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EXAMINING FLOODS IN ACCRA:

A COMMUNITY APPROACH TO DISASTER PREPAREDNESS IN THE GA SOUTH DISTRICT ASSEMBLY, WEIJA

BY

ANITA SELASSIE ASAMOAH

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DECLARATION

I, the undersigned, hereby declare that the work contained in this dissertation submitted for the Masters of Arts in Development Communication at the Ghana Institute of Journalism is my own original work, that all sources used or quoted, have been indicated and acknowledged by means of complete references, and that this dissertation was not previously submitted by me or any other person at any other university.

ANITA A.S. ASAMOAH (STUDENT)

Signed.....

Date.....30/10/15.....

APPROVED FOR FINAL SUBMISSION

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30/10/2015

SUPERVISOR: DR. JAMES DZISAH Date

DEDICATION

I dedicate this dissertation to my best friend, my rock, inspirer and mother, the late Mrs. Felicia Akua Asamoah. Thank you so much for your love, support and inspiration. I MISS YOU

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LIST OF ABBREVIATIONS

CBDRM	Community Based Disaster Risk Management
CDMP	Comprehensive Disaster Management Programme
CBDP	Community Based Disaster Preparedness
CRED	Centre for Research on the Epidemiology of Disasters
DDR	Disaster Risk Reduction
DMC	Disaster Management Cycle
EU	European Union
FEMA	Federal Emergency Management Agency
HFA	Hyogo Framework for Action
IFRC	International Federation of Red Cross
IMD	Indian Meteorological Department
ISDR	International Strategy for Disaster Reduction
MLGRD	Ministry Of Local Government and Rural Development
NADMO	National Disaster Management Organization
NFIP	National Flood Insurance Programme
NDRC	National Disaster Relief Committee
NRC	National Research Council
RTU	Representative Tutorial Unit

UNCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNDP	United Nations Development Programme
UNISDR	United Nations Strategy for Disaster Reduction
WEPP	Western Emergency Preparedness Programme

ABSTRACT

Ghanaians are increasingly finding themselves exposed to various forms of disasters more importantly, floods. Concerns have, however, been raised on how prepared and equipped most residents are towards disaster in their communities. As such, this study was designed to ascertain the extent of community preparedness for disasters in some selected settlements in Weija. Weija was selected as the study area for this research because of its proneness to flooding due to heavy rains and also the spillage of the Weija dam.

The study utilizes both quantitative and qualitative method of data collection to identify causes of flooding and preparedness measures that are put in place.

The research revealed that members in the surveyed communities were not the least prepared for disasters in that they did not have an effective early warning system in place. Also, the Disaster Volunteer Groups (DVG's) in the community were not up to the speed because they lacked the knowledge and technical know-how to act as first responders whilst awaiting external assistance. It was also revealed that a community based approach was not the current practice in the community since the resident, who would form the basis of this critical approach are not fully empowered.

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Over the past decades, the world has suffered an increasing number of natural disasters affecting more than 2.5 billion, killing about 500,000 and causing economic losses of about US$ 700 billion. (Center for Research on the Epidemiology of Disasters, 2015) Increased population density, environmental degradation and global warming induced climate change as well as poverty have worsened vulnerability and made the impact of these disasters worse and severe. Globally, it is recognized that the degree of damage to property and loss of life in the aftermath of disasters could be directly linked to the level of development.

Ghana has not escaped from the impacts of these disasters, but it has however tried to reduce the effects on the citizenry as much as possible. The country is plagued with various types of disasters from natural to man-made. One disaster that has affected Ghana over the years is that of flooding which is usually caused by heavy rain fall. The issue of flooding has been of grave concern to communities, peoples and the country at large. In recent times, June 3, 2015 has become the most deadly dates in the history of Ghana that would be remembered for a long time. On this fateful day scores of people lost their lives in a flood and fire twin disaster.

No populated area in the world is safe from being flooded. However, a range of vulnerability to the flood hazard is very wide, in fact wider than most other

hazards. Some societies (communities, states, regions) have learnt to live with floods. They are prepared. Others are completely sometimes taken by surprise when a river stage (or the sea) rises to a level residents have never experienced before in their lives. (Kron, 2002)

In parts of Accra, including Gbawe, Odawna, Avenor and Alajo, severe flooding is an annual affair damaging property and taking priceless lives. Reasons abound as to the causes of these flood but, it seems year in year out, nothing is done about it and history often repeats itself. These reasons include haphazard urban development and poor sanitation leading to choked waterways and gutters.

The Ga South Municipality was carved out of the Ga West district with Weija being the municipal capital. This is a community vibrant in farming, fishing and other economic activities however, drained by rivers and dams such as River Densu and the Weija Dam which serves over two million people in the Greater Accra Region. Due to rapid urbanization, the areas around the river have been occupied with settlements and other forms of infrastructure rather than the normal growth of crops and vegetables. Whenever there is a torrential downpour, these settlements are affected. Weija is a community that has not been spared the brunt of flooding anytime there is a heavy downpour. The question that is mind bugling is that are communities in Weija prepared for disasters. The thrust of this study is to examine the state of preparedness some communities' resident in the Weija municipality and hopes to answer the research questions set below.

1.1 Statement of the problem

Ghana, like many countries, is prone to a range of environmental and natural disasters including floods. The nature and severity of such disasters depend on geographical conditions and the preparedness of the local population. Even though cyclones, "tsunamis" and earthquakes are not common in Ghana, the occurrences of floods have had major impact on the standard of living of people in the country, especially the urban population. For example, in June 2015, there were severe floods in Accra, and certain parts of Northern Ghana due to intense rainfall, poor drainage systems and the spilling of water from the Bagre dam in Burkina Faso and Akosombo dam in Ghana. As results of the floods, human lives, farm lands and livestock were lost and also destruction of properties including buildings which ran into thousands of Ghana cedis.

Flash floods can develop at a very rapid rate with little or no warning as these events are defined to be a flood that occurs within six hours of a rainfall event. When flash flood conditions become eminent, the public needs to be warned in an informative and timely manner to minimize impact and prepare towards the event. This process would include the recognition of precipitation onset, threat recognition, notification, public action and mitigation strategies. The short time frame associated with these events does not leave any margin for error within the entire warning process. In order for this process to evolve in an effective manner, before the flood commences, there is a need for a seamless connection between hazard assessment, analysis and communication with the general public. There is currently a communication gap between the experts and the public complicating the

communication of dangerous events. Experts underestimate the level of risk that the public perceives in hazardous events, while the public overestimates the level of risk experts perceive. This mutual misunderstanding of beliefs and values has been illuminated as a source of the hazard communication breakdown and has led to suspicion about a lack of honesty between the two sides.

