UNIVERSITY OF EDUCATION, WINNEBA

PUBLIC PERSPECTIVE OF FLOOD MANAGEMENT IN THE EFFUTU MUNICIPALITY IN THE CENTRAL REGION OF GHANA

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DECLARATION

Student's Declaration

I, Robert Quartey, hereby declare that this research, with the exception of quotations and references contained in published works, which have all been duly identified and acknowledged has not been submitted either in part or whole for another degree elsewhere.

Signature: ……

Date: ……

Supervisor's Declaration

I certify that the preparation of the project work was supervised in accordance with the guidelines on supervision of project work laid down by the University of Education, Winneba.

Name of Supervisor: Dr. Isaac Eshun

Signature: ……

Date: ……

DEDICATION

This work is dedicated to my dear family: wife, Mrs. Diana Quartey and mother, Mrs. Adelaide Kwakye.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This work examined flood management in the Effutu Municipality. The main objectives of the research was to examine the causes of flood; the flood management practices; the main challenges to flood management; the factors that promote flood management and flood coping strategies in Effutu. Mixed method approach with sequential research design was employed in this study. A total of 250 respondents were selected from different parts of the municipality using multi-stage sampling. Instruments for data collection included questionnaires, interview guide and observation checklist. Quantitative data were analysed into percentages and weighted mean, whilst qualitative data were analysed into themes based on the research questions and the outcomes derived from the interviews and the observation conducted. The analysis suggests that, many residents thought flood management is as a result of neglect in implementing laws and policies on the part of the Municipal Assembly. It is argued that, financial resource constraints were not the major problems confronting flood risk management in Effutu. There was a general feeling that residents have developed effective coping strategies to deal with flooding. The temporality syndrome and the lack of political will to implement policies were the main challenge facing flood management in Effutu. Residents of flood prone areas only sees the situation as only temporal and something that will not last for a long time. It is recommended that there should be strong political will in enforcing laws governing town planning and development to prevent future occurrence of flood in the Effutu Municipality.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Each year, flood disasters cause tremendous losses and social disruption worldwide (IFRC, 2018). In 2018, several countries and States across the globe were hit by flood disaster these include Argentina where there was a serious flood on the 20th January 2018 whilst Texas in the United State of America also experienced flood in the same year in October 17, 2018. Moreover, the Northern part of Ghana had its share of the flood disaster on the 21st September 2018 due to heavy rains and the spillage of the Bagree dam of Burkina Faso also contributed to the flood. Furthermore, the capital of Ghana Accra got flooded on the 19th June 2018 due to torrential rains (NADMO, 2018). Finally, Winneba had it share of flood disaster on the 20th June where some part of the Municipality was affected due to rains and the accumulation of water from some part of Eastern region of Ghana into the Ayensu River which has it source in Winneba. It is believed that over 250 million people are affected by natural disasters each year around the Globe (www.reliefweb.int/disaster/fl-2018). While many countries are making progress in systematically recording disaster losses, most losses due to extensive disaster events are unaccounted for (UNISDR, 2009).

Ghana ranks high amongst African countries, most exposed to risks from multiple weather related hazards particularly the natural hazards such as floods and droughts. Flood occurrence has been an annual ritual in southern Ghana especially in the Central Region for the past decade and it is still causing widespread destruction, increasing risk of vulnerability and general underdevelopment of the region (UNDP/NADMO, 2017).

Worldwide, floods are viewed as one of the most destructive naturally triggered disaster. This is indicated by reported flood losses that exceed one third of the estimated total cost associated with all disaster events triggered by natural hazards Additionally, flood events account for two thirds of the global population affected by all naturally triggered disaster events (UNDP, 2004). Initiatives such as the International Strategy for Disaster Risk Reduction (ISDR) have recognised the urgency to reduce such flood losses and are as such, advocating for greater attention to integrated flood risk management as an integral aspect of sustainable development. In this context, the ISDR reports that nations and communities that have successfully reduced their flood losses effectively balance the potential consequences of flood risk with the value of other beneficial and socio-economic goals. Such countries also reportedly make informed management decisions based on reliable information, promote principles of self-help and self–reliance and support traditional mitigation methods along with new technologies.

In recent years, risk-based approaches have received increasing attention as means to ‗manage' flood hazards. In day-to-day language, the term ‗risk' is often used as a synonym for probability or chance. This should not be a surprise since the denotation of the term often varies with the sector in which it is applied (e.g. in legal professions, insurance, natural disaster research communities, cultural heritage researchers, etc.) Yet, even in a flood context alone, numerous definitions for flood risk have been suggested. In their ‗Language of Risk' Report, Samuels and Gouldby (2009, p. 21) recommend to employ the term flood risk as ―the probability multiplied by the consequence in which the multiplication is to be understood as including the combination across all floods."

The definition of a disaster is even vaguer. In the glossary of the UN International Strategy for Disaster Reduction (Vanneuville, Kellens, Maeyer, Genserik & Frank Witlox, 2011) defined disater as ~~"a~~ serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources."

In Ghana, flooding is a common phenomenon in the cities and other places alike. The nation suffered a major flood disaster on June 3, 2015 when flooding led to fire at a fuel station in Accra that killed more than 160 people (NADMO, 2015). Despite this devastation, the nation continues to suffer flooding in many parts. However, human activities in the course of the flood plains - (agricultural practices) lead to degradation of environment, loss of vegetation cover resulting in erosion and siltation of rivers. The challenge here is that the capacities of the major drains are reduced and as heavy rains increase water volumes, the rivers give up the excess water resulting in flood in years of copious rain.

In Ghana, as in other parts of the world, flooding continues to interrupt the development process. Outside of the cities, flood causes poor harvest with growing food insecurity and hunger, worsening poverty levels, and high out migration among the youth. What is not certain is the fact that, all the flood occurrences did not attract the attention it deserved in the past resulting in the annual loss of lives, property, and livelihoods. What accounts for the floods from both the technical and ordinary citizen's viewpoints to natural incidence of heavy down pours and human activities? Torrential rains during rainy season cause high discharges and large-scale sudden flows above the capacity of the drainage to carry.

Therefore, this research explored disaster risk management as essential, because, often the poor, uneducated, very old or very young, the sick, and the oppressed experience the worst impact (Comfort, Wisner, Cutter, Pulwarty, Hewitt, Oliver-Smith, Wiener, Fordham, Peacock & Krimgold, 1999). Therefore, this research explored the public perspective of flood management in the Effutu Municipality in the Central Region of Ghana.

1.2 Research Problem

Flooding has always been an issue of great concern both internationally and locally. In 2018, specifically on 17th October most part of Texas States were flooded after an extreme rain fall to the extent that state of emergency was declared by authorities of Texas. One will ask why should a beautiful State like Texas be hit with a flood because it is believed they have all it takes to manage flood. and to direct it to proper use after the rains, but unfortunately despite all the policies and programmes that have ever been putting together by the authorities of Texas State and the expertise available to people of Texas they could not control the flood that resulted from the rains till it ended up as a disaster that called for state of emergency (www.watchers.news, 2018).

Ghana being one of the developing nations within the sub-Saharan Africa is always hit by flood in some part of the country especially, its capital, Accra. Accra has experienced periodic flood leading to the death and destruction of properties which is estimated to be around UD$ 780,500,000 (Asumadu-Sakodie, Owusu & Rufangura, 2015). One of the most destructive flood disasters to have hit Ghana is the June 3, 2015 flood disaster that was as a result of torrential rains. Government through it agency responsible of managing flood and other forms of disaster which is National

Disaster Management Organization (NADMO) has put several programmes in palace to curb the consistent occurrence of flood but it seems the policies and programmes are not yielding the required result hence the occurrence of flood every year. More over flooding has persisted and is increasing in frequency despite several programmes and projects that have been designed and implemented by the Ghana government over the years.

Flood disasters play a substantial role in inhibiting economic development and create greater difficulties for many of the regions' poor (UNDP/NADMO, 2009). Today, there appears to be great public concern about the perennial floods that ravage the region, and the social and economic consequences. The relevant institutions and partners seem overwhelmed by the causes and negative effects in dealing with the problem. Effutu Municipality located on the coastal belt of Ghana, has several rivers, streams, the Atlantic Ocean and several water bodies make the Municipality very venerable to flood disaster. It is on this note that the researcher wants to research on the public perspective of the causes, effects, management practices of flood disaster management and the coping strategies adopted by people in the Effutu Municipality.

1.3 Objectives of the Study

The following objectives guided the study:

1. explore the causes of flood in the Effutu Municipality.
2. analyse the effects of floods in Effutu Municipality.
3. examine the flood management practices in Effutu Municipality.
4. explore the main challenges to flood management in Effutu Municipality.
5. evaluate flood coping strategies to militate against flooding in Effutu Municipality.

1.4 Research Questions

The following research questions guided the study:

1. What are the causes of flooding in the Effutu Municipality?
2. What are the effects of flood in the Effutu Municipality?
3. What are the flood management practices in Effutu Municipality?
4. What are the main challenges to flood management in Effutu Municipality?
5. Which coping strategies are explored to militate against flooding in the Effutu Municipality?

1.5 Significance of the Study

Flooding continues to destroy various part of the world and interrupt the development process. Disaster risk management is essential to the fight against poverty, because often the poor, uneducated, the old or very young, the sick and the oppressed experience the worst impact (Comfort et al., 1999; IFRC, 2007).

This research when concluded is aimed at helping the government through the Effutu Municipal Assembly and its agency that is NADMO to take decisions that will help eradicate flooding in the Municipality.

Also, this research is aimed at guiding the Municipal Works Department to enforce laws that prohibit building on water ways that is on the rise in the Municipality and to check that the proper size of drainage systems that are constructed when there is future development. Furthermore, this research will help the communities as to where to situate their properties and the appropriate formalities that should be followed before any form of construction can take place in the Municipality. Finally, this research will be a guide to any future study into floods in the Effutu Municipality and the University of Education Winneba.

1.6 Delimitation of the Study

The study covered the Effutu Municipality (Winneba) in the Central Region of Ghana because of the perennial flooding in the Municipality. The focus is on perennial flooding, the effects and the capacity of the institutions and victims of flood to respond in an effective manner in order to reduce the impact and vulnerability that comes with flood.

1.7 Organisation of the Study

This thesis is organised into five chapters. Chapter One focuses on and national contexts of flooding risk as well as background of the study. It outlines the objectives of this thesis and describes the research questions. Chapter Two examined and reviewed relevant literature in the subject matter and basic definition of the concepts, effects, causes and disaster management practices of flooding. It also examined factors constrain as well as those that promote flood disaster management. The data collection methods and analyses are covered in the Chapter Three. Chapter Four contains the analysis and discussions, deductions and inferences from the data collected, while Chapter Five covers the summary of major findings, conclusion and recommendations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter explores literature in order to provide an insight on how various people and scholars consider flood disaster management and ways to manage its impact. Also this chapter seeks to emphasis the:

i. Concept of flood management;
ii. Causes of flood;
iii. Vulnerability as a concept for understanding disaster;
iv. Theoretical framework of flood disaster management;
v. Effects of flooding;
vi. Challenges of flood management; and
vii. Flood coping strategies.

2.1 Concept of Flooding

The term flood or flooding is variously defined. The European Union (EU) Floods Directive (2007) defines flood as a temporary covering by water of land not normally covered by water. Chow, Maidment and Mays (1988) assert that flood is a relatively high flow which oversteps the natural channel provided for the runoff. According to Ward (2011) flood is defined as a bowl of water which rises to overflow land which is not normally submerged. Following that argument, flooding may result from the volume of water within a body of water, such as a river or lake, which overflows with the result that some of the water escapes its usual boundaries.

A floodplain can be defined as ―the area of a river valley which is covered with water when the river overflows during floods" (Smith & Ward, 1998). The dominant views of what the best strategy for prevention of flood disaster evolved through three distinct paradigms: the engineering, the behavioural and the development paradigm (Smith & Ward, 1998).

2.1.1 The engineering paradigm

According to Smith and Ward (1998), the engineering paradigm states that the cause of flood was due to extreme hydrological events and the best cure is to exert physical control over flood flows. The engineering paradigm captures all the physically based techniques which seek to modify the flood as natural disaster. Hydrological engineers may build artificial flood banks or defence walls, straighten the river course, and or dredge the riverbed to make it deeper and wider so as to carry more water.

2.1.2 The behavioural paradigm

Smith and Ward (1998) explained that the behavioural school of thought believes that flood incidence is due to failing of engineering to deal with the phenomenon. It is argued that, failure of the flood prevention authorities to consider the implication of non-structural alternatives such as land zoning, forecasting and early warning systems accounts for the worsening flood disaster. The behavioural paradigm further states that behavioural failure of individual food plain managers and residents to assess the full risk from floods are the cause of the devastation that society is confronted with. They prescribe a full vulnerability and risk assessment of all flood plains so as to develop a human response for plan flood control.

2.1.3 The development paradigm

The development paradigm according to Smith and Ward (1998) relates flood disaster to development and underdevelopment. The development group criticized the behavioural paradigm and concluded that though local issues are considered at the behavioural level as alternatives, it is still the technocrat that leads the process.

It is argued, therefore that the public should participate in planning the process of managing rivers and water bodies and made to understand the importance of adopting community-based flood response than allowing the technocrats to plan for them.

2.2 Causes of Flood

People are divided on the causes of flood. While some link it to human interventions which appear varied depending on the locality (Dixit, 2003), others believe it is a natural incident (Lui, 2004; Brant, 2007). Floods are attributable to several causes which include natural ones like the geophysical location, topography of flood plain, prolonged and torrential rains and or human induced such as space use and location of economic activities (Zhang, Wei-chun, & Xian-Rong, 2008).

2.2.1 Natural causes of flood

There are two main discourses on flood disasters. The first, and dominant view, is that flood disasters are inherently a characteristic of natural hazards (Dixit, 2003). Floods occur when the soil and vegetation capacity cannot absorb all the down pours allowing the water to run off the land in quantities that exceed stream channels. Floods described by White (1945) sighted in (Hinshaw, 2006; Kates, 2007) as an ―act of God" can be caused by heavy rain or prolonged precipitation within a short period over spatial unit. White (1945) stated that floods are ―acts of God" but flood losses are ―largely acts of man" although humans have been victims of natural flooding, their

presence and interventions near rivers and flood plains contributes to the problem. Floods such as tsunamis result from high tides conditions and increasing storm surges which create tidal waves driven into enclosed bays and batter the coast causing coastal floods (Smith & Ward, 1998).

2.2.2 Human induced causes

One suggestion is that flooding is related settlement-decision. Twigg (2009) argue that land immediately surrounding rivers is often perceived to be ideal for agricultural, industrial and residential development as it is typically flat and fertile with a close water supply. Disaster risk managers have long known that environmental risks such as rain, storms, high winds, heat waves that create environmental hazards do not always have to result in disasters.

According to Zhang, Wei-chun, and Xian-rong (2008), and Action Aid (2005) agree that human activities driven by socio-economic factors should be considered responsible for the recent increasing level of flood risk. Flood disasters are created by countless locational decisions of individuals that encourage the settlement, unregulated expansion into flood zones and intrinsic land use and economic development of flood plains (Smith & Ward, 1998).

Human interventions into the processes of nature have considerably changed the situation in whole river basins. The alteration of environment such as change in the drainage patterns from urbanization, construction of concrete and stone building causes additional run off due to poor water absorbing capacity. Inappropriate agricultural practices resulting in erosion and situation of rivers and clearing of forest for wood and wood products and settlement development-contribute to the disaster (Lui, 2004).

Vegetation captures significant amount of water and return it to the atmosphere before it gets the chance to hit again at the ground. Without vegetation cover to trap the rain, the ground receives more water and its absorption limits are reached rapidly and flooding can increase. It is now common knowledge that the causes of natural disasters are complex and attributable to a combination of socio-economic factors that modulate for better or worse the impact of environmental hazards on human systems (White, 1945; Zhang et al., 2008; Action Aid, 2005).

Scholars such as Alexander (2000), Pelling (2003), and Wisner, Blaikie, Cannon, and Davis (2004) advance the thinking, that disasters are the combination of environmental hazards, poverty, and other causes of vulnerability including the income level of individuals, age, political power, health, education, and gender. As such, vulnerability becomes a cause of flooding determined by income distribution, political capital, access to education and health services and to other assets that influence the capacity of individuals and systems to cope with and recover from disasters (Brant, 2007).

2.2.3 Assessment of food patterns

In orders to establish the flooding patterns in urbanized cities of Singapore Chow, Maidment, and Mays (1988) used a multi-method approach which combined analysis of station precipitation data with archival government and newspaper records. The study also document changes in flash flood frequencies, coupled with reports on impacts of floods to the affected cities and it residents of Singapore. It was found that there had been creased flooding incidence in the period under study.

Further, the intensity and severity of these flooding events had increased over the period under review.

