography and Resource Development. My thesis work is entitled "**Urban Households Adaptive Capacity to flooding: Analysis of Risk Transfer"**. I am collecting data for this research study that seeks to analyse flood risk transfer as an urban household adaptive capacity to flooding in Accra to build the resilience of urban households.

You have been chosen randomly as one of the participants in the study. I will ask you detailed questions about how urban households are adapting to flood risks and their ability to transfer these risks, which is critical for developing effective strategies and policies to enhance adaptive capacity within urban settings in Accra. If you choose to participate in the survey, you are welcome to interrupt me to clarify the question and to ask me to repeat a question if you do not understand. The questionnaire will last for 60 mins. Your time, effort and contributions are highly appreciated and extremely valuable for will add to knowledge by exposing the gaps and barriers to flood risk management in relation to risk transfer in Ghana.

Before we begin, I would like to assure you that this study will not affect you in any way as the data is solely for research purposes and the data will be treated anonymously and confidential. Your name and other personalized information will be accessible only to the researcher and will never appear in any form publicly.

With your signature/thumbprint below, you agree to participate in the survey, which will take about 30 mins. You can decline to participate or stop at any time you want after the interview has begun. You can also stop the facilitator at any time and ask questions.

If you are in doubt or have questions concerning the survey, you are free anytime to contact me (Melissa Forson) 0500323555

Respondent Name

_____

Respondent signature/AGREEMENT/YES

Household ID	Community Name	Date of interview

SECTION A: AWARENESS, KNOWLEDGE, AND EXPERIENCE OF FLOOD RISK

1. How would you rate your level of understanding of flood risks in your area?
    a. Very low
    b. Low
    c. Moderate
    d. High
    e. Very high

2. How often do you receive information about flood risks in your area?
    a. Never
    b. Rarely
    c. Occasionally
    d. Frequently
    e. Very frequently

3. What is your primary source of information about flood risks and preparedness?
    a. Local news media
    b. Government announcements
    c. Community meetings
    d. Social media
    e. Friends/Family
    f. I don't receive information

4. How would you rate the adequacy of the information provided to you about flood risks and management?
    a. Very inadequate
    b. Inadequate
    c. Neutral
    d. Adequate
    e. Very adequate

5. Are you aware of the local government's plans or policies regarding flood risk management?

a. Yes, fully aware
b. Somewhat aware
c. Not very aware
d. Not aware at all

6. Do you know what to do to protect your property and family in case of a flood?
   a. Yes, completely.
   b. Somewhat
   c. Not very much
   d. Not at all

7. How confident are you in your ability to respond effectively to a flood?
   a. Very confident
   b. Confident
   c. Neutral
   d. Not confident
   e. Not confident at all

8. Does flooding cause damage to your property?
   a. Yes
   b. No

9. If yes, how often does this occur in a year?
   a. Once in a year
   b. Twice in a year
   c. Every month
   d. Once every 3 months
   e. Other (please specify): ……

10. Does flooding cause damage to your household items?

    a. Yes
    b. No

11. If yes, what type of damages does it cause?
    ……..
    ……..
    ……...

12. If yes, how often does this occur in a year?

    a. Once in a year
    b. Twice in a year

c. Every month
d. Once every 3 months
e. Other (please specify): ……

SECTION B: PERCEPTIONS OF FLOOD INSURANCE

1. Does your household currently possess a flood insurance policy?

a. Yes
b. No

2. If your household is not covered by flood insurance, what is the principal reason for this absence?

a. Prohibitive cost
b. Lack of awareness regarding insurance options
c. Perception of non-necessity
d. Unavailability in my locality
e. Other (please specify)……...

3. Do you own an insurance policy?

a. Yes
b. No

4. If yes, what type of insurance policy do you own?

Tick as many as apply

a. Motor Insurance	
b. Life Insurance	
c. Property Insurance	
d. Private Health Insurance	

e. Others (please specify): …….

……

5. If you do not have insurance, what is the primary reason?

a. High cost
b. Lack of awareness
c. Don't believe it's necessary
d. Not available in my area
e. Other (please specify)

6. How satisfied are you with the insurance policy you signed on to?

Tick one

Very dissatisfied	Dissatisfied	Unsure	Satisfied	Very Satisfied

7. How important is an insurance policy?

Tick one

Not at all important	Slightly not important	Important	Fairly important	Very important

Briefly explain your answer: ……
……
……
……

8. Do you think insurance (flood) should be made mandatory for residents in high-risk areas?

a. Yes
b. No
c. Unsure

9. How important do you think flood insurance is for enhancing the adaptive capacity of residents in flood-prone areas?

a. Very important
b. Important
c. Neutral

d. Unimportant
e. Very unimportant

10. Are you willing to sign a flood insurance policy?

a. Yes
b. No

Briefly explain your answer: ……...

……

11. If yes, how much are you willing to pay?

……

12. If yes, how often do you want to pay?

a. Daily
b. Weekly
c. Monthly
d. Yearly
e. Other (please specify) ……

13. Which other factors will inform you decision to sign a policy?

……...

……...

14. If yes, which household items and appliances are you willing to cover?

Tick as many as apply

a. Furniture (chairs, tables, sofa)	
b. Electronic (fan, iron, television, radio)	
c. Electronic (microwave, rice cooker)	
d. Electronic (fridges, deep freezers)	
e. Beds/ Mattresses/ other sleeping mats	
f. Cooking utensils	
g. Food items	
h. House/structure	

i. Other (please specify):…….

SECTION C: SOCIODEMOGRAPHIC INFORMATION

1. Gender	a. Female b. Male
2. Household size	a. 1-3 b. 4-6 c. 7-10 d. Above 10
3. Level of employment	a. Employed b. Unemployed c. Self-employed
4. Occupation	
5. Estimated monthly income	
6. Age	a. 15-20 b. 20-25 c. 25-30 d. 30-35 e. 35-40 f. 40-45 g. 45-50 h. 50-55 i. 55-60 j. 60-65 k. 65+
7. Level of education	a. Primary b. Secondary c. Tertiary d. No education
8. Marital Status	a. Single b. Co-habiting c. Married d. Divorced e. Widowed