Hazard notification processes and mitigation strategies developed by experts typically focus on the physical attributes that describe the science, magnitude, and frequency of an event, but rarely consider the meaning these physical characteristics have for people or their relationship to risk reduction behavior. Conversely, people confronted with complex issues and warnings concerning events that they are unfamiliar with may transfer all responsibilities for their preparation and protection to the experts. Thus, it is important for experts to develop risk communication strategies for public use that build on common knowledge, beliefs, needs, and expectations rather than simply providing information that reflects the level of intelligence and expectations of the scientific community. In order for experts to obtain a better means of warning the public, it is essential for them to have a clear understanding of the public's perception of the hazardous event that they are forecasting. Perceived risk has been linked to issues such as proximity to the hazard source, likelihood of future disasters, the perceived extent of impacts, and past experience in disasters. In terms of flash floods this would include understanding of flood-related risks, previous interaction with flash floods, reaction and response in flood conditions, awareness of available warning methods, and a preferred warning process.

Given that natural disasters are closely linked to changes in climate patterns, there is increasing need to study the problem of the annual occurrences of floods in Accra by adopting an integrated approach. This is done with the view that one discipline only is not enough in providing the relevant answers to the causes, effects and mitigating strategies for the problem of annual occurrences of floods in Accra. An increase in population has led to settlements in dangerous areas whereby the natural features of these places are not known.

Ghana has not been spared of disasters. There has been a series of floods, famine, fire outbreaks, ethnic conflicts, disease epidemics and earthquakes. However, the country's state of preparedness and response has not kept pace with the increased occurrence of disasters. Most residents in Ghana specifically in the Weija community are unable to identify, anticipate, manage and prepare against the potential danger of a disaster in their neighborhood before experiencing such an event. Furthermore, the deliberate spilling from the Weija Dam compounds the issue of flooding in Weija. According to AMA (2010), flooding is common along an eight kilometer stretch of the Densu River below the Weija dam whenever there is a deliberate release of water over the spillway. Areas like Glefe and Opetekwei which are low lying areas get flooded during water spillage from the dam. Most settlers there are squatters and have lived in these floodable areas for years. This study examines the preparedness measures of residents in the Weija community and also highlight some of preventive measures needed to reduce the social and economic effects (costs) of floods in Accra.

1.2 Objectives of the study

The study seeks to generally examine floods in Accra in relation to flood preparedness and awareness in Weija. Research of this nature is important because floods are a part of nature one cannot live without.

Specifically, the study seeks to

- Access the level of preparedness of residents at Weija at the local and expert level
- To examine the major causes of flooding in these communities
- Examine the effectiveness of their early warning system in place
- To identify what preparedness strategies residents in Weija have put in place to mitigate floods.

1.3 Research questions

- The research questions for this study would include but not limited to
- What are the major causes of floods on these communities?
- How prepared are these communities in times of floods?
- What is their level of awareness in times of floods?
- Why does such a situation persist annually?
- What measures are being put in place at the government and community level to curb this situation?
- Why residents still reside in these areas despite warning from authorities?

1.4 Significance of the study

Finding from the present study would not only be used in academic circles but also add to national discussions on individual, family and community preparedness. This study would also make recommendations that can be included in the policy, strategic planning and budgetary discourse on how to increase citizen and community preparedness and awareness in Ghana.

1.5 Scope and limitation of the study

The study would be limited to the perennial flooding situation in Accra with focus on the affected communities in the GA South Municipal Assembly such as Weija, Oblogo, Tetegu, Tsokomey, Away and Adankope. These communities were selected, based on routine visits and enquiries from key departments because they are the most affected every raining season, when the water level of the dam increases and exceeds the actual level thus the need to spill the dam which causes flooding to the above mentioned communities. The study would also be limited to how prepared and aware these communities are before the dam is being spilled.

1.6 Justification of the study

Vast amount of research has been conducted on flooding in various parts of the country. However, no research has been undertaken on community preparedness towards flooding. Secondly, issues raised in this study would serve as a focal point of study for other researchers to tackle in the near future.

Finally, it is hoped that information on flooding and some other suggested issues will undoubtedly facilitate decision making

1.7 Organization of the study

Chapter one introduces the background of the study, statement of the problem, research questions and highlights the objectives, significance and scope of the study.

Chapter two highlights the literature review which includes a review of the conceptual framework related studies and definition of terms.

Chapter three discusses the methodology used for the study. It also systematically outlines the sample selection, instrument of data collection as well as design and procedure used in data collection.

Chapter four presents the findings and analysis of data and discussion of findings for the study.

Chapter five discusses and summarizes the findings, makes recommendations and concludes the study.

1.8 Definition of some key related disaster concepts and terms

A **'hazard'**, by definition, is any event, phenomenon, or human activity that may cause loss of life and property. Natural and human induced factors may act together to create a hazard. For example, earthquakes are normally considered to be natural hazards, but they can also be triggered by mining activities or the impoundment of large dams. A landslide can be caused by a

combination of heavy rains, light earth tremors, and deforestation. (ICSU, 2007)

A 'disaster' is defined as an event that causes serious disruption, leading to widespread human, material, or economic losses beyond the coping capacity of a given society. Disaster management requires a set of actions and processes that are designed to lessen hazardous events before they become disasters. (ICSU, 2007)

Preparedness – Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations. (ISDR, 2004)

Mitigation – Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation, and technological hazards (ISDR, 2004)

Resilience/resilient – The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. It is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures (ISDR, 2004)

Risk – The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted, or environmental damage) resulting from interactions between natural or human-induced hazards and vulnerable conditions. Conventionally risk is expressed by the notation Risk = Hazards x Vulnerability. Some disciplines also include the

concept of exposure to refer particularly to the physical aspects of vulnerability. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk. (ISDR, 2004)

Vulnerability – The conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of a community to the impact of hazards. (ISDR, 2004)

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Natural disaster preparedness is an emerging issue all around the world, specifically due to the recent debates about human induced climate change. The magnitude of damage from natural disasters—landslides, floods, and earthquakes—is growing in terms of frequency and intensity. The hallmark of this review is an attempt to identify, assemble and analyze as much as possible, the existing literature that relates to flooding and state of preparedness of communities in times of disaster. The search has by no means been confined to conventional academic sources – on the preparedness side in particular, the documents surveyed include a variety of non-academic literature. Categories of literature drawn on in this review include academic studies, peer-reviewed studies and reports by governmental, non-governmental and international organizations, newsletters, website documents and texts.

2.1 Historical overview of natural disasters and hazards

Disasters are first and foremost a local phenomenon where the local communities are on the frontlines of the immediate disaster impacts including emergency response, preparedness both the disaster and for reducing underlying risks factors. Disasters must be seen as much more than a state of emergency, as they carry longer term social impact on the affected communities including loss of public facilities like hospitals, schools and administrative buildings, followed by a compromised overall functioning of the community. For individuals, disasters effectively remove the income

sources by damaging or destroying homes, livestock, infrastructure or small scale businesses. Local communities experience a vital setback in development gains already made and the longer term consequences from disasters keeps nations, communities and individuals trapped in poverty cycles. It is often the cumulative effect of high- frequency and low-impact disasters that cause most losses, particularly amongst the poor. (CRED, 2009)