In Ghana, two state agencies that National Disaster Management Organization (NADMO) and the Environmental Protection Agency (EPA) did a research into the flood patterns of Ghana in 2012. The study found that from 2001, the country is hit by flood every year despite government and developmental partners‘ efforts that is put to curb flood. Always, the damage caused by these floods increases increase year by year rather than the reverse. Karley (2009) found that significant flood disaster recorded in 1986 to 2011 have all found that most flooding in Ghana are often between the months of May and July. Between these times every year some part Ghana, including Winneba (Effutu) suffer from flood.

2.2.4 Flood vulnerability

A combination of structural and non structural measures can be used to deal with floods (Sagala, 2006). Structural measure comprise of a set of works aimed at reducing one or hydraulic patterns like run off volumes, peak discharge, rise in water level, duration of flood, flow velocity etc. Non-structural measures involve a wide range of measures to reduce flood risk through flood forecasting and early warning system, emergency plans and posing laud use regulation and policies.

2.3 Vulnerability as a Concept for Understanding Disasters

Vulnerability has become central for understanding what it is about the living condition of people that enables a hazard to become a disaster (Tapsell et al., 2010). Vulnerability is the exposure of a system to injury or damage. It defined as being prone or susceptible to damage or injury.

Blaikie, Cannon, Davis and Winser (1994) defines it as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It is shaped by a set of conditions and processes resulting from physical, socio-political, economic and environmental factors that increase peoples' susceptibility to the impacts of hazards (Ahrens, 2002).

Vulnerability is determined by the degree of risk, susceptibility, resistance and resilience (McEntire, 2001). Risk is the result of proximity or exposure to triggering agents, which increases the probability of disaster and the potential for human or material losses and susceptibility is the product of social, economic, political, and cultural forces and activities that determines the proneness of individuals and groups to being adversely affected by disaster (McEntire, 2001; Buckle et al., 2000).

The ability of a system or a community or an individual to scale through negative impacts of a disaster and bounce back in the face of adversity is known as resilience. Resilience stresses the ability of a system to deal with a hazard, absorbing the disturbance or adapting to it (Few, 2003). A community's resilience enables it to limit negative effects of disaster and is able to adapt in the face of adversity.

Many scholars differ in their definition of the concept of vulnerability with explanations centring on various aspects of the term. According to Cutter, Burton and Emrich (2010), vulnerability means different things to different people. Definitions of vulnerability focus on risk and risk exposures on one hand and coping and adaptation mechanisms on the other. Adaptive capacity is seen as a key component of the concept of vulnerability (Adger, 2000). Adaptive capacity is the ability of a system to adjust to stresses, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (Brooks, 2003). These include characteristics of

communities that will enable them adjust to disasters and the damages and the extent to which they are able to cope with the impacts. These characteristics determine the extent to which people live-in disaster-prone areas with minimal or no injury to lives and properties after a disaster.

Cutter et al. (2003) identifies three main tenets in vulnerability research which are; the identification of conditions that make people vulnerable to extreme natural events (an exposure model), the assumption that vulnerability is a social condition (a measure of societal resistance or resilience to hazards) and the integration of potential exposures and societal resilience with specific focus on particular places or regions.

According to Twigg (2001), one of the models developed to give disaster practitioners a framework for understanding peoples' vulnerability is the Pressure and Release/Access Models by Blaikie et al. (1994). The basis of the Pressure and Release Model is the recognition that a disaster is the intersection of two opposing forces: the processes generating vulnerability on one side, and physical exposure to hazard on the other side. Increasing pressure can come from either side, but to relieve the pressure, vulnerability has to be reduced (Twigg, 2001). The Access Model also sees livelihood strategies as the key to understanding the way people cope with hazards and involve the ability of an individual, family, group, class or community to use resources to secure a livelihood. Their access to resources is always based on social and economic relations.

Other definitions of vulnerability also centre on the susceptibility and impact of disasters on the livelihood of people. Adger (2000, p. 739) for instance defines vulnerability as the presence or lack of ability to withstand shocks and stresses to livelihood. In this study however, the exposure model by Cutter et al. (2003) is used

to identify vulnerability factors. With this model, vulnerability is considered as social conditions that make people vulnerable to extreme natural events. These conditions are responsible for exposing people to harm and thus enable a natural hazard to become a disaster.

2.3.1 Social vulnerability

There are however various aspects of vulnerability and this explain why various scholars centre on different definitions and factors accounting for it. One of the most critical aspects of vulnerability that many researchers and policy makers ignore is social vulnerability. According to Cutter et al. (2003), social vulnerabilities are largely ignored due to the difficulty in quantifying them. This explains why social losses are normally absent in after-disaster cost/loss estimation reports. Fekete (2008) contends that social vulnerability is often hidden, complex, and nested in various human aspects and contingencies bound to different levels of society. This may be reasons why many a time, the issue of social vulnerability is ignored and definitions also differ. Authors use term social vulnerability with different meanings (Adger, 1999; Tapsell et al., 2010).

Social vulnerability includes a combination of factors that determine the degree to which someone‘s life, livelihood, property and other assets are put at risk by a discrete and identifiable event in nature and in society (Wisner et al., 2004). These factors are not natural but are social creation by humans that endanger the lives of individuals and create a system of inequality that places people in various locations. These emanate from social factors that place people in highly exposed areas, affect the sensitivity of people to the exposure, and influence their capacity to respond and adapt (Yarnal, 2007). According to Maskery (1989) people live in vulnerable regions

because they lack the basic knowledge about hazards or because of their inefficient decision-making and management structures in their society.

However, this assertion is depleted and unable to explain how decisions of people are influenced by socio-economic constrains. Individuals may have no choice when market forces dictate locations low income groups should occupy which eventually is in vulnerable locations. Blaikie, Cannon, Davis, and Winser (1994) contend that hazards impact on groups of people that are at different levels of preparedness, resilience, and with varying capacities for recovery. Vulnerability involves much more than the likelihood of people being injured or killed by a particular hazard, and includes the type of livelihood people engage in, and the impact of different hazards on them.

Cannon (1994) again argues that, vulnerability is a characteristic of individuals and groups of people who inhabit a given natural, social and economic space, within which they are differentiated according to their varying position in society into more or, less vulnerable individuals and groups. Differences in socio-economic factors result in hazards having a different degree of impact. Social vulnerability is influenced by the degree of preparedness of the individual or group which is a function of the protection available (Cannon, 1994).

Most people in developing countries including Ghana are vulnerable in both their lack of preparedness and in their livelihood level and resilience. They are unable to provide self-protection for themselves and the State is unable to offer protection because they (the State) lack resources or are unwilling to offer relevant social protection for political expedience. The causes of social vulnerability are often

explained by the underlying social conditions that are often quite remote from the initiating hazard or disaster event (Cutter, 1996).

Wisner (2000) provides an example of this critical social perspective in his discussion of the impact of Hurricane Mitch in Central America in 1998. He contends that the vulnerability of people in this region of flooding and landslides was caused by political and economic issues (E.g. land distribution and public expenditure cuts) as well as the nature of the storm event itself. Pelling (1997) also shows that the neighbourhoods most vulnerable to flooding in Georgetown, Guyana, tended to be those with low household incomes, poor housing quality and low levels of community organization

Cutter et al. (2003) content that there is a general consensus within the social sciences about some of the major factors that influence social vulnerability. These include; the lack of access to resources, limited access to political power and representation, social capital including social networks and connections, beliefs and customs, building stock and age, frail and physically limited individuals, and the type and density infrastructure and lifelines (Cutter, 2001; Blaikie et al., 1994; Putnam, 2000). These are social conditions that make people vulnerable to disasters and they vary from region to region. Social capital is a factor that influences social vulnerability and is also critical in understanding the vulnerability of people. According to Armah et al. (2010), social capital refers to connections within and between social networks as well as connections among individual. Putnam (1993) went further to define social capital broadly as the features of social organizations, such as networks, norms, and trust that facilitate action and cooperation for mutual benefit. Such networks facilitate action and cooperation during and after a disaster and are useful for mitigating

disasters and building resilience communities. It also includes people's ability to have access to or contribute to various networks, and systems of mutual support in times of crisis and is an important factor in dealing with hazards (Cannon, 2000). Social capital is beneficial in providing access to various resources in disaster situations, including information, aid, financial resources and can become a resource that can be utilized by disaster managers for mitigation purposes.

There are also psychological issues that make people vulnerable as the effect of a disaster has some impact on people's psychological state. Tapsell et al. (2010) identify psychological vulnerability as not only the consequences of an event on an individual but also the pre event attitudes and perception of individuals towards a hazard that may affect their preparedness and recovery from an event. The impact of disaster can also have psychological effects on survivors especially if it involves traumatic experiences leading to the loss of lives of close relations and friends which may cause stress after the disaster.

There have been attempts to explain why the poor and marginalized in society are always the ones at risk from disasters. According to Fordham (2003), poorer households tend to live in riskier areas in urban settlements, putting them at risk from flooding, disease and other chronic stresses. The most vulnerable are the low-income people, migrants, those living in flimsy houses, those without insurance or financial reserves, the elderly and the infirm (Few, 2003). Burton et al. (1993) however argues that hazards are essentially by institutional structures, and that increased economic activity does not necessarily reduce vulnerability to impacts of hazards in general.

Decision-making processes that ignores the concerns and needs of society by making people passive actors rather than active, and prescribes wrong doses of treatment to developmental problems. Vulnerable people and places are often excluded from decision-making and from access to power and resources (Adger, 2006; 2003; Pelling, 2003).

However, Cannon (2000) also contends that some people are affected by disasters not because they have been exposed by exploitative processes but they are put at risk because they themselves decide to live in dangerous locations in view of the benefits they gain for their livelihood activities.

There is a decision to live in a particular place and that choice is made on the basis of the benefit that decision brings to the individual in terms of the livelihood that is essential for their survival. He calls these –innocent" disasters in the sense that not all disasters can be blamed on class or political causation but then economic processes have led people to seek their livelihood in potentially dangerous location (Cannon, 2000). People are exposed to disasters not because they have been forced by social, economic, or political factors of exploitation but their livelihoods lead them to locate in dangerous places. The focus should be on the social factors that make people vulnerable to disasters and not just on supporting victims.

This study therefore focuses on the social vulnerability factors that lead to disasters. These factors according to Cutter (1996) are explained by the underlying social conditions that are often quite remote from the initiating hazard event. They include a combination of factors that determine the degree to which someone's life, livelihood, property and other assets are put at risk by a discrete and identifiable event in nature and in society. These factors (social vulnerability factors) are used in this study to

describe the conditions that combine and expose people to harm. In this formulation, it is the interaction of the hazard with these social vulnerability factors that produces an outcome (effect). And in this study, in terms of effects, the focus is placed on social, economic, and psychological effects of the twin-disaster on the livelihood of survivors.

2.3.2 Structural factors influencing flood vulnerability

No standard method of vulnerability assessments exists. However, similar studies have applied different approaches to assess the different aspect of the vulnerability of various areas of floods. The most common approach used for vulnerability assessments is the administrative units/boundaries approach, which Roy and Blaschke (2015) faulted for its inadequacy in detailed spatial variation of hazards and damages. Further they argue that the approach suffers a geographical problem. Roy and Blachke (2015) used a srid-based approach to carry out a spatial vulnerability assessment of Dacope Sub-District in Bangladesh. The methodology makes use of varied physical, social, economic and environmental indicators for spatial vulnerability assessment to flood. It hence solves the problem of data unavailability and enhances transferability and applicability of a spatial vulnerability assessment.

Mustafa (1998) carried out a study that sought to understand the causes of vulnerability and the development of these causes that culminates in disaster. The study was carried out in central Pakistan with a focus on five villages. The study used a Pressure and Release (PAR) model to understand the progression of vulnerabilities to disaster. The study found out that vulnerability of a community is due to disempowerment; since the research had focused on vulnerability from the

perspective of individual and community defenselessness and not on the structural and non structural causes of vulnerability to flooding.

Brown (2005) sought to analyze the institutional impediments that had continued to propagate the application of traditional urban storm water management techniques in Sydney, Australia, despite there being the existence of advance alternative strategies. By aid of interviews, questionnaires and desk studies, the author undertook data collection within institutions mandated with urban flood management with the city. The research found out that there had been a general preference to traditional storm water management techniques as a result of historical technocratic institutional of power, values and expertise that entrenched continued impediments to implementation of the advanced strategies.

In Ghana the National Disaster Managements Organisation (NADMO) was formed with the act of parliament (Act 927) to manage disasters and emergencies. Although NADMO has been given the Act of parliament to prevent and manage disaster it does not have the power to pull down building in water ways and other things that are seen to be hazardous to disaster management so NADMO always has to collaborate with sister agencies like the Town and Country Planning, the Municipal Assemblies and others to fight disasters.

2.3.3 Theoretical framework of flood management

In crafting the theory of urban resilience to flood, Liao (2012) proposes a flood hazard management approach that is geared towards adaptation and resilience as opposed to hard-engineering structural flood control. Before narrowing down on this theory, another goes on to distinguish two broad interpretation of resilience as engineering resilience and ecological resilience (Holling, 1996) and defends the ecological resilience interpretation.

Wary and Blackmore (2009) as cited by Liao (2012) states that, ―In engineering, resilience is concerned with disturbance that threaten the functional stability of engineering system, which are often linked with low probabilities of failures or, in the case of failure, quick recovery to normal levels of functionality". Liao (2012) continues to argue that engineering resilience is more concerned with how well a system recovers (bounces back to full functionality after undergoing stress). Resilience in itself is, according to Norris et al. (2007), a concept that has its origins in physics and mathematics but one that has also been applied in describing adaptive capacities of individual, communities and even larger societies.

They go on to state that community resilience has to go hand in hand with defiling ―Community" and as such go on to define it as a unit that shares geographic boundaries and that is subject to similar built, social, natural and economic environments that interact in a complex way to affect how the unit functions. Patton (2000) as quoted by Norris et al. (2007) explains the concept of community resilience as being the capabilities that an integrated unit has to recover following contact with hazards. This capability is aided by its efficient use of the physical and economic resources at its disposal.

2.3 Effects of Flooding

Flood disasters impose the largest burden on developing countries. The inter-regional distribution is variable, based on income disparities. The per capita burden of catastrophic losses is dramatically higher in developing countries. The effects of flood disaster risk management are often suffered most by the poor, uneducated, very old or very young, the sick, and the oppressed (Comfort et al., 1999; IFRC, 2007). Flood disaster causes major infrastructure damage - disruption to transport, electricity, and water supply and sewage disposal systems.

The economic effects of floods are often much greater and often spread well beyond the flooded area and may last much longer than the flood itself. Floods impact interpretation may have positive impact though most floods assessments emphasize the negative effects. These effects on humans could be direct/tangible and or indirect intangible (Smith & Ward, 1998).

2.3.1 Direct effects

Direct or primary effects of floods include damage caused by direct flood waters coming in contact with humans and damageable property. Physical assets such as shelter and infrastructure will be more susceptible to damage as frequency of flooding increases (Gall & Borg, 2013). Direct disaster losses refer to the directly quantifiable losses such as the number of people killed and the damage to buildings and properties, infrastructure and natural resources. Though human lives, livestock, buildings are lost, capital infrastructure such as road, culvert/bridges, and drainage systems are often seriously affected (Smith & Ward, 1998).

In most case when there is flood it affects many houses, therefore, makes the families or occupants in those houses or building homeless. Sometimes one‘s shop is washed away by the flood and several properties are affected. These are the effects one can feel directly because if one‘s house has been washed away by flood, the family will be homeless till they find a new place to stay or to repair their damaged house to enable them to live together. The effect will be felt directly because that is where the individual earns the living to either take care of his/her family.

2.3.2 Indirect effects

Disaster losses include not only the shocking direct impacts that we see on the news, such as the loss of life, housing, and infrastructure, but also indirect impacts such as the foregone production of goods and services caused by interruptions in utility services, transport, labour supplies, suppliers or markets. Secondary losses include impacts on such macroeconomic variables as economic growth, balance of payments, public spending, and inflation (Smith & Ward, 1998). The indirect effects mostly involve losses that are difficult to assess in monetary terms.

Floods directly modify the natural environment and undermine the poor who depend on local ecosystems for a variety of goods and service (Gall et al., 2013). Indirect effects include declines in output or revenue, and impact on wellbeing of people which generally arise from disruption to the flow of goods and services as a result of the disaster. Changes in local ecosystems entail changes to agricultural systems and practices which form the basic livelihood of the poor. The loss of entire harvest reduces livelihood security, the contamination of potable water supplies, unhygienic conditions, the incidents of infectious diseases like cholera and water borne diseases are all indirect and are predicted to rise with flooding. Another important indirect

impact is that funds targeted for development are reallocated to finance relief and reconstruction efforts, jeopardizing long term development goals especially in developing countries (Smith & Ward, 1998).

Natural disasters, therefore, impede progress towards social and economic growth, as they wipe out investments made and divert resources from federal, state, and municipal/district assembly budgets and aid agencies to recovery activities (UNISDR, 2004). With the changes in the global the perception of risk can adversely affect a Country if investors demand higher rates of return. Increased investor demand can lead to increased household costs, decline in income, slower economic development and poor livelihood security.

2.4 Flood Management

The effects of flooding have led to the development of several measures against flooding. The main thrust is flood disaster management. In the context of flooding, a disaster denotes a large or even catastrophic event (Lumbroso, 2007).

Flood management refers to the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society, and communities to lessen the impacts of natural hazards and related environmental and technological disasters (WHO/EHA, 2002). This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards on people (UNISDR, 2002).

Flood disaster management comprises more than flood risk calculations. It addresses al aspects of flood risk management focusing on prevention, protection, preparedness, including flood forecasts and early warning systems (Lumbroso, 2007). It includes the reduction of potential adverse consequences of flooding with regard to human health, the environment, cultural heritage and economic activity.

One word that appears in the definition of flood disaster management is _resilience' - focusing on the integration of a variety of dimensions (e.g. social, socio-cultural-historical, legal-institutional, political and economic characteristics), differing with the flood type and the degree of awareness as well as with the uncertainties and the way they are dealt with. This concept can bridge flood risk management and flood disaster management (Chow, Maidment & Mays, 2016). An increase in the resilience (also referred to as _adaptive capacity' or _coping capacity') is a _before the event' action to minimize or decrease the negative consequences after the flood disaster.

According to (Smith & Ward, 1998) the disaster management response is put into structural and non-structural measures. The structural aspect covers the technical or physical control measures which are usually geared towards flood prevention. The non-structural part deals with the human behaviour and response which seeks to reduce flood disaster impact by the process of adjusting people to damaging events, loss sharing, disaster aid and insurance to reduce future loss. The _structural' school of thought argued that, specific actions have to be taken to reduce general social vulnerability. They advocated the need to bring together agency and behavioral change for disaster risk reduction with concurrent change to economic and political structures (Alexander, 2000; Pelling, 2003).

However, wider disaster literature has paid relatively less attention to understanding how to foster such integration with significant attention being put on the challenges of structural reform for pro-poor growth and less about how different approaches to disaster risk reduction can create policy environments that are conducive to the design and implementation of structural reforms.

Therefore, this work adopts this framework to examine flood disaster management in the study area. In terms of flood disaster preparedness, early warning systems will include cleaning of chocked gutters and drains, identifying areas that need improved drainage system, places were culvert need to be constructed and sometimes building that is on water ways to be demolished.

2.4.1 Disaster management: Mitigation, prevention and risk reduction

Disaster management is an essential planning tool for reducing damages to properties and the loss of human lives in a disaster event. It is important in building resilient communities and in the process reduces the forces that make people vulnerable. According to Cutter et al. (2003), and Adam (2004), mitigation measures are geared towards lessoning risks or reducing the negative impact of disasters.

Reducing negative impacts of disasters means addressing issues and factors that makes people vulnerable and unable to cope with shocks and stress of disasters. Disaster risk reduction is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).

Many a time when disaster strikes, the immediate response has been to provide relief items to victims. This goes a long way to help them to partially recover but not fully. At the same time, other community members may migrate to other locations as a way of adapting to the situation.

According to Cannon et al. (2003), the focus continues to support victims of disaster rather than build up preparedness, resistance and resilience through reductions in vulnerability. Often times, disaster relief and recovery fail to incorporate the need to support livelihoods and future resistance to hazards by reducing vulnerability as well as dealing with the community's immediate needs as a way of drastically reducing risk. The provision of disaster relief may subsidize risk taking and encourage dependence on others while response and recovery operations may ironically augment vulnerability (Mileti, 1999; McEntire, 2001).

It is imperative that disaster management should not focus too much attention on response operations alone but should be able to address all aspects of vulnerability with all agents and actors on board. Kulling (2000) asserts that disaster risk reduction should focus on building resilient communities rather than merely responding to disasters.

One important resilient strategy to reduce risks to people and property is by providing early warning information and advice to households on how to respond to a particular disaster risk. This enables people to adequately prepare ahead of an impending disaster. Preparedness involves measures taken in anticipation of a disaster to ensure that appropriate and effective actions are put in place during a disaster. It also includes constructing effective risk messages on what to do before, during, and after a disaster.

Providing such information should not be assumed that it will facilitate the adoption of preventive measures as people take it for granted that once the central authorities provide such information, they will equally take responsibility for managing both the hazard and their safety and in the process reducing the likelihood of them attending to risk messages and adopting recommendation (Paton & Johnson, 2001).

McEntire (1999) believes that some approaches focus too much attention on mitigation and recovery at the expense of preparedness and response measures and activities. Pelling (1999) also suggests that it is the socio-political processes by which people are made vulnerable that are most relevant to mitigation strategies. In order to address vulnerability to disasters, an understanding of the social context is required. According to Allen (2003), emphasis is moving away from disaster response to preparedness and mitigation, from service provision to the facilitation of community initiatives. One of such approaches is the Community Based Disaster Management (CBDM).

2.4.2 Disaster management: Community based disaster management

One of the most important aspects of disaster is how it is managed in order to reduce the risk it presents as well as how it affects the community and people in the future. There is now a development approach to disaster management where development plans incorporate hazard mitigation and vulnerability reduction strategies. Community Based Disaster Management (CBDM) is one of such approaches, to disaster management which helps in building the capability of local communities to cope with disasters by developing a locally appropriate and locally owned strategy for disaster management.

According to Singh (2010), making plans for locals to mobile communities for preparing and protecting themselves and for increasing their capacities to cope with and recover from disasters without looking up for outside assistance. This makes the community self-reliant and prepared for response and recovery. For CBDM to be effective there has to be inclusiveness and participation of all the community members to be better informed on what to do when disaster strikes. The local community is the primary focus of attention in disaster reduction since it is the unit immediately affected by disaster and is the first to respond directly. Through CBDM, people's capacity to respond to emergencies is increased by providing them with more access and control over resources and basic social services (Pandey & Okazaki, 2005). Through CBDM groups, communities that are vulnerable can be transformed to resilient communities that are well able to withstand as well as recover from stress and shocks brought about by disasters.

According to Yodmani (2001), Community Based Disaster Management has received wide acceptance because it is considered that communities are the best judges of their own vulnerabilities and can make the best decisions regarding their well-being. The aim of CBDM is to reduce vulnerabilities of people and to strengthen their capacity to cope with hazards. Hitherto, most disaster responses were characterized by a top-down approach with logistics at the centre. This approach had some limitations inherent in them that resulted in a failure to meet vital needs and a general dissatisfaction over performance (Pandey & Okazaki, 2005). This means that the top-down approach failed to address local needs appropriately and even though communities were the ones faced with the negative consequences of disasters, they were not part of decision-making processes to address their concerns.

According to Victoria (2002), there was a call for a shift in perspective from emergency management framework to disaster risk reduction, one that highlighted the significant role of local communities. The top-down approach failed to address local needs, ignored the potential of indigenous resources and capacities, and may have increased people's vulnerabilities (Shaw, 2012; Victoria, 2002).

The top-down approach did not also promote participation which is critical for sustainable disaster risk reduction. Alvarez (2006) is of the opinion that the participation of local people is important in designing and planning the process of flood risk management with respect to policy measures and called for the enhancement of indigenous systems in disaster preparedness. Participation and the application of local knowledge can help to positively address local socio-economic concerns and can empower people with knowledge and skills to contribute to development initiatives. Due to exposure and proximity to hazardous conditions, local people are the first to respond when disaster hit the community even before assistance come from outside forces. This is where indigenous knowledge is very useful in the sense that they have been living in the community for a long time and understands the local dynamics well enough that aid workers.

Shaw (2009) described indigenous knowledge as a cumulative body of knowledge, know-how, practices, and representations maintained and developed by people with extended histories of interaction with the natural environment. According to Pearce (2002), it is local level bottom-up policies that provide the impetus for the implementation of mitigation strategies and a successful disaster management process. Decentralization of power and responsibility to provide basic development services from the national level (centre) to lower local government units is critical to

CBDM. Decentralization includes the transfer of decision-making to lower levels of governments through the local units‘ government process of how local communities are governed (Goss, 2001). This, if well done, can enable grassroots participation at the community level together with government officials and expert groups. Singh (2010) asserts that, to organize a disaster resistant community, the principles and process of disaster mitigation must be integrated into local government institutions, community based organization and NGOs. That is to decentralize the national disaster management plans for them to become more effective and efficient. CBDM is therefore a process that seeks to develop and implement a locally appropriate and owned strategy for disaster preparedness and risk reduction (Singh, 2010).

Through Community Based Disaster Management approaches, the people‘s capacity to respond to emergencies is increased by providing them more access and control over resources and basic social services (Shaw, 2012). Major benefits of CBDM includes building confidence, pride in being able to make a difference, individual and community ownership, commitment and concerted action in disaster mitigation, resource mobilization, and a wide range of appropriate, innovative and do-able mitigation solutions, which are cost effective and sustainable (Victoria, 2002).

2.4.3 Disaster management and development

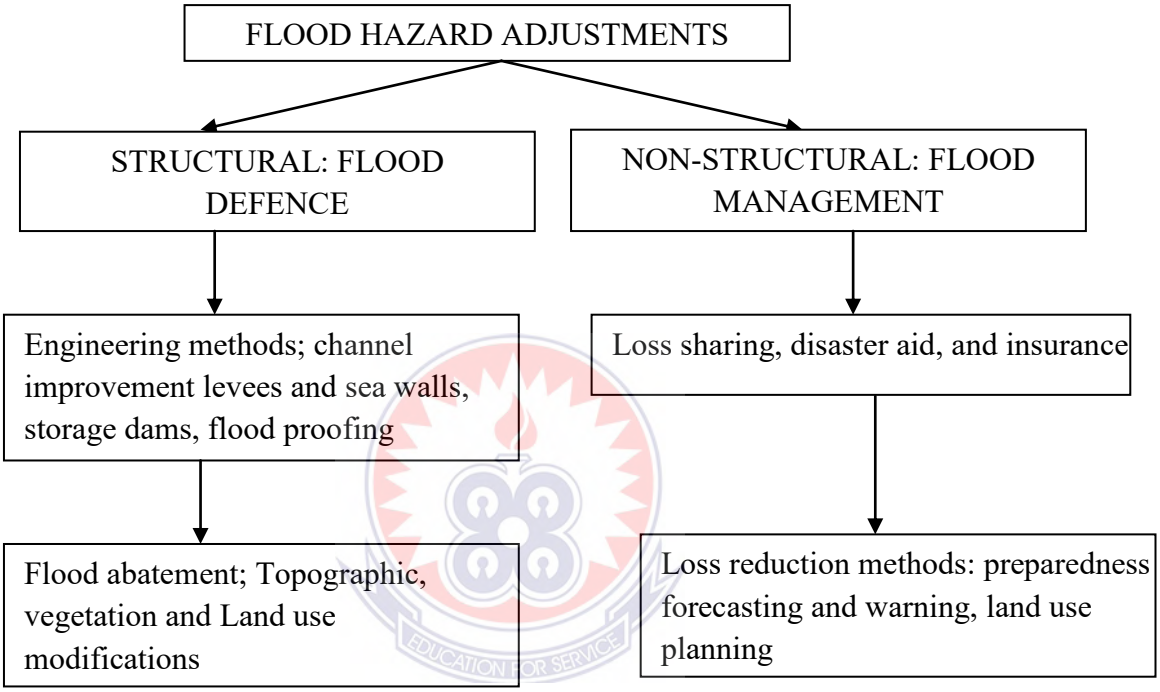
Disaster has been described as a problem of development as El-Masari and Tipple (2002) asserts that disaster is a development problem resulting from poor decision-making on the part of policy makers. This indicates that due to development challenges and inaccurate decisions on the part of policy makers, disasters have gain a foothold and impacted negatively on development. The impact of disasters according

to Carter, Michael, Peter, Tewodaj and Worken (2007) may result in an increase in poverty and deprivation of the affected areas.

There are other studies that also link disasters to the pursuit of economic development and this has to do with unfriendly or unsustainable use of natural resources for the goals of development. Cannon (1994) for instance argues that natural hazards can be exacerbated by the pursuit of economic and social goals which are seen as the objectives of economic growth. This mind-set paints a ‗gloomy' picture of the impacts of development on the onset of disasters. Haque (2003) also asserts that development activities and programmes themselves can aggravate in a subtle way the threat of disasters to people, jeopardize their livelihoods and degrade their societal and environmental resilience.

This notwithstanding, disasters also have a negative impact on development as Benson and Clay (2003) argue that the long-term impact of disasters on growth is negative. This demonstrates that disasters may stifle development goals and therefore the need to consider it in development planning. It is therefore important that decision-making on economic development activities should be consistent with sustainable development goals-one that is not detrimental to the environment and does not expose people to environmental risks-in order that people's vulnerabilities to natural hazards are reduced. Building a petro-chemical plant for instance is a good development plan that will ensure that fuel is provided for vehicular movement and for household use. But citing such plants in a location where people reside certainly will pose a threat to people and increase the vulnerability of people to disaster.

However, there are others who also see a positive correlation between disasters and development. Skidmore and Toya (2002) have argued that natural disasters may have positive impact on growth in the long runs as there is a reduction to returns on physical capital but an increase in human capital leading to higher growth. Figure 1 highlights the range of potential human adjustment to the flood hazards.



Source: Adopted from Smith and Ward (1998)

Figure 1: Range of Potential Human Adjustment to the Flood Hazards

Chan (1997) said –structural solutions are attempts at controlling floods and non-structural solutions are largely preventive efforts". These strategies could also be implemented in the flood-prone areas that are not fully developed. Non-structural flood mitigation measures can also complement the structural approaches in areas where future development may occur, and they may also represent an independent approach where some control over floodplain development can be exercised at low cost. All of the above methods of flood control can work, however the structural

methods often have negative effects on the river as a natural habitat for other organisms (Chan, 1997).

2.4.4 Process of flood management

Various guidelines on managing flooding and reducing the damaging impacts exist (Smith, 2001; Alexander, 2000). For instance, Wisner et al. (2003) emphasize two clear dimensions of disaster risk reduction: the short-term recovery and relief aspect that is predominantly humanitarian, and the other longer-term planning aspect which addresses sustainable risk management. The disaster risk reduction approach often begins with disaster risk ―prevention" followed by ―preparedness", then ―response" and finally ―rehabilitation" (UNDP, 2004). The processes of responding to disasters are further discussed below:

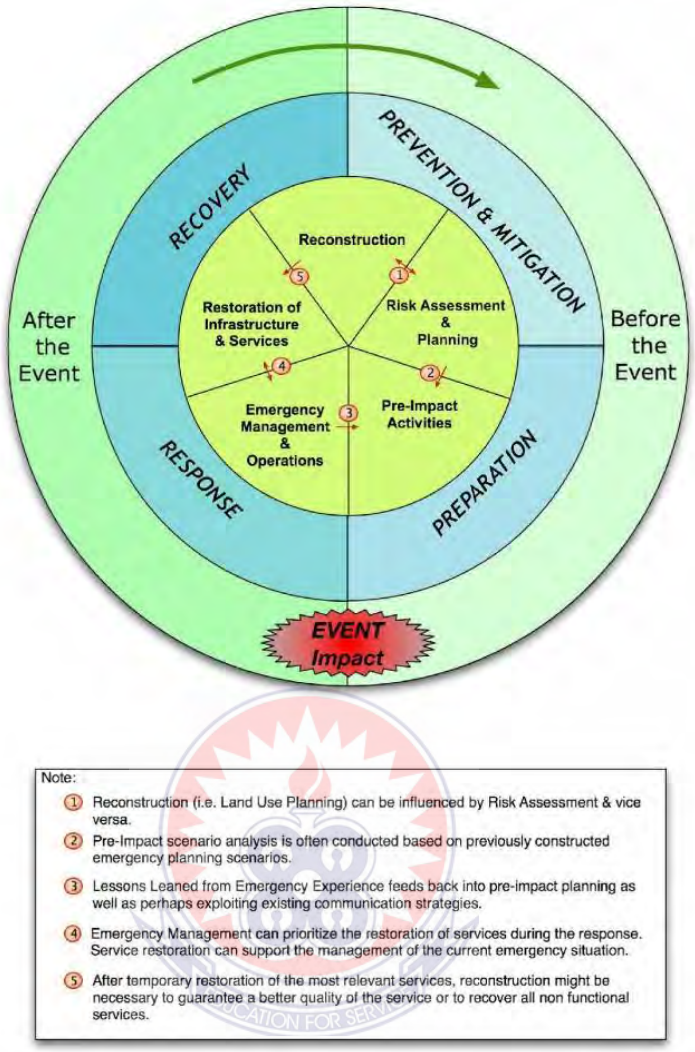
Prevention: According to Henderson, (1990) is those activities taken to prevent a natural phenomenon or potential hazard from having harmful effects on either people or economic assets. Delayed actions drain the economy and the resources for emergency response within a region. In developing nations, prevention is perhaps the most critical component in flood disaster management, however, it is clearly one of the most difficult to promote. Prevention planning is based on two issues, hazard identification (identifying the actual threats facing a community) and vulnerability assessment (evaluating the risk and capacity of a community to handle the consequences of the disaster. Once these issues are put in order of priority, emergency managers can determine the appropriate prevention strategies.