Disasters are often portrayed as acts of nature, or of a natural order. Yet, this is not an accurate reflection of reality. The major factors influencing disaster risks are human and social vulnerability, matched with the overall capacity to respond to, or reduce the impact of natural hazards. An integrated approach including environmental conservation is often adopted in the field of disaster risk reduction. At the same time relief organizations tend to focus on damage to life and property, ecological services and their indirect economic values are often omitted completely from disaster assessments. Mainstreaming ecosystem concerns- both ecological and economical- into the development agenda and integrating them into disaster risk reduction, becomes essential. An ecosystem is a functional unit consisting of all the living organisms (plants, animals and microbes) in a given area, as well as the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. (CRED, 2009). An ecosystem can be of any size – a log, a pond, a field, a forest or the Earth's biosphere – but it always functions as a whole unit. It is only by addressing environment and natural hazards together with poverty that we can separate communities trapped in a grinding poverty cycle, and the ones who secure lives and livelihoods. Poverty is heavily contributing to escalating disaster risk by reducing existing coping

capacities and future resilience. Another patch of common ground is that the less privileged are suffering the most from the immediate and long term disaster impacts. Environmental losses are often overlooked, even if this might have the most significant and long term effects on livelihood as an income sources (e.g. agriculture) for the poor. Disasters should therefore be seen as an integrated part of development and without major efforts to address disaster losses, disasters will become a serious obstacle to achieving the Millennium Development Goals. Consequently, hazards, vulnerabilities and capacity building needs to be considered in projects and activities aiming at enhancing environmental conservation and reducing disaster risk

In Ghana, natural hazards can be can be classified into epidemics, drought, earthquakes, floods and wildfires. These disasters are not new since they date back to colonial times. Amponsah (2010) reveals that the first earthquake in Ghana was recorded in 1615. However, subsequent ones were recorded in 1862, 1906 and 1939. In recent times, the focus of disasters in the country is on three main areas – floods, epidemics and industrial fires. However, the major natural disaster that affects more people in Ghana is flooding.

2.2 Flooding in Accra – a contextual review

Accra is located on the southern coast of Ghana and the capital city, attracts many people from other regions of the country. The Representative Tutorial Unit (RTU) included Accra metropolitan, GA East and GA West districts. Floods are a serious natural hazard affecting the Accra area. In recent years, rainfall in the area occurs in intensive and perennial storm hazard, leading to

local floods. According to the Accra Metropolitan Assembly, floods have become recurrent due to the catchment areas of the Odaw River which drains the central part of Accra and its outlet into the Korle Lagoon, being built up. According to the Ghana Statistical Service, the past four decades which has witnessed significant flooding has been recorded in 1973, 1986, 1995, 1999, 2001, 2002, 2007, 2009, 2010, 2011 and 2015. The causes of flooding are many but generally precipitation and spilling from dams are the main source of floods in many countries. (Intergovernmental Panel on Climate Change, 2013)

Accra experiences flooding annually mainly because of the haphazard construction of houses, especially on water courses, the poor drainage system and the poor waste management challenge that leads to residents turning drains into refuse damps. Recent studies shows that flooding in Accra is as a result of several factors. (Daily Graphic, 2015).

These factors have been classified by the National Adaption Committee of Ghana as poor land administration and planning; poor sanitation and lack of drainage maintenance; building on water ways; defective engineering works; tidal influence of the sea; obstructive activities by utility agencies and inadequate funding for flood mitigation. The attempt to address one factor without addressing others may not yield the needed results. The growth of the city of Accra coupled with increased impervious surface has been identified as one of the primary causes of flooding in the city. (Rain, et al., 2012). In addition, the sanitary behavior of the people especially with regard to disposal of solid waste has become a major concern. Disposal of solid waste into drains prevents the easy flow of water in the event of heavy

rainfall and this usually leads to spill-overs which affect low-lying communities (Rain, et al., 2012). There has also been an increase in slums springing up in different parts of the city which has led to people building on water ways as well as living in deplorable conditions that encourages poor sanitation behavior. The clogging of the Odaw River with household waste is the major cause of flooding in some parts of Accra. (Adanu, 2013).

Hashizume, (2013) states that the global pattern of rainfall has been associated with flood events in several parts of the world but the situation in Accra cannot be said to be same. The increased occurrence of flooding cannot be associated with rainfall because the pattern has not changed much. However, the lack of drainage facilities and the maintenance of the existing drains to collect the storm water for safe disposal is the main cause of flooding in the city (Karley, 2009). In addition, the topography of Accra indicates a low lying area and some communities have been identified to be flood-prone. The vulnerability of a community to flooding depends on the infiltration rate which is basically determined by the soil characteristics of the area. (Nyarko, 2000). It was observed that areas below 350 meter contour are prone to flooding in the city. These flood-prone areas are inhabited by people from diverse backgrounds and it is important to assess the capacity of these people to be able to withstand the challenges that are associated with flooding. Additionally, heavy rainfall also causes the water level of streams, river and other water bodies to rise exceeding the carrying capacity of the channels. The result is overflow of the excess water onto its surroundings leading to flooding (Oppong, 2008).

2.3 The concept of floods

Flood is too much water in the wrong place, whether it is an inundated city or a single drain. Many definitions of flood have been proposed by many scholars. The (European Union Flood Directory, 2014) defined flood as a covering by water of land not normally covered by water. Floods are associated with some extreme natural events that happen on a geographical area known as a drainage basin, which is also referred to as a river basin, a catchment area or a water shed. (Andjelkovic, 2001). Oyegbile, (2008) defined flood as an over flow of water that submerges land. This definition by appears to narrow flood to a land phenomenon only. This is not entirely correct as rivers and seas also experience flood. Flooding is the unusual presence of water in a place to an intensity which has a disruptive effect on normal activities. Flooding arises mainly due to over flowing rivers and heavy rain over a short duration. In the sense of "flowing water" flooding many also be applied to the inflow of tide on land and may also result from the volume of water within a body of water, such as a river or lake, which flows or breaks levees, with the result that some of the water escapes its boundaries. It may also be due to accumulation of rainwater on saturated ground in an area. (Oyigbile, 2008)

The National Flood Insurance Program (NFIP) defines *flooding* as "a general and temporary condition in which the surface of normally dry land is partially or completely inundated. Two properties in the area or two or more acres must be affected." (Watson & Adams, 2011). Within the general definition of flooding, Watson and Adams (2011) outline in their book, *Design for flooding*, a variety of flood types. This includes coastal flooding, riverine

flooding, alluvial flooding, and shallow flooding. Coastal flooding occurs on the coastlines and results from any combination of ocean storms, tides, storm surges, and other precipitation events. Riverine flooding occurs inland when the land is overwhelmed by an extreme amount of precipitation that is more than the watershed base capacity can handle. Alluvial flooding, the third type of flooding described, occurs when mud flows and flash flooding are possibilities in the desert and mountainous areas. Flash flooding as mentioned in the previous definition is when there is a rapid increase in water levels, normally within six hours of the beginning of a heavy precipitation event ("Flash Flood"). The final type of flooding Watson and Adams mention is a type that occurs when water depths are one to three feet outside of a defined channel, known as shallow flooding. This last type of flooding involves ponding of water in flat areas, when sheet flow occurs (water spreading across flat area), and can result in urban drainage problems.

For the purpose of this study the researcher would focus on flash floods (riverine floods) because of the subject under study and the situation that pertains in the study area.