Preparedness: These are the measures that ensure the organized mobilization of personnel, funds, equipments, and suppliers within a safe environment for effective relief (UNDP, 2004). Flood disaster preparedness is building up of capacities before a flood disaster situation prevails in order to reduce impact. Its measures include inter alia, availability of food reserve, emergency reserve fund, seed reserve, health facilities, warning system, logistical infrastructure, relief manual and shelves of projects.

Response: This is the set of activities implemented after the impact of a disaster in order to assess the needs, reduce the suffering, limit the spread and the consequences of the disaster, open the way to rehabilitation (NNDP, 2004).

Rehabilitation: Rehabilitation refers to the actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair physical damage and community facilities, revive economic activities and provide support for the psychological and social well-being of the survivors. It focuses on enabling the affected population to resume more-or-less normal (pre-disaster) patterns of life. It may be considered as a transitional phase between immediate relief and more major, long term development.

Disaster preparedness: Preparedness is a medium-term planning activity that involves developing and testing disaster management plans. It involves the development and implementation of early warning systems, resource inventory and stockpiling of resources, coordinating agencies, and ensuring evacuation plans work (IFRC, 2007).



Source: Adopted from Smith and Ward (1998)

Figure 2: Flood Risk Management Cycle

2.5 Flood Management Practices

The main thrust of flood disaster management practices is to modify the floods through specific structural measures such as reservoirs, embankments, channel improvement, town protection and river training works. Whichever paradigm is adopted, flood management practices have been very practical process. The main steps for flood disaster management are briefly discussed below:

2.5.1 Flood risk calculations

Kellens et al. (2008) and Deckers et al. (2009) presented several overviews of the flood risk calculation methodologies. Until now, the majority of the flood risk calculations only consider economic losses. Social cost-benefit analyses are ideal instruments to bring together the tangible (economic losses) and intangible elements (social and ecological aspects).

Vanneuville et al. (2011) elucidates the type of data that is needed to calculate flood risks. Flood risk calculation comprises the combination of the flood maps (i.e., hazard maps) with the land-use maps (i.e., vulnerability maps). The so-called stage-damage curves are often used to define a relation between the water depth (or another flood characteristic) and the expected damage for each specific land-use category. Many functions have been proposed in the past, either on theoretical grounds, or on empirical grounds.

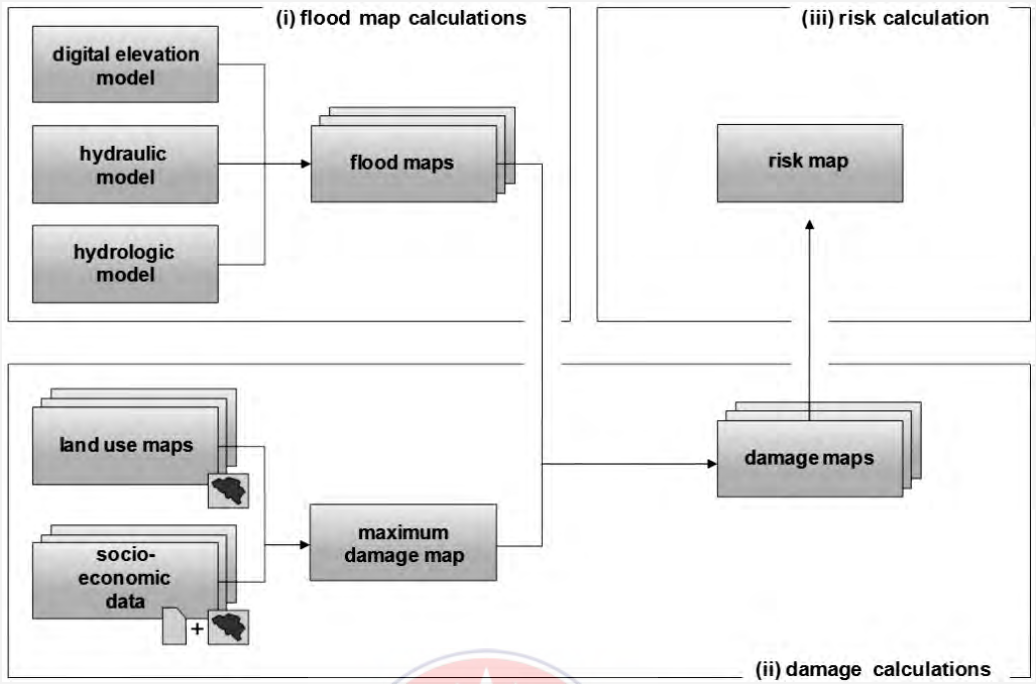


Figure 3: Derivation Scheme of flood risk mapping in Flanders (Kellens et al., 2008)

The Digital Elevation Model (DEM) plays a key role in the flood risk methodology (US Geological Survey, 2010). A Digital Elevation Model (DEM) is a specialized database that represents the relief of a surface between points of known elevation. It is based on laser scanning in rural areas with basically 1 point per 4 m^2 during recording. For urban areas, photogrammetric interpretation based on stereoscopic aerial photos is used, resulting in 1 point per 100 m^2. Additional break lines are added to compensate for the lower point density. This high density of elevation points is needed, as the topography is rather flat in a large part of the territory. The local variations have to be in the model to accurately delineate the flooded area. Local embankments or quarries not immediately included in the elevation model create over- or underestimation of the flood zone.

Also, successful flood risk calculation relies on a detailed and uniform land-use map since it determines what is damaged in case of flooding. In the Flemish methodology, various land-use categories are distinguished (e.g., urban area, industrial area, infrastructure, crop land, pastures, etc.). This is further subdivided according to their vulnerability level, which is related to the desired level of detail. A high level of thematic detail is needed where the damages are high or highly varying (e.g., built-up area, industry and infrastructure) and less where the (economic) damages are low (e.g., different types of pastures of nature areas).

The vulnerability of the land-use categories is determined by various socio-economic data (e.g., replacement values). With respect to spatial distribution and update frequency of land-use data, airborne and space borne data sets have been found promising in the past. Recently, cadastral information is being employed to calculate the damage of individual houses and industrial sites resulting in a higher level of detail (Vanderkimpen et al., 2010). In this methodology, each country collects socio-economic information differently and applies interpretation keys of land-use information in a (slightly) different way.

2.5.2 Flood forecasting

Flood forecasting involves giving prior information regarding the occurrence of floods (Arduino, Reggianal & Todini, 2005). This is essential and is extremely useful for taking timely action to prevent loss of human lives, livestock and movable property. It is usually done through Flood forecasting network. This centers on issues of daily-flood forecasts and warnings throughout the flood season. Flood forecasting involves the following four main activities:

- Observation and collection of hydrological and hydro-meteorological data;
- Transmission of data to forecasting centres;
- Analysis of data and formulation of forecast; and
- Dissemination of forecast.

The utility of flood forecasts is dependent on both accuracy and timeliness. The organizations responsible for flood-protection, warning and flood-fighting work on the principle that ―A Flood Forecast received too late to take the necessary flood fighting measures is of ‗No' use." Therefore, forecast bulletins are issued to as early warning measures depending upon the urgency and available mode of communication media.

For effective forecasting, State Governments set up ―Central Control Rooms" which receive these forecasts and disseminate the warning to the affected areas and organize relief as well as rescue operations. On receipt of ―Fresh Information" a revised forecast is issued, if the situation warrants. During high flood stages the ―Control Room" of the forecasting centre works round the clock and keeps informed the flood fighting agencies about the latest river position. They work in close collaboration (Arduino, Reggianal & Todini, 2005).

2.5.3 Reduction of runoff

Reduction of runoff is one of the very effective methods of flood disaster management (Arduino, Reggianal & Todini, 2005). Runoff can be reduced by inducing and increasing infiltration of the surface water into the ground in the catchment area. This can be done by large scale afforestation particularly in the catchment area. Afforestation helps in reduction of runoff in the following ways:

i. The canopy of the forest cover intercepts the falling raindrops and the roots, the leaf litter and humus are capable of holding water.
ii. Together these encourage infiltration and reduce runoff.
iii. Runoff reduction helps in reducing soil erosion which leads to reduced sediment load of the streams.
iv. Reduction in stream sediment load reduces siltation and helps in maintaining the water accommodating capacity of the rivers.

Runoff can be reduced by artificially inducing infiltration by digging wells along the beds of ephermal channels. A series of dug wells helps in storing and channelizing the surface water.

2.5.4 Reducing flood peaks by volume reduction

This involves constructing dams and detention basins. The flood peaks can be reduced by construction of dams and detention basins. Dams have the capacity of holding huge quantity of water during the flood period and help in reducing flood peak volume of water. Water stored in reservoirs created by constructing dams can be allowed to flow down the stream under controlled conditions depending upon the accommodating capacity of the river downstream the dam. These dams have helped in mitigating flood-peak in the downstream reaches. Apart from dams as described above ponds, tanks and surface storage structures also check flood and help in harvesting water for dry seasons. Other type of detention basins includes natural depressions such as marshes in plains and old quarries and mines.

2.5.5 Reducing flood levels

Flood levels are reduced through many ways. The following ways are noted within the literature (Linnerooth-Bayer & Amendola, 2003).

i. Stream channelization**:** A close network of canals reduces flood hazard to a great extent because flood water flowing in the river can be diverted to canals. Canals serve as temporary storage and hold water as its flood waves move downstream. Thus, they help in reducing the severity of the flood.

ii. Channel Improvement**:** Channel improvement is done by deepening, widening, straightening, lining and cleaning out of vegetation and debris from the river channel.

iii. These changes in the river channel increase the flood conveyance capacity of the river. Channel improvement is supplemented by bank stabilization by constructing ripraps, dykes or spurs and planting deep root trees on embankments. In a meandering river, meander loops impede drainage and retard disposal of flood water. Whenever, the river meanders become extremely sharp, they can be straightened by artificially cutting individual or a series of bends.

iv. Flood Diversion**:** Flood diversion is the process of diverting the flood water in marshes, lakes, the depressions and spreading it thinly over paddy fields and desert dry lands (Linnerooth-Bayer & Amendola, 2003).

2.5.6 Protection against inundation (Construction of embankments)

Building of embankments was considered to be the only way of controlling floods in 1940s. It is still considered to be one of the very effective devices against inundation of the inhabited areas and agricultural land. Construction of embankments has been taken up at a large scale in India, where more than 44,451km of embankments had been constructed (Arduino, Reggianal & Todini, 2005).

2.5.7 Emergency relief response and recovery

Response occurs when the hazard is about to happen, or is happening and involves real-time disaster response (assessment, coordination, and relief). Rehabilitation focuses on recovery taking into account long-term planning objectives (Pelling, 2003).

This framework has been applied in many different contexts i.e. the landslides and tsunami on the east coast of Canada (Liverman, Batterson, & Ryan, 2001). It is very lucid that access to public infrastructure comprises a large component of the wealth of the poorest households and therefore the annual direct damage to rural infrastructure due to natural disasters such as roads, bridges, irrigation, electrification, schools, are said to cost billions of dollars around the globe pushing the poor further down the poverty drainpipe (UN, 2004). The links between poverty and disaster vulnerability make disaster management an important part of development planning particularly in developing economies where poverty levels are starting. While these elements are critical for effective disaster risk reduction, they are not always designed to concurrently bring about long-term development.

2.5.8 Institutional frameworks for flood management

Governments across the world located within flood prone zones often draw up policies and strategies to at least reduce the occurrence of flooding and lower the effects on populations living in the flood plains. In many countries across the world, rivers prone to floods are often carefully managed (Dunne & Leopold, 1978), using structural measures such as levees, bunds, reservoirs, and weirs to prevent rivers from bursting their banks. When these defenses fail, emergency rescue measures are used to reduce the effect on the people.

Disaster risks can be minimized and losses substantially reduced by enabling local bodies such as Union and Municipalities to undertake planned interventions. Most governments have national disaster and emergency policies with special ministries, departments and agencies charged with the responsibility for disaster preparedness and response. For example, in Vietnam, the Department of Dyke Management, Flood and Storm Control, the Hydro-meteorological Service, and the Red Cross are in charge of advance planning and implementation of appropriate mitigation (development) strategies to significantly reduce the drudgery and cost of rescue, relief, resettlement and reconstruction (IFRC, 2007).

Disaster risk reduction in Ghana has its main institutional home within the National Disaster Management Organization (NADMO) established in 1996 under a National Security Council, under the NADMO Act (Act 927, 1996) in the Ministry of the Interior. The organizational framework indicates that NADMO is responsible for assisting the Government of Ghana in observing and investigating the establishment and implementation of the annual flood preparedness solutions and plans for all disaster types and phases. NADMO functions under a National Secretariat in Accra

with 10 Regional Secretariats, 170 District/Municipal Secretariats and 900 Zonal offices. Since its inception, NADMO has contributed considerably to the management of disasters across the country, despite a constant struggle to obtain resources and maintain response capacity on the ground.

The National Disaster Management Committee (NDMC) has administrative oversight responsibilities for NADMO and reports to the National Security Council, which is NADMO's Governing Council. Seven hazard-specific technical committees of governmental and non-governmental experts have been established to advise the NDMC on specific issues. Confronted with a variety of natural hazards, and prompted by the recent floods in the north, the Government of Ghana initiated actions on several fronts in order to develop strategies and strengthen institutional capacity in disaster risk management. A draft National Disaster Management Plan (NDMP) has recently been prepared as a revision of the 1997 NDMP along with an Amendment to the Act, (UNDP/NADMO, 2009).

2.5.9 Adaptation measures

Adaptation measures are connected with the concept of resilience. Adaptation is not about returning to some prior state, because all social and natural systems evolve and, in some senses, co-evolve with each other over time (Tomkins & Adger, 2004). Adaptation refers to the actions that people take in response to, or in anticipation of, projected or actual changes in climate, to reduce adverse impacts or take advantage of the opportunities posed by climate change.

Paton, Millar and Johnson (2001) recognize the importance of the nature of social relationships as a factor that can enhance resilience. Although the lessons from these studies are context-specific, they do establish some broad criteria by which to assess

the adaptive capacity of communities. The nature of the relationships between community members is critical, as are access to and participation in the wider decision-making processes (Adger, 2003).

Social resilience is often used to describe the capacity for positive adaption despite adversity (Luther, Cecchetti & Becker, 2000). In the context of climate change, social resilience is the ability of groups or communities to adapt in the face of external social, political, or environmental stresses and disturbances (Adger, 2000). To be resilient, societies must generally demonstrate the ability to safeguard disturbance, self-organize, learn, and adapt (Trosper, 2002).

Social resilience in this context appears to be promoted through at least two distinct forms of cross-scale interaction: Network and community relations of individuals and groups operating to cope with variability and change in everyday decision making, and wider networks of individuals or groups who may be able to influence the decisions that are being made at the local scale.

These approaches offered pathways for vulnerable communities to engage in developing response policies and ensure that there is room for change in those policies. These principles are relevant to climate change situations in which there is much uncertainty and disagreement about how best to manage the potential consequences of climate change issue, yet there is a need to take anticipatory adaptive action. Networks can be explored in terms of the access to power and the representation that they provide to participants (Cox, 1998). For instance, networks of engagement, and the support they offer to participants in vulnerable positions (networks of dependence) and the expansion of their engagement appears to be

critical to the enhancement of resilience in communities affected or likely to be affected by climate change.

Adaptation is not about returning to some prior state, because all social and natural systems evolve and, in some sense, co-evolve with each other over time. Adaptive co-management may promote the expansion of networks and thus enhance social resilience in the area of responding to climate change (Lee, 1999). However, it is their networks that enable individuals to engage in the wider decision environment that will affect their longer-term resilience (Tompkins et al., 2004). The existence and the usefulness of these networks are determined by institutional as well as social factors (Trosper, 2002).

At the community level, reducing the barriers to communication through sharing information and feedback that provides positive reinforcement are important elements in consolidating networks of dependence. At the institutional level, integrated institutional structures may be better able to support the inclusion of climate stakeholders in decision-making processes to ensure that their needs can be addressed by as wide an audience as possible. The wider community is being drawn on for assistance and advice. The adaptive management processes is informed by iterative learning about the ecosystem and earlier management successes and failures and increased threats of climate change and disasters.

Present-day resilience which in turn increased the ability to respond to the threats of long-term climate change today came as a result of time-tested adaption strategies. This type of adaptive management, according to Lee (1999) can be used to pursue greater ecological stability and more flexible institutions for resource management.

2.5.10 Risk assessment/analysis

This is a methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

The process of conducting a risk assessment is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities related to the risk scenarios (ISDR, 2002, WHO/EHA, 2002).

The level of loss a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions is termed acceptable risk. In engineering terms, acceptable risk is used to assess structural and non-structural measures undertaken to reduce possible damage at a level which does not harm people and property, according to codes among other issues based on a known probability of vulnerability (ISDR, 2002, WHO.EHA, 2002).

2.6 Factors that Promote Flood Management

This section examines the literature on factors that promote flood disaster management.

2.6.1 Political will

Political will in any situation is very important especially in flood disaster management. These points have been reinforced by the World Bank‘s recent

publication, Natural hazards, and unnatural disasters (World Bank, 2010) and in the first draft of the global assessment report on Disaster Risk Reduction (2011).

Other ways to strengthen the effectiveness and political ownership of the Disaster Risk Reduction agenda so as to build domestic political will include:

1. Government respecting, protecting, and fulfilling human rights relevant to the safety and protection of its people.
2. Sitting specific time-bound targets for risk reduction, with dear individual and institutional roles, responsibilities and measureable commitments.
3. Establishing methods for auditing progress towards targets with graduated sanctions for non-compliance.
4. Undertaking research to demonstrate the value of Disaster Risk Reduction (DRR).

According to International Federation of Red Cross, (IFRC 2007) thousands of lives and billions of dollars could be saved every year if a fraction of the cost of disaster response was spent minimizing the impact of hazards. This is when the political leaders show commitment in promoting flood disaster management. This is by providing all the assistance that in needed in managing disaster, and also taking action like demolishing of buildings and properties in water ways without considering the votes that will be lost or gain.

2.6.2 Timing

Timing in flood disaster management is very important. This made of the time for education, time deployment and time of relief. It is always good to start education on flood issues far or many months before the rains set in to enhance the understanding of the concept make residents plan and prepare for the rains.

Secondly timing also helps those in authority to know when they should deploy their staff in order not to waste their budget since every deployment foes with a huge budget. Also timing helps in the releasing of relief items for upward distribution to disaster victims in order to stop or prevent diversion to illegal places. International Federation of Red Cross (IFRC, 2007)

2.6.3 Proper planning/engineering

Proper planning helps promotes flood disaster management because when there is proper planning people don‘t build in water areas construction of bridges and culverts are done correctly and that avoid flood disaster (International Federation of Red Cross, IFRC, 2007).

2.7 Challenges to Flood Management

The literature, especially from development agencies variously discussed some factors that constrain disaster management (UN, 2010; Khan, 2013).

2.7.1 Human attitudes

Human beings were naturally to be disaster control ambassadors but in recent times their actions rather make it very difficult in management of disaster especially flood disaster. These days the sitting of our homes do not matter no more so far as there is a plot of land that can be used in putting up a small building for residential purposes. One do not care if his/her house is close to a river or water body and many instances the authorities tries to stop them but they refuse and use any means possible to go ahead with the project and finally when there is a flood disaster they will be the same people to call for help from government and other organization.

2.7.2 Planning

Planning under factors that promotes flood disaster management can be grouped into four. The first is institutional disaster planning. United Nation Disaster Risk Reduction, UNDRR (2010) defines the general scope of humanitarian actions that the National Society and International Federation will undertake. It is based on the organization‘s institutional mandate which provides a framework within which its policies, strategies, standards and norms, and legal remit can be defined.

The second is Disaster Response Plan**.** This involves identifying, strengthening and organizing resources and capacities so as to reach the level of preparedness for timely and effective response to a potential disaster. Disaster response planning is preliminary in nature, based on educated assumptions of risks and hazards, and does not address specific disaster scenarios as in the case for contingency plans. Once a disaster occurs, plans must then be monitored, evaluated and adapted to the specific situation.

The third is contingency plans. These are based on specific events or known risk at local, national, regional or even global levels (eg. earthquakes, floods or disease outbreaks), and establish operational procedures for response, based on anticipated resource requirement and capacity.

The fourth is Standard Operating Procedures (SOP). These are set of standard procedures that operationalize the disaster response and contingency plans. In other words, SOPs specify the way in which individuals or units will carry out their functions under the plan. It also set out what should be done how it should be done, who is responsible for implementing what, and specifies available resources.

Resources here can be grouped into two that is human resources and material resources. Human resource problems are related to staffing. Inadequate qualified staff or personnel that will help in preventing disaster before by giving education during rescuing moment and after the disaster by giving or distribution of relief items to the affected people or victims. Material Resource are funding related. The inadequate of funds to purchase disaster relief items that will be use before during and after the disaster to help the victims return to normal. In most cases the agencies responsible in managing disaster complain of their budget being slashed by government and that makes it very difficult for them to do what they are expected to do in times of disaster (Arduino, Reggianal & Todini, 2005).

2.8 Coping Strategies

Coping is the way in which people act within the parameters of prevailing resources and range of expectations to achieve various ends. In general, this involves no more than _managing resources', but usually it means how it is done in unusual, abnormal and adverse situation. Thus, coping can include defense mechanisms, active ways of solving problems and methods for handling stress (Wisner et al., 2004).

When shocks hit, household cope by changing work pattern – moving more people and property. Members of households may migrate to the village, or families may move together. If this also does happen, members will beg or ask for help (Pryer, 2000). Families with good economic status will buy a land or house in safer places so that they can migrate to those areas in disaster times. As self-protection is also one of the strategies adopted by the affordable household. The other aspect of safety – social protection is the function of non-monetary social relations as for example, mutual aid in a community, neighbourhood, or extended family member (Wisner et.al., 2004).

Depending on the endowments, entitlements and other factors, coping strategies will differ from place to place, and other demographic factors such as age, gender, etc. People living in mountainous areas face exposures on a regular basis, as they have developed many ways of coping, but they are vulnerable notwithstanding, and many cope as long as possible, and are then forced to abandon their homes (Dahal, 1998).

Some areas in semi-arid regions such as India employ strategies such as, growing of mix crops and rearing a variety of livestock, earning the labour and tenancy market as needed, drawing down stored goods or fixed assets adjusting consumption, borrowing and drawing upon traditional security: what differs from region to and over times in the pattern who adopt which strategies, in what sequence and under what circumstances (Chen, 1991).

In a study by Moench and Dixit (2004) in Rohini and Bagmati Nepal, it was discovered that, household adopted a variety of coping mechanisms and strategies. When flood occurs, priorities tend to break down as follows: first of all, the victim try to save themselves and will try to save the valuable goods for example jewelry and important paper. Secondly, they try to save their food supplies; thirdly they attempt to save their animals and fodder for them, in the time of severe flooding family‘s release their livestock‘s and they try to move them in the higher elevated parts

When flooding cause crops to fail, families must look for other employment in order to sustain themselves until the next crop is harvested, if that is not damaged. After the floods people cannot mortgage their land to get money because it has little value and at the same time nobody wants to buy the affected land. Thus, the incentives to invest further in farming declines sharply, families generally have two options to restore income sources following major floods losses. If they have access to irrigation and

can count on growing a winter crop, they borrow food from neighbours to meet their needs for a few months until harvestings time. If they lack access to irrigation most people attempt to find jobs within the village, or at a viable commuting distance. In the time of crisis, it has also seen that most of the victims work in the relief actives which are one of the coping mechanisms. If the above said jobs are not available locally, they migrate to nearby town and cities. For those who cannot move to other places or find jobs, selling land and gold ornaments and begging is the last resort (Moench & Dixit, 2004).

Crisis events occur from time to time in peoples lives, as well as in the lives of whole communities and societies, in which case they are often called disaster. Such events call for the mobilization of resources at various levels to cope with their impact. When people know an event may occur in the future because it has happened in the past, they often set up ways of coping with it (Wisner, 2004).

"Poor households often cope by reducing consumption, removing children from school and seeking off-farm employment (at low wages). Some studies concludes that an appropriate policy is needed to assist vulnerable household in this "diversification process". However, supporting coping behaviour can keep household locked in the vicious cycles of poverty. Concern exists that poor people have less ability to smooth consumption and this inability may lead to behaviour such as shifting to less risky portfolios that exacerbates income inequality" (Alwang, Siegel, & Jørgensen, 2001, p. 20-21).

2.9 Summary

This chapter highlights several issues in literature related to flood disaster management. It highlights that flooding is a major problem the world over. The causes are context specific and the effects are wide and varied. The management of floods is not a simple process. It requires planning at various levels – institutional to standard operating levels. Flooding management is promoted and constrained by different factors. Prominent among the factors is political will, timing and proper planning.

In terms of constraining factors, human attitudes and resource availability are crucial increase the risk of vulnerability among certain social groups. What remains unanswered is how flooding is managed in places outside the capitals in Ghana. How the causative factors are manifested in communities is largely unknown. How the effects of flooding are mitigated and the management practices in place remain unaccounted for within the literature. Therefore, this research explored the case of the Effutu Municipality to generate knowledge about flood disaster management outside of the capital.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

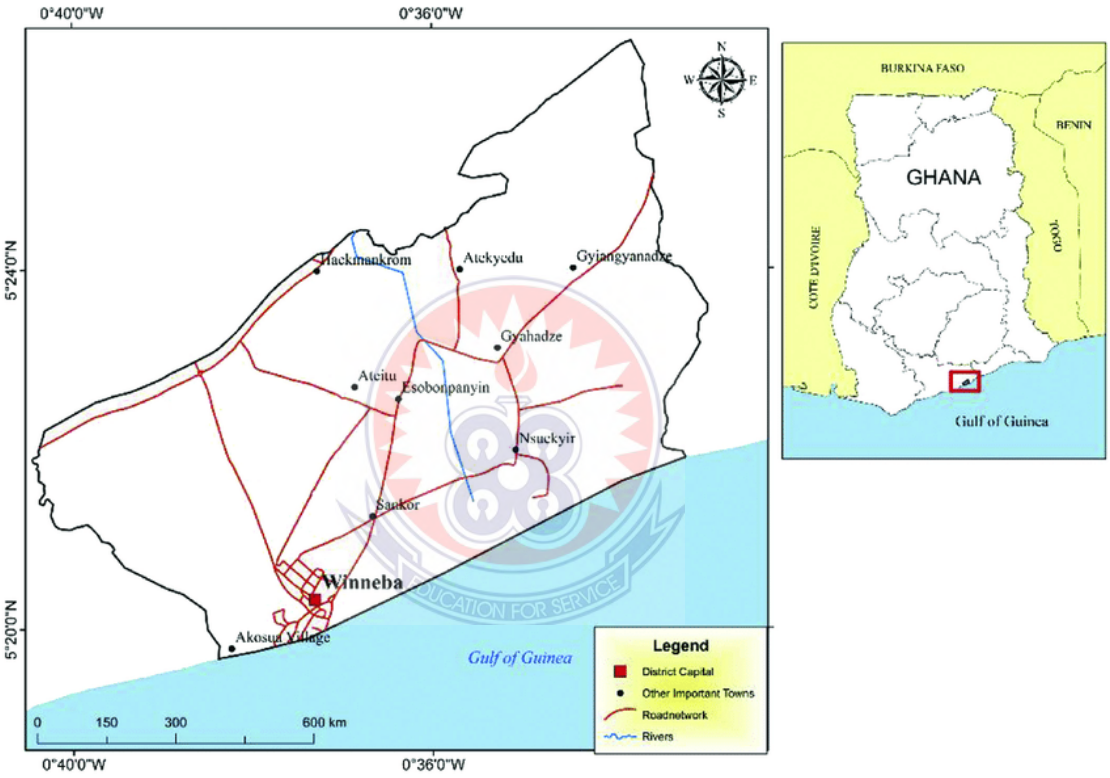
This chapter presents the research design the researcher adopted for the study, target population, sample and sampling procedure, research instruments, validity and reliability of quantitative, and trustworthiness of qualitative research instruments. It also specifies how the research instruments were employed in the data gathering procedures and data analysis procedure. Ethical considerations are also dealt with in this chapter.

3.1 Research Setting

Effutu Municipal Assembly is in the Central Region of Ghana which has Winneba as its capital. Winneba has a population of about 80,000 people. Effutu Municipal share it boundaries to the north with the Gomoa Central District Assembly, to the west with Gomoa West District Assembly, to the East with Gomoa East District Assembly and the South is the Atlantic Ocean. The main indigenous occupation is fishing and farming. Where majority of the indigenes of Winneba involved in fishing in both the Atlantic Ocean and the many water bodies that God has blessed Winneba with.

The others are involved in farming because Effutu Municipal has about 7 villages that are not close to the Atlantic Ocean but have other water bodies.

Winneba as the Capital of Effutu Municipal Assembly has the University of Education, Winneba which is one of the main drivers of the economy of Winneba with a student population of about 30,000 students in it South, Central and North campuses respectively. Below is the Map of Winneba.



Source: Ghana Shared Growth and Development Agenda, GSGDA II (2014-2017)

Figure 4: Map of Winneba

3.2 Research Approach

The researcher used mixed method for this work. That is both qualitative and quantitative data collection. This includes close-ended information such as that found to measure attitudes (eg rating scales), behaviours (eg observation check lists), and performance instrument. The analysis of this type of data consist of statisticall

analysis of this type of data consists of statisticall analysis scores collected on instrument (eg. Questionnaires) or checklist to answer research questions or to test hypotheses.

Qualitative data consists of open-ended information that the researcher usually gathers through interviews, focus groups and observations. The analysis of the qualitative data (words, text or behaviours) typically follows the path of aggregating it into categories of information and present the diversity of ideas gathered during data collection (Gallo & Lee, 2015)

3.3 Research Design

Kish (1967) cited in Robert (2004) states that research denotes all stages and processes involved in research to reach the respondents. Moore and McCabe (2005) defines research design as a plan for conducting research which usually includes specification of the elements to be examined and the procedures to be used. It is done purposely to have the most feasible and appropriate methods for answering research questions. The study employed sequential mixed method research design. This research design assisted the researcher in obtaining the perceptions and opinions of respondents relating to the cases available to make a full description of the whole phenomenon at hand.

3.4 Population

A population is any group of individuals that has one or more characteristics in common and that are of interest to the researcher (Creswell, 2005). The population for the study therefore included the residents of the Effutu Municipality. The scope of the population covers NADMO staff, members of the university community. The University community comprise of those in Central, North and South campuses of

University of Education (UEW). Other residents involved are those in the catchment area from Klimovic to Kojo Beedu. The accessible population was made of 250 people.

3.5 Sample and Sampling Procedure

The method of purposive sampling was used to develop the sample of the research under discussion. According to this method, which belongs to the category of non-probability sampling techniques, sample members are selected on the basis of their knowledge, relationship and expertise regarding research subject (Freeman, 2007). In this study the sample members who were selected are people who have either been affected by flood, people who have some sufficient relevant work experience in the field of flood disaster management.

As the name implies, purposive sampling involves the selection of settlements, organisations, and or respondents (households/individuals) who can best answer the research questions (Twumasi, 2001). The key institutions charged with the responsibility for planning and managing disasters at the regional and district level were also purposively chosen. Sample characteristics are crucial to non-sampling errors which can occur because of problems in coverage. The sample population used for the study was 250 individuals selected using convenience and purposive sampling techniques. Convenience sampling was used to select 240 participants from various strata within the municipality as follows:

Out of the 250 people, 10 were purposively selected for interview for the study. four (4) were selected from the University Community (Departments of Geography Education and Social Studies Education) while the six (6) were selected from the District Assembly (Planning Office and NADMO). This is shown in Table 1.

Table 1: Sample of Population

Education	Frequency	Percentage (%)
Rural Surburbs	23	9.2
Central Winneba	80	32
Klimovic and Kojo Badu	90	36
Low Cost and New Winneba	57	22.8
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

3.6 Research Instruments

The data collection process employed direct administration of questionnaire, observation and semi-structured interviews to a sample of households and some public institutions to solicit information through interviews. The closed-ended questionnaire with 5 like scale was employed. The questionnaires were administrated to the selected sample. Also, the researcher used semi-structured interview schedule to fill some gaps that were not met by the questionnaires this was to help obtain exact information like the number of those affected and the real effect of the flood.

Again, field observation was used. Kumar (1999) defines observation as ~~"a~~ purposeful selective and systematic way of watching and listening to an interaction or phenomenon as it takes place." In this work, field observation involved walking through the Municipality during the rainy season to do semi-structured observation waterways, flood situations and general topography as well as general environmental conditions related to flood prevention.

3.6.1 Validity and reliability of quantitative instruments

The content validity was ensured by subjecting the instrument to experts who estimated the validity by their experience. Lecturers placed their input to the instrument‘s validity. In this study, reliability was achieved by measuring consistent results from the respondents. The researcher ensured proper wording of instructions and logical arrangement of the structure of the questionnaire and interview guide. The researcher consulted with his supervisor to streamline the research tools that would provide information that can answer the research questions.