2.4 Defining disaster: a review

It is important to review the definition of disasters. There are varying definitions for the term disaster, however for the purpose of this study, the definition by the Asian disaster preparedness center would be adopted. They define disasters as the "serious disruption of the functioning of society causing widespread human, material or environmental losses, which exceed the ability of the affected people and the community to cope using their resources". (Asian Disaster Preparedness Centre, 2004) This simply implies that, when a

disaster strikes a community, their state of normalcy is disrupted which results in a crisis situation. If the community or local level government is able to manage the crisis without the aid of the international community then it remains an emergency. However, if it cannot be handled at the local level and the international community to intervene, then it becomes a disaster.

The 1996 National Disaster Management Act, Act 517, defines disaster as any occurrence by which there is a serious disruption of the general safety endangering the life and health of many people or large material interest which requires coordinated action by services of different disciplines. (Act 517, pg. 10). Judging from the above definitions, it is evident that it is an event that causes harm, damage, death, displacement, serious difficulty and disruption of economic and social life that merits external intervention.

2.4.1 Vulnerability

McEntire, (2001) posits that the degree of risk, susceptibility, resistance and resilience are all factors in determining the level of vulnerability in a community. While these are all factors in vulnerability, the concept itself is not static simply because of these factors. Each of the factors can intensify or even attenuate others making the ability to measure vulnerability a variable quantity. In addition to the inconsistency of a location's state of vulnerability, recent trends indicate the variance of vulnerability as increasing over time due to physical, social, cultural, political, economic, and technological influences. According to Morrow, (2011), while poverty and economic status are the most likely groups to be considered vulnerable, demographics and living arrangements are factors in determining access to resources. Those with

limited access to resources due to social influences are more likely to be vulnerable. Furthermore, Morrow (2011) adds that mental limitations can provide further vulnerabilities.

2.5 Disaster typologies and causes

Disasters are not predictable though natural or human made. They follow no standard operating procedures, no predetermined strategies. Sometimes a manmade disaster can result in a natural disaster. For instance, if a river embankment is not firm enough, it could be washed away causing flood around the river banks. (Murphy, 2007)

2.5.1 Natural disasters: some of the natural disasters that can happen around the world include cyclones, earthquakes, hurricane, tornadoes, drought, floods, landslides, volcanic eruptions and typhoons amongst others. While some natural disasters are catastrophic in character and could hardly be prevented, many environmentalists will argue that the negative results of natural disasters on people are often a result of human activity. For example, houses washed away during floods are likely to be those that are built on precarious deforested hillsides by poor families with few alternatives. Many natural disaster phenomena are cyclical in nature and can be predicted with some degree of accuracy; thus emphasizing the importance of prevention, preparedness and mitigation in program planning.

2.5.2 Human made disasters: toxic waste and hazardous waste, bird flu, avian flu, road vehicles, boats, ferries, and industrial fires amongst others.

The above concludes the various types of disasters and their causes. It is however worth knowing that disaster types vary from communities and countries alike and therefore it is important to know that communities and countries know the particular disaster type that affects them in order to enable them put in place prevention and mitigation measures. The geophysical and socio-economic conditions of a country make it vulnerable to various types of disasters. In Nepal for example, the rugged and fragile geophysical structure, very high peaks, high angle of slopes and complex geology, it's very remote, rural and difficult geophysical situation, variable conditions, active tectonic processes and unplanned settlement make it prone to such natural disasters such as flooding, landslides, fires, earthquakes, drought, epidemics and avalanches amongst others. (Chhetri, 2007)

A review of disaster types in Vietnam reveals that disasters are classified as natural and man-made. The prevailing disaster types in Vietnam are storms, floods, inundation, drought, salt water intrusion, storm surge, landslides, and flash floods greatest amount of damage and loss of life in the period 2001-2003: This period has been marked by numerous storms affecting central Vietnam, floods of record proportions for three consecutive years in the Mekong Delta, and damaging flash floods in various parts of northern and central Vietnam. It is also worth noting the disasters immediately preceding this period, in particular typhoon Linda in 1997, the severe flooding in central Vietnam in 1999, and the Mekong Delta floods of 2000. (Murphy, 2007).

In the same vein, a review of disaster management in India revealed that disaster are also classified as natural and manmade. Some man made problems could also affect natural phenomenon. For example, all over the

world, global warming due to climate change is increasing the global surface temperature causing various problems such as melting and retreat of glaciers. (Murphy, 2007). Some of the disasters identified include drought, floods, tornadoes, glacier melting and avalanche amongst others.

However, the World Bank Global Risk Analysis Report (World Bank, 2005) reveals that Bangladesh is faced with geophysical, hydrometrical, industrial and food related disasters. The Comprehensive Disaster Management Programme (CDMP) lists floods, cyclones, earthquakes, tornadoes, river bank erosion, water logging, drought, salinity, storms, landslides, and tsunami as major hazards to which the people and their livelihoods are vulnerable in Bangladesh. The list also includes other hazard trends such as industrial pollution, fire, epidemics, and food related disasters as well as political violence. These disasters hit the country's agro-ecological areas: flood plains, small hilly regions, and urban centers.

2.6 Disaster Management

The International Federation of the Red Cross and the Red Crescents has defined disaster management as "the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters." International Federation of Red Cross and Red Crescents Societies (2010). (Donohue, et al., 2000) refer to disaster management as: "Disaster management encompasses all aspects of planning for and responding to disasters including hazard analysis, vulnerability reduction / preparedness, prevention, mitigation, response, recovery and

rehabilitation". Even though Kapucu, (2011) agrees with this definition, he preferred to use the term emergency management. He explained that emergency management consists of four elements which are *mitigation, preparedness, response and recovery.*

Kapucu, (2011) refers to *Mitigation* as all actions that can either prevent and or reduce the effects of an upcoming threat. He explained *preparedness as* including all actions (plans, schedule, field work etc.) that are being taken before the catastrophe emerge. Just after the disaster occurs the communities (both citizens and government) will take action against the damages of the catastrophe. This is called the *response*. *Recovery* refers to all activities that occurs after the disaster. The main goal of the recovery phase is to transform their damaged communities into their former glory. (Kapucu, 2011)

Based on these definitions of disaster management, I would like to point out that each phase in the disaster management cycle is a very interesting study. Referring to the research question of this paper, the focus of this research will be on the preparedness and mitigation phase of the disaster management cycle.

2.7 The Disaster Management Cycle

Disaster preparedness is a phase within pre-disaster stage in the Disaster Management Cycle (DMC). Disaster management occupies an important place in this country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters. The DMC provides a framework for what needs to be undertaken at every phase of the cycle from preparation for, during and after the occurrence of a disaster. According to the European Commission (2006), the aim of the DMC is to help reduce the

impact of losses of a disaster, ensure rapid and appropriate assistance to disaster victims and also find is achieving rapid response. It is often implied that once these approaches are followed correctly, actions at all points in the cycle will lead to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters Figure 1 portrays all the phases in the disaster management cycle.