3.6.2 Trustworthiness of the qualitative instrument

Trustworthiness of the qualitative instrument refers to the validity and reliability of the instrument. The following are the things that makes an instrument trustworthy.

i. **Credibility:** The confidence the qualitative researcher is in the truth of the research study‘s findings. ―How do you know that your findings are true and accurate”. With respect to this work the researcher made sure that all the information gathered for the purpose of this work are very true, very credible and factual.

ii. **Transferability:** The way the researcher demonstrates that the research study‘s finding are applicable to other contexts. Flooding is likely to be found at most of the coastal town and villages in the Central Region of Ghana hence the ability to transfer the finding of this project to a town like Apam and Ekumfi Otuam is highly possible because the settings of these three towns are almost the same (Winneba, Apam and Ekumfi Otuam) and faces the same flooding issues even though the magnitude of each may not be the same.

iii. **Confirmability:** This is the degree of neutrality in the research study findings. Creswell and Plano Clark (2017). As much as the researcher was very neutral

and didn‘t do anything to affects the findings of this project which can really stand the test of time.

3.7 Data Collection Procedures

Data gathering involves collection of data from a variety of sources, in a variety of ways, with a variety of perspective in the measurement of variables (Tague, 2004). An introduction letter was obtained from the Department of Social Studies Education for the researcher to solicit approval to conduct the studies from the respective areas and departments that deal with disaster management in the Effutu Municipality. After the approval, the researcher secured a list of the qualified respondents from the local authority heads of disaster-prone areas and the disaster management organizations officials. The selection of the suitable respondents was made with the aid of stratified and purposive sampling technique. Then respondents were given detailed explanation about the study and requested to sign the information consent form.

The researcher reproduced more questionnaires for distribution after he appointed research assistants in the data collection process. Before real data collection, the research assistant were briefed and oriented in order to be consistent in administering the questionnaires. Respondents were requested to answer completely and not leaving any part of the questionnaires unanswered.

The researcher and assistants emphasized retrieval of the questionnaires within one week from the date of distribution. On retrieval, all returned questionnaires were checked if all were answered. The gathered data were collected, encoded into the computer and statistically treated using Microsoft Excel.

3.8 Ethical Considerations

Four important ethical considerations guided this research. These included: protecting the confidentiality of participating respondents; ensuring transparency within the research process; ensuring accountability of the research to both the residents and local authorities; ensuring the inclusiveness of respondents. With respect to protecting the confidentiality of respondents, the field research component of the thesis does not contain names of participants in interviews and the workshop.

Additionally, without permission, names are not used within the final document or any of the report-back documents. Measures were adopted to ensure inclusiveness of respondents. This was done so that there would be minimal bias as to who participated in the workshop.

3.9 Data Analysis

Content analysis was used to analyse the data which was gathered from personal interviews. According Moore and McCabe (2005), this is the type of research whereby data gathered is categorized in the themes and sub- themes, so as to be able to be comparable. The main advantage of content analysis is that it helps in data collected being reduced and simplified, while at the same time producing results that may then measured using quantitative techniques.

Moreover, content analysis gives the ability to researchers to structure the qualitative data collected in a way that satisfies the accomplishment of research objectives. However, human error is highly involved in content analysis, since there is the risk for researchers to misinterpret the data gathered, thereby generating and unreliable conclusions (Krippendorff & Bock, 2008). The frequencies and percentages were used in analyzing data about the respondents‘ profile, descriptive mean was

statistically computed using Microsoft Excel package in determining the level of selection process in flood hit areas and disaster management.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter looks at the analysis of the data gathered from affected communities in the Effutu Municipality which is one of the most affected by flood municipalities in the Central Region, and actors or institutions charged with the responsibility directly or other wise to manage flood. Central Region is on the costal belt of Ghana blessed with the Atlantic Ocean and many rivers and water bodies. This chapter presents the research findings and discussion of the study. The data collected from the field during data collection are presented and analyzed critically based on the research questions. The first part explained the demographic characteristics of respondents.

4.1 Demographic Information

This section presents information about the demographic characteristics of the participants in the research. It presents information about their age, gender, educational status and other characteristics that enhanced the analysis of diversity.

Table 2: Gender Characteristics of Participants

Gender	Frequency	Percentage
Male	128	51
Female	122	49
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 2 shows the gender characteristics of the participants. It shows that males constituted 128 (51%) and females constituted 122 (49%) of the study population. The relatively higher number of males is not intentional but purely accidental.

The effect is not much as this research is not interested in gender analysis.

It purely explored the views of citizens. The gender characteristics were, however, useful in making the point that a cross-section of the Ghanaian population was involved in the study.

Table 3: Educational Characteristics of Participants

Education	Frequency	Percentage
Post-Secondary Professional Certificate	23	9
Diploma	122	49
University degree	105	42
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

From Table 3, all participants had post-secondary education.

This was mainly due to the use of questionnaires which required that the individual attains some level of education.

The table shows that nine percent (23) of the participants had post-secondary professional certificates such as the Teachers' Certificate 'A' and Nurses. Forty-nine percent representing 122 participants hold Diploma including the Higher National Diploma (HND) that was awarded to Polytechnic graduates prior to the conversion of Polytechnics to Technical Universities in 2016. The remaining 42% (105) participants were University graduates.

Therefore, it can be argued that the participants were people who could read, and understood the items in the questionnaires.

Table 4: Residential Status of Participants

Number of years living in Effutu	Frequency	Percentage
Resident	227	91
5-10	2	1
11+	21	8
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

The data in Table 4 shows that although all participants were Ghanaian nationals, they were not all resident in Effutu their entire lives. The majority (91%), representing 227 participants were Effutu residents. Two participants, representing one percent have lived in Effutu more than five years. Another 11 participants representing eight percent have lived in Effutu for more than 11 years.

4.2 Causes of Flood in Effutu Municipality (This addresses research question 1.)

The first research question sought to address the causes of flood in Effutu Municipality. This section presents the results from the interviews, observations and questionnaire on the causes of flood disaster in the Effutu Municipal. It is organized based on the questions that were explored during the fieldwork. The results are organized in frequency tables and supported with descriptions from the interviews and observations.

4.2.1 Views of people concerning causes of flooding in Effutu Municipal

The first research was to explore the causes of flood disaster in the Effutu Municipality. The section dealt with the views on the following: weak enforcement of laws/policies; flood prevention plans are not implemented; many people build on

waterways; gutters and drains are choked; and parts of the township are built in waterlogged areas. Table 4.4 shows the outcome of the questionnaire administered.

Table 5: Views on Causes of Flooding in Effutu Municipality

Item	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Weak enforcement of laws/policies	166 (66.4)	75 (30)	9 (3.6)	0 (.0)	0 (.0)
Flood prevention plans are not implemented	168 (67.2)	74 (29.6)	4 (1.6)	3 (1.2)	1 (.4)
Many people build on waterways	156 (62.4)	63 (25.2)	23 (9.2)	8 (3.2)	0 (.0)
Gutters and drains are choked	166 (66.4)	84 (33.6)	0 (.0)	0 (.0)	0 (.0)
Parts of the township are built in waterlogged areas	140 (56)	105 (42)	5 (2)	0 (.0)	0 (.0)

Source: Researcher's Fieldwork, 2019

It may be observed from the data in the Table 4.4 that participants generally identified with the causative factors related to flood disaster.

Out of 250 responses to each item, majority either agreed or strongly agreed to all the indicators that causes flood in the Effutu Municipality. In relation to weak enforcement of laws/policies, 166 (66.4%) of the respondents strongly agreed, 75(30) agreed, whilst 9 (3.6) were not sure whether weak enforcement of laws/policies are causative agent of perennial flooding in the municipal. Concerning flood prevention plans are not implemented, 168 (67.2%) strongly agreed, 74 (29.6%) agreed, 4 (1.6) were not certain, 3(1.2) disagreed, whilst 1(.4) strongly disagreed. Responses in relation to building on waterways depicts that as many as 219 (87.6%) agreed to the assertion, only 23 participants were not sure, while eight disagreed. With the outcome on choked gutters, all participants agreed that it was a cause of flooding. Only five

participants disagreed that parts of the town are not built in waterlogged areas with the remaining agreeing to the assertion as a cause of flooding.

The interview results further corroborate the outcomes of the Likert scale items. Some of the typical responses include and not limited to the following:

> *Disasters whether natural or man-made can strike at any time… but here we are creating it. People build on waterways and in marshes. What can one do to prevent these areas from flooding when there are available lands to build on, that are not waterlogged? People chose to be there at their own risk.* (**Interview with a Geography Lecturer, May 15, 2019**)

> *I'll say that flooding is prevalent in Winneba because the Assembly rules are not implemented. People build anyhow. Gutters are choked everywhere. Look everywhere and you will see people living with gutters and drains that are full of filth. Why won't flooding occur here as frequently as it does?* (**Interview with District Assembly Official, May 4, 2019**)

> *I personally don't think we have flood prevention plans in this Municipality that is obviously flood prone. If there is NADMO Office here, it has to engage the Assembly on the issues of developing a comprehensive flood prevention plan. This is the problem. …it's a big problem that requires attention.* (**Interview with a resident within Winneba Township, May 3, 2019**)

The comments confirmed the responses concerning building on waterways and non-implementation of the Assembly policies and rules.

Personal observations within the township confirmed that, many buildings were constructed along waterways and in marshes. It seems that some of the Winneba Township can be described as flood plain. These places are seen to be marshes.

Given the responses and personal observations, one aspect that was explored was to establish what the participants thought was the most important cause of flooding within the Effutu Municipality. The findings confirm the assertion of Smith and Ward (1998) that, flood disasters are created by countless locational decisions of individuals that encourage the settlement, unregulated expansion into flood zones and intrinsic land use and economic development of flood plains.

4.2.2 Most important causes of flood in the Effutu Municipality

This section examines the major causes of flood in the Municipality. Respondent was asked to rank the following causes of flood based on their knowledge in the Effutu municipality. The outcome in table 4.5 depicts the results. Respondents were asked to choose one of the causes enumerated earlier in order of gravity. The outcome is shown Table 6.

Table 6: Most Important Cause of Flood in the Municipality

Item	Frequency	Percentage
Weak enforcement of laws/policies	156	62.4
Flood prevention plans are not implemented	76	30.4
Many people build on waterways	49	19.6
Gutters and drains are choked	11	4.4
Parts of the township are built in waterlogged areas	18	7.2
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 6 shows that majority (62%) of participants were of the opinion that weak enforcement of laws was responsible flooding in the Effutu Municipality. Notwithstanding the 76 representing 30% of participants indicated that non-

implementation of flood preventing policies was the main cause of flooding. This was followed by 49 representing 20% participants. Choked gutters and parts of the township being located in waterlogged areas seemed to be the less responsible for flooding in the Municipality. This would suggest that most participants think that policy decisions are more responsible for flooding than practical questions.

One way of interpreting the results is that participants thought that policy implementation could have prevented the citing of parts of the township in waterlogged areas, for example. In relation to choked gutters, all participants agreed that it was a cause of flooding. Concerning flood prevention plans, building on waterways and non-implementation of Assembly policies and rules. Personal observations within the township confirms that many buildings were constructed along waterways and in marshes.

It seems that some of the Winneba Township can be described as flood plain as the whole area seems to be marshes. Given the responses and personal observations, one aspect that was explored was to establish what the participants thought was the most important cause of flooding within the Effutu Municipality. Choked gutters and parts of the township being located in waterlogged areas seemed to be less responsible for flooding in the Municipality (Coste, 2001; Vanneuville, Kellens, De Maeyer, Reniers & Witlox, 2011).

This would suggest that most participants think that policy decisions are more responsible for flooding than practical questions. One way of interpreting the results is that participants thought that policy implementation could have prevented the sighting of parts of the township in waterlogged areas, for example. showed that most

participants either agreed or strongly agreed to all the indicators concerning why flood victims continue to live in flood prone areas.

This was more pronounced concerning where victims assume that flooding is a temporal experience. Whereas this corroborates the earlier responses concerning the causes of flood disaster within the municipality, the results equally raise some issues with what may be described as a temporality syndrome. This is in view of the fact that, most people indicated flood victims usually think it is a temporal experience.

4.3 Effect of Flood in Effutu Municipality (This addresses research question 2.)

The second research question examine the effect of flood in the Effutu Municipality. This section presents view of people in relation to the direct and indirect effect of flood on the lives of the citizens.

Table 7: Effects of Flooding

Item	Agree %	Strongly Agree %	Disagree %	Strongly Disagree %	Not Sure %
Loss of properties	147 (58.8)	53 (21.2)	6 (2.4)	3 (1.2)	41 (16.4)
Loss of lives	53 (21.2)	147 (58.8)	3 (1.2)	6 (2.4)	41 (16.4)
Outbreak of Diseases	147 (58.8)	53 (21.2)	41 (16.4)	6 (2.4)	3 (1.2)
Destruction of Properties	91 (36.4)	89 (35.6)	49 (19.6)	13 (5.2)	8 (3.2)
Displacement of Affected	130 (52)	101 (40.4)	11 (4.4)	8 (3.2)	0 (0)
Collapse of Bridges	111 (44.4)	117 (46.8)	18 (7.2)	1 (.4)	3 (1.2)

Source: Researcher‘s Fieldwork, 2019

Table 7 shows the various effects of the total participants agreed that flood in the municipality results in loss of properties.

Nine out of the total participants did not agree that flood results in loss of properties, whilst 41 out of the total participants were not sure floods can result in loss of properties.

Secondly, with loss of lives 200 participants out of the total number agrees that floods can results in loss of lives. Nine out of the total number of participants disagrees that floods result in loss of lives and the remaining 41 were not sure.

Also, 200 participants out of the total number agreed that outbreak of diseases is an effect of floods whiles 47 of the participants disagreed with the assertion that outbreak of diseases is an effect of floods 3 out of the total participants were not sure if outbreak of diseases is an effect of flood.

Furthermore, 180 out of the total participants agree that properties destruction is an effect of floods in the municipality, 62 out of the participants disagreed that destruction of properties is an effect of flood. Eight out of the total number of participants were not sure of destruction of property as an effect of flood.

Moreover, on displacement of affected is an effect of flooding in the municipality. Nineteen out of the total participant disagreed that displacement of the affected people is an effect of flood.

Finally, 228 out of the total participants agreed that collapse bridges is an effect of flood in the municipality. Nineteen out of the participants disagreed that collapse of bridges is an effect of floods and 3 participants out of the total were not sure if collapse of bridges is an effect of floods.

In the discussion above it is noticed that there is a confirmation of the assertion of Gall and Borg (2013) which sees the effects of flood as quantifiable losses such as the number of people killed and the damage to buildings, properties, infrastructure and natural resources.

Smith and Ward (1998) also confirms the research finding with the view that though human lives, livestock, buildings, capital infrastructure such as road, culvert/bridges, and drainage system are often seriously affected by floods.

Checking for consistency of result, quantitative research outcomes were triangulated with interviews and observation. The following are the excerpts from the qualitative data collected:

> *The flood takes over our farms and all plants die off. When it happens this way, we are unable to visit the farms and harvest the produce. Seedlings and nursery beds go waste and as a result, all money(loan) from the banks for farming go waste and we have to pay the banks from our personal pocket or sell our personal belongings to save ourselves from disgrace* (**Interview with a maize farmer, May 18, 2019**).

Source: Researcher's Field Work, 2019

> *Whenever we encounter flood issues in Effutu, the victims loose numerous properties. These include house hold items, office equipments, monies and other valuable items.* (**Interview with District Assembly Official, May 4, 2019**)

> *Flood affects our life's badly to the extent that, our children have to stay home for some weeks before going back to school. It takes weeks for us for to gather ourselves before going back to work. Depending on the intensity of the flood, some families loose life's of siblings.* (**Interview with a resident within Winneba Township, May 3, 2019**)

The picture below shows a flooding situation around the Klimovic area.

Source: Researcher's Field Work, 2019

Source: Researcher's Field Work, 2019

The picture above shows settler farmers behind the Winneba Senior High School area trying to escape from the flood with their precious belongs.

The picture below shows properties destroyed by flood behind the Winneba Senior High School area

Source: Researcher's Field Work, 2019

Source: Researcher's Field Work, 2019

The pictures above show a flooding situation around the Egyaa Lodge East area of Winneba.

The above pictures taken from the flood scenes depicts the seriousness of flood in the municipality. The qualitative (interview and observation) outcomes supports the outcomes of the questionnaires administered.

4.4 Flood Management Practices (This seeks to address research question 3)

The fifth research objective seeks to examine the flood coping management practices in Effutu Municipality. This section examines the management practices of flood in the Municipality. This section includes the following: (4.4.1) Management strategies to reduce flooding; and (4.4.2) Rehabilitation strategy against flooding. Interviews, observations and questionnaire were used to derive the outcome from the sub-themes. It is organized based on the questions that were explored during the fieldwork. The findings are organized in frequency tables and supported with descriptions from the interviews and observations.

4.4.1 Management strategies to reduce flooding in Effutu Municipal

This section dealt with the views on the following: flood diversion into existing water into marshes and lagoons; training people in flood resilience; construction of embankments; construction of dams and deepening of existing streams; early warning systems; cleaning of choked gutters and drains; mapping places where culvert need to be constructed; and construction of canals. Table 4.5 shows the outcome of the questionnaire administered.

Table 8: Management Strategies to Reduce Flooding

Item	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Flood diversion into existing marshes and lagoons	91 (36.4)	89 (35.6)	49 (19.6)	13 (5.2)	8 (3.2)
Training people in flood resilience	98 (39.2)	78 (31.2)	55 (22.0)	8 (3.2)	11 (4.4)
Construction of embankments	112 (44.8)	46 (18.4)	45 (18.0)	44 (17.6)	3 (1.2)
Construction of dams and deepening of existing streams	147 (58.8)	53 (21.2)	41 (16.4)	3 (1.2)	3 (1.2)
Early warning systems	170 (68.0)	77 (30.8)	0 (.0)	1 (.4)	3 (1.2)
Cleaning of chocked gutters and drains	130 (52)	101 (40.4)	0 (.0)	11 (4.4)	8 (3.2)
Mapping places where culvert need to be constructed	103 (41.2)	88 (35.2)	44 (17.6)	0 (.0)	15 (.6)
Construction of canals	96 (38.4)	86 (34.4)	44 (17.6)	11 (4.4)	13 (5.2)

Source: Researcher's Fieldwork, 2019

Table 7 showed views concerning the management strategies that could be adopted in managing flood disaster in Effutu Municipality. The areas that received the greatest support, was early warning systems where a total of 247 participants agreed that this could be an effective way of managing flood disaster. This was followed by cleaning of chocked gutters where 231 participants agreed. In terms of mapping places where culvert could be constructed, 191 participants agreed.

4.4.2 Rehabilitation Strategies against flooding

This sub-theme surveys the questionnaire outcome of respondents on the following: emergency relief response; development of flood recovery plan; construction of shelters for flood victims; provision of relief items; and financial support to flood victims in the Effutu Municipality. The outcome is shown in Table 8.

Table 9: Rehabilitation Strategies against Flooding

Item	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Emergency relief response	147 (58.8)	53 (21.2)	41 (16.4)	3 (1.2)	3 (1.2)
Development of flood recovery plan	225 (90)	22 (8.8)	0 (.0)	1 (.4)	3 (1.2)
Construction of shelters for flood victims	130 (52)	101 (40.4)	0 (.0)	11 (4.4)	8 (3.2)
Provision of relief items	91 (36.4)	89 (35.6)	49 (19.6)	13 (5.2)	8 (3.2)
Financial support to flood victims	111 (44.4)	117 (46.8)	18 (7.2)	1 (.4)	3 (1.2)

Source: Researcher's Fieldwork, 2019

Table 9 showed rehabilitation measures that can be taken against flood disaster effects. The data showed that 200 participants agreed. Out of the total, 247 agreed with the development of flood disaster recovery plan. Construction of shelters for flood victims was supported by 231 participants while provision of relief items was supported by 180 participants. Financial support to flood victims was supported by 228 participants.

4.5 Challenges of Flood Management (This answers research question 4)

The fourth research objective seeks to evaluate the main challenges to flood management in Effutu Municipality**.** The study seeks to examines why people who suffer flood disaster continue to live at the same place most important reason why flood victims remain in flood prone areas/ main reason preventing people from leaving flood prone areas; and main challenges facing flood disaster management in Effutu.

4.5.1 Reasons preventing people from leaving flood prone areas

This section examines why victims of flood disaster continue to live at the same place. Answers were sought from the following: flood victims assume that flooding is temporal experience; victims assume flooding will not occur again; lack of political will to evict; and they have no alternative place to relocate. The results are shown in Table 10 below.

Table 10: Why do People who Suffer Flood Continue to Live at the Same Place?

Item	strongly agree (%)	agree (%)	not sure (%)	disagree (%)	strongly disagree (%)
Flood victims assume that flooding is temporal experience	147 (58.8)	107 (42.8)	3 (1.2)	0 (.0)	0 (.0)
Victims assume flooding will not occur again	170 (68.0)	77 (30.8)	0 (%)	1 (.4)	3 (1.2)
Lack of political will to evict	130 (52.0)	101 (40.4)	19 (7.6)	0 (.0)	0 (.0)
They have no alternative place to relocate	89 (35.6)	91 (36.4)	49 (19.6)	13 (5.2)	8 (3.2)

Source: Researcher's Fieldwork, 2019

Table 10 above showed that most participants either agreed or strongly agreed to all the indicators concerning why flood victims continue to live in flood prone areas.

This was more pronounced concerning where victims assume that flooding is a temporal experience. On that score, only three participants were not sure; 147 strongly agreed, and 107 agreed. Majority of participants' responses followed a similar trend. The responses related to the suggestion that victims assume flooding will not occur again also received similar responses where 170 strongly agreed and 77 agreed. One person disagreed while three strongly disagreed. Interestingly, lack of political will to evict people from flood prone areas also received very high responses as 130 strongly agreed and 101 agreed to this as the reason why people continue to live in flood prone areas. Only 19 participants indicated they were not sure. Whereas this corroborates the earlier responses concerning the causes of flood disaster within the Municipality, the results equally raise some issues with what may be described as a temporality syndrome.

This is in view of the fact that, most people indicated flood victims usually think it is a temporal experience. Given that the research explored views on the major reason why victims continue to live in flood prone areas. This agrees with the study that floods are shocks which do not occur throughout the year. People only adjust or relocate temporally because they do believe the floods will recede after a short while (Smith & Ward, 1998).

4.5.2 Most important reason why flood victims remain in flood prone areas

Participants in the study were asked to rank the following based on their knowledge regarding reason why flood victims remain in flood prone areas. This section focuses on reasons flood victims assume that flooding is temporal experience; they assume flooding will not occur again; lack of political will to evict; and they have no alternative place to relocate.

Table 11: Most Important Reason why Flood Victims Remain in Flood Prone Areas

Item	Frequency	Percentage
Flood victims assume that flooding is temporal experience	106	42.4
They assume flooding will not occur again	38	15.2
Lack of political will to evict	86	34.4
They have no alternative place to relocate	20	8
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 11 showed that 106 representing 42.4% participants were of the view that the most possible reason why flood disaster victims continue to reside at the same location is that they think of floods as a temporal experience. This is followed by lack of political will to evict people residing in flood prone areas which accounted for 86 (34.4%) of participants. Responses relating to the fact that flood victims assume that flooding may not occur again accounted for 38 (15.2%) of participants. Only 20 (8%) indicated that flood victims continue to stay where they were despite flooding because they had nowhere to go. Thus, put together, it may be argued that 57% percent of the participants refer to the temporality effect or syndrome as the main reason.

In this case it can be argued that the temporality effects or syndrome and the lack of political will are responsible for the reasons why flood victims continue to be where they were flooded.

4.5.2 Main challenges facing flood management in Effutu

This section examines the main challenges facing flood disaster management in Effutu. It touches on the following: human resource; financial resource; logistic and equipment; and perceptions about flooding. The outcome is depicted in Table 12.

Table 12: Main Challenges Facing flood Management in Effutu

Item	strongly agree (%)	Agree (%)	not sure (%)	disagree (%)	strongly disagree (%)
Human resource	53	147	41	3	3
	(21.2)	(58.8)	(16.4)	(1.2)	(1.2)
Financial resource	55	22	170	1	3
	(22.0)	(8.8)	(68.0)	(.4)	(1.2)
Logistic and equipment	130	101	0	11	8
	(52.0)	(40.4)	(.0)	(4.4)	(3.2)
Perceptions about flooding	91	89	49	13	8
	(36.4)	(35.6)	(19.6)	(5.2)	(3.2)

Table 12 showed majority (170 out of 250 participants) were not sure that financial resources accounted for challenges affecting flood disaster management is Effutu. However, a total of 200 participants agreed that human resource issues affect flood disaster management. Two hundred and thirty-one agreed with that logistics is a many constraint while 180 agreed perceptions about flooding is major obstacle to flood disaster management. This would suggest that many participants thought flood disaster management is not necessarily constrained by the lack of financial resources.

They rather thought it is related to policy implementation issues. The main challenges identified did not identify financial resources as accounting for flood disaster management is Effutu.

That majority of the participants agreeing that human resource issues affect flood disaster management. Logistics was identified as main constraint. The perceptions about flooding was identified as major obstacle to flood disaster management. This would suggest that many participants thought flood disaster management is not necessarily constrained by the lack of financial resources. They rather thought it is related to policy implementation issues.

4.6 Factors that Promote Flood Management

Table 13: Awareness of NADMO as a Disaster Organization in the Municipality

Item	Frequency	Percentage
Yes	151	60
No	13	6
Not sure	86	34
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 13 showed that only 151, representing 60% out of 250 participants were aware of the existence of the main flood disaster organization, National Disaster Management Organisation in the Effutu Municipality. Out of the 250 participants, 86 (34%) were not sure of the organization's existence while 13 were not aware it exists within the Municipality.

This is very serious given that flood disaster occurs frequently within the Municipality.

The following interview quote further makes the point.

> *I have been in this town for ages. I have not seen NADMO in any flooding situation. I usually see the fire service, not NADMO.* (**Interview with a resident Klimovic area, May 1, 2019**)

> *I will be shocked to hear that NADMO exist here. I don't know where their Office is because I have never seen anything about them in this Municipality. If it exists, it is a dormant entity.* (**Interview with resident at Winneba Junction, May 4, 2019**)

Table 14: Satisfaction with the way NADMO Handles flood in the Municipality

Item	Frequency	Percentage (%)
Yes	81	32.4
Not sure	13	5.2
No	156	62.4
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 14 showed that majority 156 representing 62% out of 250 participants were not satisfied with the way NADMO handles floods within the Effutu Municipality.

Thirteen (13) participants, representing six per cent were not sure. However, 81(32%) were satisfied. This corroborates the earlier findings that many participants were not even aware of the existence of NADMO within the Effutu Municipality.

Table 15: Prevention Strategies to Address Flooding

Item	strongly agree (%)	agree (%)	not sure (%)	disagree (%)	strongly disagree (%)
Construction of drains	98	78	55	8	11
	(39.2)	(31.2)	(22.0)	(3.2)	(4.4)
Political will to evict people	112	46	45	44	3
from flood plains	(44.8)	(18.4)	(18.0)	(17.6)	(1.2)
Proper town planning	147	53	41	3	3
	(58.8)	(21.2)	(16.4)	(1.2)	(1.2)
Afforestation for run-off	55	22	170	1	3
reduction	(22.0)	(8.8)	(68)	(.4)	(1.2)
Identifying areas that need	130	101	0	11	8
improved drainage system	(52.0)	(40.4)	(.0)	(4.4)	(3.2)
Demolishing buildings that	103	22	66	44	15
are on water ways	(41.2)	(8.8)	(26.4)	(17.6)	(6.0)

Source: Researcher's Fieldwork, 2019

Table 15 showed views about flood prevention strategies in the Effutu Municipality. The results showed that a total of 176(70.4%) participants agreed that construction of drains will solve the flood disaster problem in Effutu. However, 55(20%) were not sure whereas a total of 19(7.6%) disagreed. In terms of political will, a total of 158(63.2%) participants agreed while 45(18.0%) were not sure and a total of 47(18.8%) disagreed. Proper town planning was supported by 200 out of the 250 participants while 47(18.8%) disagreed. Afforestation for run-off prevention was supported by 77(30.8%) out of 250 participants, while 170(68%) participants were not sure and only four disagreed. The fact that 170 people indicated they were not sure that afforestation for run-off prevention can solve the flood disaster problem in Effutu

indicates that they have very serious concerns about the flood dynamics in the Effutu Municipality. Their concerns seemed to be reflected in the fact that 231(92.4%) people agreed that identifying areas that need drainage facilities would solve the flooding problem while 206(82.4%) people agreed that demolishing buildings that are cited on water ways could solve the problem. This again speaks to the policy implementation question.

4.7 Flood Coping Strategies and Management Practices (This addresses research question 5)

The firth research objective was to explore flood coping strategies in Effutu Municipality. This was examined by taking the following into consideration, the factors that can promote flood management in the municipality. The Tables 4.15, and 4.16 depict the various coping strategies and factors that can promote flood management in the Municipality respectively. Table 4.15 addresses the details of the level of coping strategies of the people.

4.7.1 Level of coping capacity of the people

This section solicited the views of respondents on the level of coping capacity of the people. The levels were arranged from the range of High, Average, Low and Poor. The outcome is shown in Table 4.15.

Table 16: Level of Coping Capacity of the People

Level coping	Frequency	Percentage
High	210	84
Average	27	11
Low	12	4
Poor	2	1
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 16 showed that 201 84% out of 250 participants claimed that the level of coping with flood disaster is very high in Effutu. Another 27 (11%) claimed the level of coping is average. Only a 12 (4%) and two representing one percent though the level of coping was low and poor. This is indicative of how people have lived with flood disaster in the Municipality for ages. The interview responses showed this more vividly. The following were typical examples.

> *I have lived with floods since I came to Winneba 25 years ago. Now I expect it and have developed strategies to cope with it. I don't think I need anyone to provide me help again. At times I refuse to complain; for it seems no one is prepared to hear you out* **(Interview with a Resident at Kojo Beedu, May 5, 2019)**

> *Flooding has been a ritual in Winneba for years. We have endured it. We will endure it. We can cope with it. If they don't do anything, we are ok. Our livelihood is tied to where we stay. This is where I was born. In fact, I cannot move to any place.* **(Interview with a Resident at Klimovic, May 10, 2019)**

> *The people of Winneba always experience flooding. They are now used to it. At times I travele to a place and wait till the floods recedes and then come back. Before doing that, I salvage all the needed valuables I can go with and leave what are not movable to the mercy of the weather. It has become part of me. It is yearly thing.* **(Interview with a University staff, May 15, 2019).**

Concerning the management strategies that could be adopted in managing flood disaster in Effutu Municipality, the areas that received that most support was early warning systems that were identified as an effective way of managing flood disaster.

This was followed by cleaning of chocked gutters and mapping places where culvert could be constructed. The construction of dams was noted as a major factor as identified in the literature (Vanneuville et al., 2011).

From the analysis, it seemed that flood disaster management should include keeping drainage systems clean. This would allow water to be carried down very fast. This is important following the earlier findings that choked drains cause a significant reduction in the ability and speed of the water to be drained away.

In most situations of urban flooding – this is a major cause. As within the literature on environment, the drains might get choked due to throwing of solid-wastes inside storm drains.

These solid-wastes might include construction material, plastics, paper etc. This is a clear example of how human activity can amplify the process of flooding. General clean-up of streets prior to the onset of the rains is important. The findings indicate that afforestation is discounted and a more plausible explanation is to convert flood prone areas to water-harvesting systems, thus, rendering both of these as ineffective. Local lowlands should have storm drains, so that water does not get accumulated there. These drains should have some kind of mesh covering, so that only water can flow in. Leaves and other solid debris should not go in these drains.

People who stay in flood-prone areas should be encouraged to construct their houses using material which does not get damaged severely due to flood-water. Also, since, there is a strong risk of structural damage (for large-scale flooding), there should be strong embankments along all entrances of the houses – so that flood water does not enter the house easily. While some of the steps mentioned above need to be taken at

municipal/city level, and, some at individual level, there are some other techniques which have been tried/used at some places.

However, these require efforts at a much larger level. Some of these steps include:

- Identified flood diversion areas where flood waters are diverted to these unpopulated areas, so that populated urban areas may be protected.
- Construction of dams at strategic locations
- Beach nourishment which includes widening the sea-beaches so that they can absorb the impact of flood-waters – due to rise in sea-levels should be encouraged.
- Conversion of flood-prone areas into wetlands, where, urbanization is not allowed, i.e. one cannot construct residential houses, or, any other permanent structures etc.

The outcome of the analysis is no so different from other coping strategies reviewed in the literature. When floods occur, households in general, cope by changing work pattern by moving more people and property. Members of households may migrate to the village, or families may move together. If this also does happen, member will beg or ask for help (Pryer, 2000). For instance, the outcomes agree with a study by Moench and Dixit (2004) in Rohini and Bagmati Nepal, household adopted a variety of coping mechanisms and strategies. When flood occurs, priorities tend to break down as follows: first of all, the victim try to save themselves and will try to save the valuable goods. Secondly, they try to save their food supplies; thirdly they attempt to save their animals.

Table 17: The Factors that can Promote flood Management in the Municipality

No of years living in Effutu	Frequency	Percentage (%)
Political will	207	82.8
Timing	3	1.2
Resources	20	8
Planning	20	8
Total	**250**	**100**

Source: Researcher's Fieldwork, 2019

Table 17 showed that views concerning the factors that promote flood disaster management in the Municipality. It showed that 207 82% out of 250 participants thought political will is fundamental to flood disaster management. Twenty participants, representing eight percent each identified that resources and planning are factors that can promote flood management in the Municipality. Only three participants indicated timing as an issue. Rehabilitation measures that can be taken against flood effects.