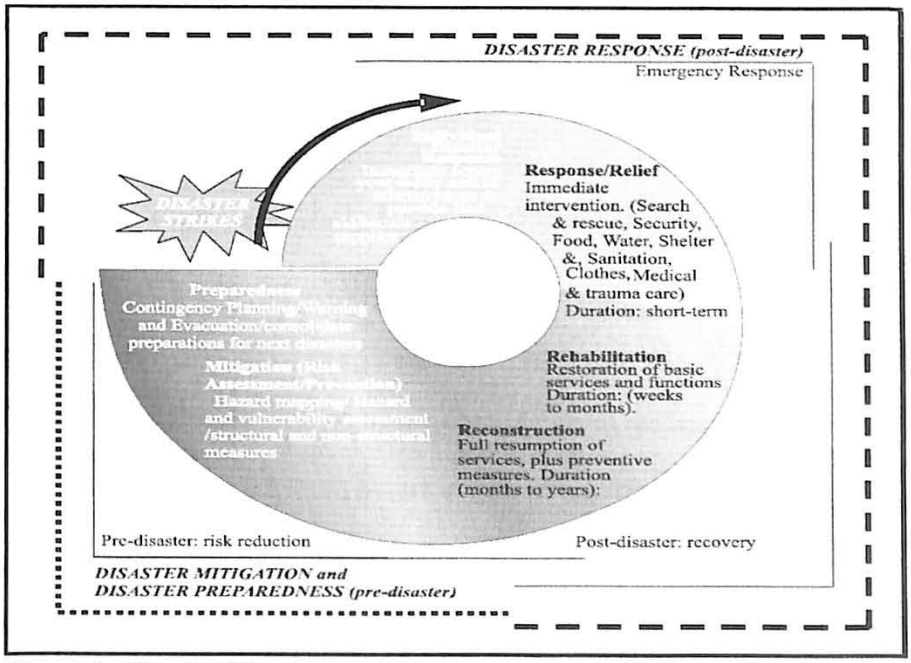

Figure 1 Disaster Management Cycle.

2.8 Defining Disaster Preparedness: An Extension of Everyday Lives

Social scientists, emergency managers, and public policy makers generally organize both research and guidance around four phases of disaster loss reduction: mitigation, preparedness, response, and recovery. According to a report by the National Research Council (2006) the core topics of hazards and disaster research include: hazards research, which focuses on pre-disaster hazard vulnerability analysis and mitigation; and disaster research, which

focuses on post-disaster emergency response and recovery. Preparedness intersects with both of these two areas, serving as a temporal connector between the pre-impact and post-impact phases of a disaster event.

Federal Emergency Management Agency (FEMA) defines preparedness as the leadership, training, readiness, exercise support, technical and financial assistance to strengthen citizens, communities, state, local, tribal governments, and professional emergency workers as they prepare for disasters, mitigate the effects of disasters, respond to community needs after a disaster, and launch effective recovery efforts (www.fema.gov).

The United Nations Strategy for Disaster Reduction (2008) defines preparedness as the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions

Preparedness is typically understood as consisting of measures that enable different units of analysis—individuals, households, organizations, communities, and societies—to respond effectively and recover more quickly when disasters strike. Preparedness efforts also aim at ensuring that the resources necessary for responding effectively in the event of a disaster are in place, and that those faced with having to respond know how to use those resources. The activities that are commonly associated with disaster preparedness include developing planning processes to ensure readiness; formulating disaster plans; stockpiling resources necessary for effective response; and developing skills and competencies to ensure effective performance of disaster-related tasks.

The concept of disaster preparedness encompasses measures aimed at enhancing life safety when a disaster occurs, such as protective actions during an earthquake, hazardous materials spill, or floods. It also includes actions designed to enhance the ability to undertake emergency actions in order to protect property and contain disaster damage and disruption, as well as the ability to engage in post-disaster restoration and early recovery activities. Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities. However, emphasis is increasingly being placed on *recovery preparedness*—that is, on planning not only in order to respond effectively during and immediately after disasters but also in order to successfully navigate challenges associated with short- and longer-term recovery.

This research defines disaster preparedness as a phase in which the communities can anticipate on possible future threats of a disaster. As discussed earlier in the dissertation, communities are unable to anticipate the threats and consequences of a disaster. However, if preparedness measures are in place, it affords the community an opportunity to reduce the impact of the disaster and safeguard lives and properties

2.9 Preparedness as a phase in the disaster management cycle

Adequate preparedness is essential, as risk can never be completely eliminated or reduced. Preparedness through early warning systems save lives and protect livelihoods and is one of the most cost-effective ways to reduce their impact of disasters. To be effective, early warning must lead to action. Preparedness

activities therefore include enhancing the capabilities of local organizations to plan for and respond to the effects of disasters.

Over the past 30 years, there has been a major shift in how emergencies and crises are managed. (World Health Organisation, 2007) More emphasis used to be placed on humanitarian response and relief activities – national or international – with little attention given to strategies and actions in place prior to disasters that can mitigate the effects of these events on communities and preserve lives and assets. It is becoming increasingly clear that while humanitarian efforts remain important and need continued attention, community-based risk reduction and emergency preparedness programmes are critical for reducing the effects of emergencies, disasters and other crises, and thus essential for the attainment and protection of sustainable development. (World Health Organisation, 2007)

Emergency preparedness has traditionally focused on stockpiling relief goods and providing urgent services to meet the public's basic needs. In most countries political commitment, financial and human resources are concentrated overwhelmingly on these short-term emergency contingencies. While building up capacities for humanitarian response continues to be a priority for all countries, it is now widely believed (perhaps influenced by the severity and frequency of disasters and conflicts in the past decade) that more should be done to reduce the social, economic and human consequences of these emergencies. This translates into a need for placing much greater attention on the implementation of proactive strategies and a call for a more comprehensive approach to building national capacities in emergency

preparedness and response as well as in risk reduction, focusing on those communities most at risk. (World Health Organisation, 2007)

Preparedness is essential in securing the right to life with dignity. States bear the primary responsibility for protecting their populations and ensuring a dignified life but the modern approach to preparedness extends well beyond those traditionally involved in relief efforts, such as civil protection forces, emergency offices and humanitarian organizations. Communities need to work closely with local authorities, public organizations and the relevant section of the private sector, in order to strengthen their own capacities to prepare for and manage the consequences of various risks. (World Health Organisation, 2007)

2.10 Why disaster preparedness

The preparedness process begins with hazard and vulnerability that attempts to anticipate what problems are likely to occur and proceed with the development of ways to address those problems effectively. The primary goal of emergency preparedness is for households, businesses and government agencies to develop appropriate strategies for responding when disaster occurs. Preparedness also aims at ensuring that resources necessary to carrying out an effective response are in place prior to the onset of a disaster or that they can be obtained promptly when needed.

For communities, preparedness encompasses a whole range of activities such as formulating disaster plans, providing training for disaster responders and the general public to improve their understanding of what to do in a disaster as well as their performance of disaster related task; and

conducting emergency response drills and exercise. Preparedness establishes the responsibilities of key players (e.g. community officials, state officials, outside agencies, municipalities, first responders, hospitals, etc.) for disaster response. A joint planning and disaster rehearsal activity, for example, facilitates coordination and strengthens personal relationships among participating agencies. (Dynes, 1994). Other preparedness activities include acquiring equipment's and facilities and other resources which would make hazard response swift. For these and many other reasons, the importance of disaster preparedness cannot the downplayed.