Construction of shelters for flood victims as well as provision of relief items were identified as the factors that promote flood management in the Municipality. Political will is fundamental to flood management. They identified that resources and planning are factors that can promote flood management in the Municipality.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMENDATIONS

5.0 Introduction

This final chapter presents the main findings from the research. The main findings are presented under the summary of findings. This is followed by conclusions, recommendations, areas for further studies and limitations of the study that are based on the findings from the research.

5.1 Summary

The study sought to know the public perspective of flood disaster management in the Effutu Municipality. The study took to considering the following objectives, explore the causes of flood in the Effutu Municipality; analyse the effects of floods in Effutu Municipality, examine the flood management practices in Effutu Municipality, evaluate the main challenges to flood management in Effutu Municipality and explore flood coping strategies in Effutu Municipality. The study adopted a mixed method approach with a population sample of 250 all living in the Municipality 128 males and 122 females took part in the studies. Purposive sampling was used to develop the sample of the research under discussion. Questionnaire, observation guide and semi-structured interview guide were used as the research instruments. The gathered data were collected, encoded into the computer and statistically treated using, Ms Excel.

This research was initiated to explore flood management Effutu.

The main objectives were to:

1. Analyze the causes of flood in the Effutu Municipality
2. Examine the flood management practices in Effutu Municipality;
3. examine the main challenges to flood management in Effutu Municipality;
4. Examine the factors that promote flood management in Effutu.
5. Explore flooding coping strategies.

The summary of findings here is presented along the lines of the research objectives. Firstly, the following are the summary of findings of the causes of flood disaster in the Effutu Municipality. From the study it was revealed that, Weak enforcement of laws/policies; Flood prevention plans are not implemented. Many people build on waterways. Gutters and drains are choked and parts of the township are built in waterlogged areas are the major cause of flood in the Municipality. In relation to weak enforcement of law, it was recorded that the highest cause of flood followed plans not implemented, many people building on waterways, chocked gutters and drains and finally part of the township been built in waterlog area.

It seems that flooding in Effutu is promoted by a temporality syndrome. Residents of flood disaster prone areas only see the disaster as only temporal and something that will not last for a long time. Many houses are sited at flood disaster prone areas but the owners or the residents believe that the flood will only come for a while and the place will turn into dry land after the rains.

They estimate the number of times it rains heavily and only make arrangement for that short term in case there is any flood. It was observed that, some houses in Winneba, particularly, around the Klimovic Hospital Junction are submerged by flood any time it rains seriously in Winneba. The residents make preparation and move their

vehicles and belongings to nearby places when the raining season is about to start to avoid properties being destroyed but move back as soon as the rains are over. This kind of practice always makes it difficult for proper flood disaster management in the area.

Secondly, the following are the summary of findings of flood management practices in Effutu Municipality. The flood management practices in Effutu include the construction of drains. Concerning the management strategies that could be adopted in managing flood disaster in Effutu Municipality.

The areas that received that most support was early warning systems that were identified as an effective way of managing flood. This was followed by cleaning of chocked gutters and mapping places where culvert could be constructed. The construction of dams was noted as a major factor as identified in the literature. Thirdly, the following are the summary of findings of the main challenges of flood disaster management in Effutu Municipality.

From the analysis, the main challenge to flood management was political will. However, it seems that critical infrastructure such as drainage facilities are also lacking. Thus infrastructures, economic systems and the role of human factors in assessing and managing the risk. The factors that promote flood management in Effutu are as follows. Flood management in Effutu requires construction of drains and the Municipality requires infrastructures, economic systems and the role of human factors in assessing and managing the flood disaster. Political will was noted as the main factor required promoting flood disaster management in the Effutu Municipality.

5.2 Conclusion

Many residents assumed flood management was as a result of neglect in implementing laws and policies of the Municipal Assembly. It is argued that financial resource constraints were not major problems confronting flood risk management in Effutu. There was a general feeling that residents have developed effective coping strategies to deal with flood disaster. The temporality syndrome and the lack of political will to implement policies was the main challenge facing flood disaster management in Effutu.

Residents of flood prone areas only see the flood as only temporal and something that will not last for a long time. Owners or residents of many houses are sited at flood disaster prone areas but the owners or the residents believe that the flood will only come for a while and the place will turn into dry land after the rains. Flood management in Effutu requires construction of drains and the Municipality requires infrastructures, economic systems and the role of human factors in assessing and managing the flood disaster. Political will was noted as the main factor required for promoting flood disaster management in the Effutu Municipality.

5.3 Recommendations

Based on the findings from this research, the following are recommended. The Municipal Assembly need to:

1. Encourage de-silting of drains before the onset of the rainy season. This prevents the drains from getting choked and increases the holding capacity of the drain, as accumulated silt prevents easy passage of water from being accumulated in the drains.
2. Construction of dams at strategic locations.

3. Convert flood-prone areas into wetlands, where, human habitation is not allowed, or people cannot construct residential houses, or, any other permanent structures.
4. Widened sea beaches so that they can absorb the impact of flood-waters – due to rise in sea-levels.
5. Collaborate with other agencies to construct and regularly repair embankments
6. Identify flood diversion areas so that flood waters are diverted to unpopulated areas, so that populated urban areas may be protected.
7. Ensure that local lowlands should have storm drains, so that water does not get accumulated there.

The residents should be encouraged to do the following:

1. People who stay in flood-prone areas should construct their houses using material which does not get damaged severely due to flood-water.
2. Residents should stop dumping refuse that contribute to chock gutters.

5.4 Limitations

It is beyond the scope of this work to discuss the hydrodynamic roadmaps that is needful to create flood maps. However, their importance should not be neglected, since detailed flood maps, indicating the flood extent, the water depth and (where relevant) flow velocity and rising velocity, are essential to produce meaningful calculations on the consequences of flooding.

Flooding is something that affects many people and certainly many may have different opinion but because the study covered only 250 people the rest of the people who have been affected by flood has been left out. Also there was no provision made

for those with special needs (Blind, Deaf and others) who have also suffered from flood before.

5.5 Suggestions for Further Studies

The study of flood should explore more on the natural causes and the preventive methods that can be employed to deal with human activities. The study should also focus on the impact of flood on residence leaving in flood prone areas within Ghana.

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APPENDICES

Appendix A

Introductory Letter

UNIVERSITY OF EDUCATION, WINNEBA
FACULTY OF SOCIAL SCIENCE EDUCATION
DEPARTMENT OF SOCIAL STUDIES EDUCATION
P. O. Box 25, Winneba, Ghana
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7th February, 2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION: MR. ROBERT QUARTEY

We write to introduce Mr. Robert Quartey to your outfit. He is an M.Phil. Social Studies Education student with index number 8180490002 from the Department of Social Studies Education, University of Education, Winneba.

As part of the requirements for the award of the Master of Philosophy degree, he is undertaking a research on the topic: '*Public Perspective of Flood Management in Effutu Municipality*'.

We wish to assure you that any information provided would be treated confidential.

Thank you.

Yours faithfully,

DEPARTMENT OF SOCIAL STUDIES EDUCATION
UNIVERSITY OF EDUCATION
WINNEBA

Lucy Effeh Attom (Ph. D.)
Ag. Head of Department

Appendix B

Questionnaire

UNIVERSITY OF EDUCATION, WINNEBA

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF SOCIAL STUDIES

This Research Instrument is designed to collect Data for a special Study on the Topic

Public Perspective of Flood Management in the Effutu Municipality.

A. Questionnaires For: Households

Date of Interview: day……/month……/2019 |_| |_| |_|

Name of Community: ……

1. Age of respondent: |_||_|
2. Sex of respondent (a) Male [ ] (b) Female [ ]
3. Household status a) husband [ ] b) wife [ ] c) child [ ]
   d) Tenant [ ]
4. Occupation (a) Fishing [ ] b) Trading [ ]c) Services [ ]
   e) Other (specify)……

   Length of stay in community……

Causes of flood

5. Has your household suffered from any flooding since you have been living here? Yes [ ] No [ ] Not Sure [ ]

6. Kindly tick one of the following as some of the causes of flood in the Municipality

Item	Agree	strongly agree	not sure	disagree	strongly disagree
Weak enforcement of laws/policies by authorities					
Flood prevention plans are not implemented					
Many people build on waterways					
Gutters and drains are choked					
The township is a waterlogged area					

7. Why do people who suffer flood disaster continue to live at the same place

(a) They don't have anywhere to go

(b) No legal requirement to leave the area

(c) It is usually a temporal experience

(d) Have no reason

8. When was the last flood experience in the Municipality?

.....

Flood management practice

9. Do you know of NADMO in your Municipality?

Yes [ ] No [ ] Not Sure [ ]

10. Are you satisfied with the way NADMO handle flood disaster in the Municipality? Yes [ ] No [ ] Not Sure [ ]

How do you think the problem of flooding can be addressed in the Municipality? ……..……..

11. Will you move out of the community as the flood problem persists?

Yes [ ] No [ ] Not Sure [ ]

Effects of floods

What are the effects of flood in Effutu Municipality? Kindly tick below your appropriate response.

Item	**Agree**	**Strongly Agree**	**Disagree**	**Strongly Disagree**	**Not Sure**
Loss of Properties					
Loss of Lives					
Outbreak of Diseases					
Destruction of Properties					
Loss of Revenue					
Displacement of Affected					
Collapse of Bridges					

Challenges in flood management

Please tick your appropriate response on the challenges of flood disaster management in Effutu Municipality

Item	Agree	Strongly Agree	Disagree	Strongly Disagree	Not Sure
Lack of funds					
Lack of Planning					
Technical know how					
Lack of cooperation among the various Agencies in fighting flood disaster					
Lack of cooperation between NADMO and the community					
Irresponsible behavior of the people in the community					
Lack of punish for people who build on water ways					

Coping Strategies

1. Why do you still leave here when it floods every year?

   .....

   .....

2. What are the things you do to reduce the impact of the flood every year?

   .....

   .....

   .....

3. How do you cope with flooding every year?

   .....

   .....

   .....

   .....

THANK YOU

Appendix C

Questionnaire

UNIVERSITY OF EDUCATION, WINNEBA

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF SOCIAL STUDIES

This Research Instrument is designed to collect Data for a special Study on the Topic

Public Perspective of Flood Management in the Effutu Municipality.

Questionnaires For: National Disaster Management Organisation / Municipal Planning Department

Date of Interview: day……/month……/2019

1. Sex of respondent (a) Male [ ] (b) Female [ ]

2. Department ……

3. Official position:……

4. **Causes of flood**

What are the causes of flood in Effutu Municipality? Please tick your appropriate response below

Item	**agree**	**strongly agree**	**not sure**	**disagree**	**strongly disagree**
Weak enforcement of laws/policies by authorities					
Flood prevention plans are not implemented					
Many people build on waterways					
Gutters and drains are choked					
The township is a waterlogged area					

5. (i) How frequent is flood disaster in this Municipality?

[ ] regularly [ ] annually [ ] others (specify)

(ii)What is/are the cause‘s flood disaster in Municipality?

1st ……

2nd ……

3rd ……..

4th ……..

Effects of flood

6. What are the effects of flood in Effutu Municipality? Kindly tick below your Appropriate response

Item	Agree	Strongly Agree	Disagree	Strongly Disagree	Not Sure
Loss of Properties					
Loss of Lives					
Outbreak of Diseases					
Destruction of Properties					
Loss of Revenue					
Displacement of Affected					
Collapse of Bridges					

7. How many people are affected by flood annually on the average?

…….....

Flood management practice

5. (a) Do you have any particular regulations for economic activities in flood prone areas in the Municipality? Yes [ ] No [ ] Not Sure [ ]
   (b) If yes are they being enforced? Yes [ ] No [ ] Not Sure [ ]
   (c) If no give reasons for your answer.....
6. (a) Do you have any programmes/projects aimed at reducing the incidence of flooding in the Municipality? Yes [ ] No [ ] Not Sure [ ]
   (b) If yes name them
   ……..…….
   ……
   What specific actions do you take in flood disaster prevention and management? ……...……
   ……..

Challenges in flood management

7. What are the main challenges that affect flood disaster management in this Municipality?……..
   ……
8. Which of these are the main challenge to flood disaster?
   i. Human resource……..
   ii. Financial resource ……
   iii. Logistic and equipment……
   iv. Others (specify) ……
9. (a) Do you collaborate with other bodies in flood disaster prevention and management? Yes [ ] No [ ] Not Sure [ ]
   (b) If yes name the agencies/bodies?
   ……
   ……
   ……
   (c) How will you rate the level of collaboration with other stake holders?
   [ ] Excellent [ ] Very good [ ] Good [ ] Fair [ ] Poor [ ] Very poor

10. (a) Do you (NADMO) involve communities in disaster management activities? Yes [ ] No [ ] Not Sure [ ]

(b) If yes at what level? …….

(c) How do you rate the level of participation of the people?

Very high [ ] High [ ] Average [ ] Low [ ] Very low [ ]

(d) What account for this level of participation?

…….

…….

11. (a) How will you rate the level of coping capacity of the people?

High [ ] Average [ ] Low [ ] Poor [ ]

(b) What account for this level?

…….

12. How do you conduct disaster risk assessment? Who does the assessment?

NADMO Zone [ ] MA [ ] Community leaders [ ] Individuals [ ] Others (specify) ……..

13. (a) Does the availability of disaster relief affect the adoption of other disaster prevention methods? Yes [ ] No [ ]

(b) If yes should disaster aid be stopped to prevent further development of flood prone areas? Yes [ ] No [ ]

(c) Give reasons for your answer……

14. What management plan do you have in place for the victims before, during and after flood disaster?

a. Prevention…….
b. Management…….
c. Rehabilitation……..

15. What are the factors that can promote flood disaster management in the Municipality?

……

……

……

Coping Strategies

1. How do you feel when you always have to fight flood every year?

   ……

   ……

   ……

2. What do you do to people who are always hit by floods?

   ……

   ……

   ……

3. What are the coping strategies you adopt yearly?

   ……

   ……

   ……

Thank you

Appendix D

Interview Guide

UNIVERSITY OF EDUCATION, WINNEBA

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF SOCIAL STUDIES

This interview Guide is designed to collect Data for a Study on the Topic

Public Perspective of Flood Management in the Effutu Municipality.

A Guide for Households

Date of Interview: day……/month……/2019

Causes of flood.

1. Have you ever been affected by flood before?
2. When was the last time you experienced flooding?
3. What causes flood in your area?
4. How long was did the flooding last?

Effects of flood

1. Did the flood damage anything in your area?
2. Did you loose or any thing to the flood?
3. Did the flood damage your property?
4. What are the general effects of flooding in your area?

Flood Management Practices

1. Do you anticipate for more floods this year?
2. How well are you prepared for floods this year?
3. What do you do when the water level in house begin to rise?
4. What do you do when your house is flooded?
5. What action you take after flooding in your house?

Main Challenges of Flood Management

1. What are the difficulties you go through while preparing for the rains?
2. What are the difficulties you go through trying to help during flooding?
3. What are the main challenges of management in your area?
4. What are the challenges you go through after flooding in your area?

Coping Strategies

4. Why do you still leave here when it floods every year?
5. What are the things you do to reduce the impact of the flood every year?
6. How do you cope with flooding every year?

Appendix E

Interview Guide

UNIVERSITY OF EDUCATION, WINNEBA

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF SOCIAL STUDIES

This interview Guide is designed to collect Data for a Study on the Topic

Public Perspective of Flood Management in the Effutu Municipality.

A Guide for National Disaster Management Organisation (NADMO) Effutu and Municipal Planning Department

Date of Interview: day……/month……/2019

Name of Department:……..

Current Rank/position:…….

Causes of flood.

1. When was the last time the Municipality experienced flood?
2. How frequent do the Municipality experience flood?
3. What are the causes of flood in the Municipality?

Effects of flood

1. How many properties are destroyed every year by flood in the Municipality?
2. Have you recorded any death as a result of flooding?
3. How many families are displaced yearly after flooding?
4. What are the main effects of flooding in the Municipality?

Flood Management Practices

1. Do you have any emergencies phone numbers in Municipality?
2. Do you anticipate flood every year?
3. Do you have any programe that prepares the Municipality for floods?
4. What measures do you take when an area within the Municipality is flooded?
5. What measures do you take after flooding in the Municipality?

Main Challenges of Flood Management

1. How easy is it information flow from the communities to your outfits?
2. What is main source of Transportation?
3. How often do you give assistance to food victims?

4. How well do you outfit collaborate with other agencies in fighting flood in the Municipality?
5. What are the main challenges to flood management in the Municipality?

Coping Strategies

4. How do you feel when you always have to fight flood every year?
5. What do you do to people who are always hit by floods?
6. What are the coping strategies you adopt yearly?