2.11 Preparedness activities for Disaster Risk Reduction

Disaster management can be categorized into three phases. These include the pre-disaster phase, the disaster phase and the post disaster phase. The pre-disaster phase which can also be identified as the risk reduction phase is the period where all preparedness measures are put in place. The disaster phase is where the disaster has occurred and there is search and rescue, immediate relief which includes addressing health, food, shelter and clothing needs. The post disaster phase is the period of rehabilitation, restoration to the pre-disaster era, reconstruction and resettlement. (National Disaster Management Organisation, 1999)

2.11.1 Planning as a prerequisite for disaster preparedness

A study conducted by Pearce, (2003) on the Australian and New Zealand approach to risk reduction concluded that community planning and public participation could improve the national policies on risk reduction.

Community planning and public participation involves the several communities and its citizens to anticipate on possible threats of a disaster with the help of the local government. This implies that the communities are actively involved in the disaster preparedness policies and also help formulate these policies. While the citizens participate with manpower and ideas, the government takes care of the infrastructure (safety equipment's, healthcare, trainings facilities etc.), technical assistance and knowledge. When the local government collaborates with the local private sector and the citizens of these communities, the people will feel more willing and helpful towards these safety measures. (Pearce, 2003)

Planning of appropriate measures include measures undertaken to prevent the disaster from occurring and also preparedness measures designed to minimize loss of life and damage to property and to organize and facilitate timely and effective relief. Also included in this mitigation measures designed to reduce the vulnerability of the community to the disaster by increasing its adjustment capacity.

A study by Ahenkorah-Marfo & Borteye (2010) on the preparedness of Ghanaian Polytechnic libraries towards disasters revealed the absence of security policies and disaster plans. Polytechnic libraries were found to be ill-

prepared with respect to disasters as fundamental and mandatory measures such as the provision of sprinklers, fire alarms, smoke detectors and emergency assembly points were absent. Therefore, the study recommended that libraries develop policies for disaster management, organize training programs for staff in order to increase their awareness about disasters and be involved in cooperative networks.

Another study by Norman et.al (2014) on Ghana's legislative preparedness to critical national risk: terrorism and money laundering revealed that the national and regional legal preparedness against drug-trafficking and money-laundering were ill-defined. Most especially, the legislative preparedness against terrorism was weaker. It further revealed that the continent's readiness to combat terrorism and money-laundering may not even exist on paper. The legislative framework provides little linkage of terrorism and narcotics threats to national security, national development and overall national emergency preparedness.

2.11.2 Early warning and disaster preparedness: Spending on improving weather forecasting and sharing data have high returns

Early warning simply means the provision of timely information through various channels and institutions in order for vulnerable communities to make preparations before the onset of the disaster. In 2005, Reid Basher, former Director of the Platform for the Promotion of Early Warning established by International Strategy for Disaster Reduction in 2003 (ISDR-PPEW), defined early warning to mean: "*The provision of information on an*

emerging dangerous circumstance where that information can enable action in advance to reduce the risks involved. Early warning systems exist for natural geophysical and biological hazards, complex socio-political emergencies, industrial hazards, personal health risks and many other related risks." This action is taken in order to reduce the risk and the likely impact of the disaster on the community and also prepare for effective response. In order to address the increasing disasters from natural hazards, the United Nation International Strategy for Disaster Reduction (ISDR) report on Global Survey of Early Warning Systems –ISDR (2006) proposed a People-Centered Early Warning Systems relevant for addressing disaster management. The aim of the people-centered early warning system is to give the communities ample time to act in order to reduce the gravity of the disaster, loss of lives and injuries.

Handmer (2007) referring to the Emergency Management, Australia (1995: page 5), noted that: "A total flood warning system integrates flood prediction, the assessment of likely flood effects, the dissemination of warning information, the response of agencies and the public in the threatened community, and review and improvement. The components must operate together for sound flood warning performance to be achieved". These components include

- knowledge of the risks faced;
- technical monitoring and warning service;
- the dissemination of warnings to those at risk; and
- public awareness and preparedness to act

This view is echoed by the (United Nations, 2006) which has emphasized that early warning systems must be community-centered. Failure in any one of

these elements can mean failure of the whole early warning system. The warnings must be 'early' and 'warn' so that if alerted to an upcoming crisis situation, the chances of preventing the situation from escalating into a serious crisis are highly increased (Alusa, 2007), (Handmer, 2007). Similar experiences elsewhere have shown that to be effective, early warning systems must be both technically systematic and people-centred (EWC II, 2004). In the Caribbean, during the 2004 hurricane season, most countries successfully alerted their populations of approaching storms and saved many lives as a result (World Disasters Report, 2005). The key to their success was putting people at the center of their warning systems.

In Cuba, disaster awareness is taught as part of the school curriculum and evacuation drills are held every year before the hurricane season. (Niskala, 2005). In Jamaica, Red Cross volunteers go from street to street issuing warnings through megaphone, 48 hours before hurricanes are due to hit. The disaster history of Ghana suggests that three hazards – floods, drought and earthquakes – are the main precursors of disasters. While flooding disasters tend to be more visible and attract the attention of mainstream media, slow-onset disasters, such as drought and in extreme cases, desertification, are also equally alarming. Other researchers point out the need to ensure that those at risk and those who have to respond in case of a warning understand the warning messages (Kelman, 2006). One of the cases regarding such a failure in communication was the 26th December 2004 Indian Ocean tsunami, where thousands of people lost their lives in coastal cities and communities due to a lack of an efficient and timely warning (Seng , 2010). But how people at risk and authorities perceive and make use of that information is another story. As

stated by Maskrey (2011), "the usefulness of an early warning system should be judged, less on the warnings that are issued per se, but rather on the basis of whether such warnings facilitate appropriate and timely decision making by those people who are most immediately at risk."

Several lower income countries with recurrent disasters such as Bangladesh and Cuba have developed effective early warning systems and as a result have experienced far less mortality (Golnaraghi, 2010). Cuba's Tropical Cyclone Early Warning System is credited with reducing deaths dramatically for weather-related hazards such as tropical cyclones, storm surges, and related flooding: five successive hurricanes in 2008 left only seven dead. (Golnaraghi, 2010)

A review of disaster management in India reveals the existence of a two stage warning system. Recently it has been improved upon by introducing two more stages - the 'Pre- Cyclone watch' and the 'post-landfall Scenario'. This four stage warning system meets the requirements of Public Administrators and Crisis Managers. The 'Pre-Cyclone Watch' stage, contains early warning about the development of a cyclonic disturbance in the form of monsoon depression which has a potential to threaten the coast with cyclone force winds. (Murphy, 2007).The coastal stretch likely to be affected is identified. This early warning bulletin is issued by the Indian Meteorological Department before the Cyclone-Alert Stage. This provides enough lead time for the crisis managers to undertake preparedness actions. However, having an early warning in place also does not guarantee that the masses will respond accordingly to a disaster. This is supported by a study in Malaysia conducted by Nakamuram (2006), which reveals that the people in the surrounding areas

were not aware of the tsunami risk, did not know what the siren was for and there were no designated tsunami evacuation zones and evacuation routes for them although the Malaysian Government had installed tsunami sirens in the region.

It is however important to note that UNDP has helped 25 countries set up Early Warning Systems and 58 countries have developed legal frameworks to facilitate disaster preparedness; and also, to oversee disaster prevention, preparedness and emergency response, UNDP has helped 45 countries set up national disaster management agencies, and at least 23 countries have prepared contingency plans. (UNDP, 2013)

2.11.3 Capacity building through education and training programmes for disaster preparedness

These programmes are organized for emergency and relief workers, health personnel's and the general public. The goal is to encourage local communities to assume responsibilities for emergencies as well as building capacity and the efficient use of resources. The Hazard Risk Management Team of UN and World Bank provide a rich collection of manuals, guidelines, damage & need assessment reports and other articles pertaining to disasters throughout the world. Training should however be undertaken at the top, middle and lower level respectively. Disasters and disaster management should be a part of school curriculum, not as a part for mere essays and short quizzes but to save the life of individuals when the situation demands. The setting up of an incident command system is key in education and training for disaster preparedness. This system provides for specialist incident command

teams with an Incident Commander and officers trained in different aspects of incident management – logistics, operations, planning, safety, and media management. One such training programme is the Western Emergency Preparedness Programme (WEPP) in Uganda. This programme has been designed to improve the ability of local actors to respond to and mitigate the effects of emergencies. Participants are from the local dioceses, from local government District Disaster Management Committees, and several local NGOs. One benefit of having so many disparate actors learning and working together is the air of cooperation that is fostered. By working together, they learn about shared standards and approaches and share the same language. They also get an appreciation of the roles each may play in a coordinated effort to deal with any emergency that should occur in the future. By working together, they increase their overall ability to support disaster-affected populations with quality programs. Another program that has been initiated by the UNDP is in Kyrgyzstan, where UNDP and the Government recently trained 40- rural rescue teams in Osh, Jalalabad and Batken provinces. These teams will serve as first-line responders during the event of a disaster and have undertaken mock drills to speed up response times

2.11.4 Warning and evacuation: moving to a safe haven.

Ensuring public safety during the onset of floods is of course a key dimension of response to floods. It is appropriate in this review to discuss general aspects of forecasting, risk mapping and warning technology, but equally important to talk about the role of warning systems and evacuation procedures in flood preparedness and emergency flood response. Efforts to

preserve public safety through warning and/or evacuation may not always be effective, especially in rapid onset situations. A study by Tapselle et al (2002) describe how the flashy nature of flooding made warning difficult and hampered people's ability to react. Moreover, there will almost always be individuals who are 'risk-informed' but fail to react to warnings because of insensitivity to risk, competing priorities or an inability to respond. (Glantz, 2012) and (Handmer, 2007). Nevertheless, well organized warning measures to ensure appropriate response by citizens can play a crucial role in saving lives and reducing injury. (Menne, 2004).

Another preparedness initiative is the Hyogo Framework for Action. In January 2005, a world conference was held in Kobe, Hyogo, Japan to adopt a ten year plan aimed at promoting a strategic and systematic approach to reducing vulnerabilities and risks to hazards. It underscored the need for, and identified ways of, building the resilience of nations and communities to disasters. A part of its priority for action was to strengthen disaster preparedness for effective response at all levels. The key activities included

(a) Strengthen policy, technical and institutional capacities in regional, national and local disaster management, including those related to technology, training, and human and material resources.

(b) Promote and support dialogue, exchange of information and coordination among early warning, disaster risk reduction, disaster response, development and other relevant agencies and institutions at all levels, with the aim of fostering a holistic approach towards disaster risk reduction.

(c) Strengthen and when necessary develop coordinated regional approaches, and create or upgrade regional policies, operational mechanisms, plans and

communication systems to prepare for and ensure rapid and effective disaster response in situations that exceed national coping capacities.

(d) Prepare or review and periodically update disaster preparedness and contingency plans and policies at all levels, with a particular focus on the most vulnerable areas and groups. Promote regular disaster preparedness exercises, including evacuation drills, with a view to ensuring rapid and effective disaster response and access to essential food and non-food relief supplies, as appropriate, to local needs.

(e) Promote the establishment of emergency funds, where and as appropriate, to support response, recovery and preparedness measures.

(f) Develop specific mechanisms to engage the active participation and ownership of relevant stakeholders, including communities, in disaster risk reduction, in particular building on the spirit of volunteerism.

The importance of preparedness can be summed up in the words of Mr. Junichiro Koizumi, Prime minister of Japan when he said "it is extremely important for all of us to prepare for such an occasion (natural hazard) not only public institutions but also each and every one of us must think about and manifest it in our daily lives preparedness for disaster prevention. The government would do everything its power to further develop Japan into a country with capacity to cope with disasters. However, at the same time, I ask that all of you do your utmost by predicting various damages that could occur and considering rescue efforts that would be required so that you would be well prepared for emergency situations". (www.unisdr.org/hfa, page 4). In other words, "disaster preparedness is everyone's business" (Odei, 2006 page 35)

2.12 Dimensions of disaster preparedness

According to Kathleen and Tierney (2009), it is possible to identify end states of preparedness activities. This is illustrated in the diagram below

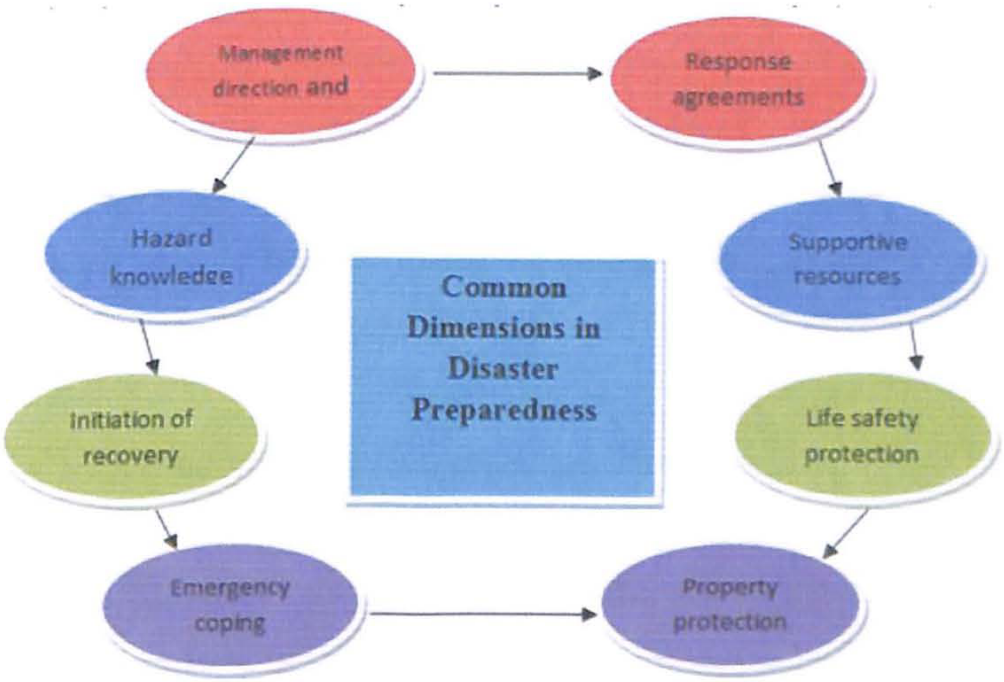

Figure 2: Dimensions of disaster preparedness. (Tierney, 2009)

Hazard Knowledge: Conducting hazard, impact, and vulnerability assessments; Using loss estimation software, scenarios, census data; Understanding potential impacts on facilities, structures, infrastructure, and populations; providing hazard information to diverse stakeholders. The type of information that provides a focus for preparedness activities must include the potential for negative impacts of the hazard on safety and health, continuity of operations of government, critical facilities and infrastructure, utilities, service delivery, economic and financial conditions and regulatory and financial obligations. (Tierney, 2009)

Management, Direction and Coordination (MDC) dimension of preparedness centers on strategies that make it possible for households, organizations and other units of analysis to manage both preparatory activities and response processes. these strategies includes assigning responsibilities; Developing a division of labor and a common vision of response-related roles and responsibilities; Forming preparedness committees, networks; Adopting required and recommended management procedures (e.g. National Incident Management System); Providing training experiences, conducting drills, educating the public. (Tierney, 2009)

Formal and Informal Response Plans and Agreements. This phase targets the developing disaster plans, evacuation plans, memoranda of understanding, mutual aid agreements, collaborative partnerships, resource sharing agreements; participating in broader and more general planning arrangements (e.g. neighborhood and community preparedness groups, Urban Area Security Initiative regional plans, industry-wide preparedness initiatives). (Tierney, 2009)

Supportive Resources: management activities and preparedness agreement are of little or no use unless resources are available to support response activities. The goal of resource management is to identify and establish internal and external resources necessary for disaster response. These resources include acquiring equipment and supplies to support response activities; ensuring

coping capacity; Recruiting staff; identifying previously unrecognized resources; Developing logistics capabilities. (Tierney, 2009)

Life Safety Protection as a dimension of disaster preparedness involves the technologies to assist with important crisis relevant task. Such activities includes preparing family members, employees, others to take immediate action to prevent death and injury, e.g., through evacuating, sheltering in place, using "safe spaces" within structures, taking emergency actions to lessen disaster impacts on health and safety; containing secondary threats, e.g. fire following earthquakes. Preparedness for communication and warning include the development of a communication plan, the establishment of a warning system including developing protocols and procedures. (Tierney, 2009)

Property Protection: Acting expediently to prevent loss or damage of property; inventories, securing critical records; ensuring that critical functions can be maintained during disaster containing secondary threats. It also involves protection systems such as fire and smoke alarms or emergency power generation systems and establishment of hazard warning and communication procedures. (Tierney, 2009).

Emergency Coping and Restoration of Key Functions. This aims at developing strategies to address problems that are likely to develop when a disaster occurs. Activities in this dimension include developing the capacity to improvise and innovate; developing the ability to be self-sustaining during

disasters; ensuring the capacity to undertake emergency restoration and early recovery measures. Although a family might have an evacuation plan, it is also important to consider what if the plan cannot be executed within the next seventy-two hours. (Tierney, 2009)

Initiation of Recovery: this dimension of disaster preparedness involves preparing recovery plans; developing ordinances and other legal measures to be put into place following disasters; Acquiring adequate insurance; Identifying sources of recovery aid. (Tierney, 2009).

2.13 Disaster Risk Reduction: possible option for risk reduction

According to Westgate (2010), Disaster Risk Reduction (DRR) is the reduction of disaster risk through an assessment and implementation process focused on reducing hazard exposure, decreasing vulnerability, managing the environment, and preparing for events. Developed as the international blueprint for DRR in 168 countries, the Hyogo Framework for Action (HFA) is centered around five priority actions

- ensuring DRR is a priority and supported by institutions at local and national levels;
- the assessment of ongoing and future risks alongside the development of warning systems;
- education that promotes safety and resilience;
- reduction in risk factors;

- Stronger preparedness for response (UNISDR, 2013). Preparedness and early warning are important factors in mitigating the effects of disasters and are priority actions in the HFA.

According to Russell Dynes,(1994) the community is always the primary focus of attention in disaster risk reduction since that is the common unit always affected by disasters. No matter the severity of the disaster, whether at the local or national level, the communities always suffer the adverse effect. They use various strategies to cope and survive and respond to the situation long before they receive help from the outside communities such as the NGO's.

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 517, 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 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 been prepared as a revision of the 1997 NDMP along with an Amendment to the Act, UNDP/NADMO (2009).

2.14 Moving from Appreciation to Commitment and Action – recognition of the need for community involvement.

Community-Based Disaster Preparedness (CBDP) has been proposed as an important component of broader disaster preparedness efforts including DRR due to its emphasis on local capacity building and sustainability, UNISDR (2005). CBDP programs have been suggested to reduce vulnerability to disasters by decreasing exposure to hazards, increasing local response capacity, awareness, and motivation to prepare for disasters, reducing dependence on external aid, and building local recovery mechanisms

A study by Kitutu et al., (2011) reveals that successful CBDP strategies can, by leveraging and improving existing informal preparedness activities, better respond to community needs throughout the disaster cycle. The inherent flexibility of CBDP, particularly its focus on local knowledge has likely contributed to its application across a wide variety of hazard types in

diverse settings including the Philippines, India, Bangladesh, Cambodia, Indonesia, Japan, and the USA among other countries. (Walia , 2008)

The community based approach corrects the defects of the top-down approach in development planning and disaster management which failed to address local needs, ignored the potential of indigenous resources and capacities, and may have even increased people's vulnerabilities. Experiences in developing regions and countries now affirm the gains of community based disaster management. Although varying in contexts, the results of the commitment to undertake and the actual initiatives taken at the regional, country and local levels all point to the viability of the community based approaches in managing and reducing disaster risk. (World Bank, 2005)

Lessons learnt from communities that have used the community participation approach in Asia, notably, the Philippines, Bangladesh, Cambodia, Nepal and Sri Lanka, have illustrated its many advantages. These advantages can be summarized as

- Governments would be able to have an additional prevention, mitigation, preparedness and response available
- Affected populations would become active participants and responders
- Better understood government processes could lead to less frustration in the response phase of the disaster
- Mitigation, preparedness and response plans would be more adequately tailored to local customs and traditions
- Local knowledge can be effectively and instantaneously tapped into for planning and response purposes.

It is however important to note that Community based disaster management (CBDM) is anchored in the disaster risk reduction framework. (United Nations Strategy for Disaster Reduction, 2008)

CBDM covers a broad range of interventions, measures, activities, projects and programs to reduce disaster risks, which are primarily designed by people in at-risk localities and are based on their urgent needs and capacities. Simply put, the aim of CBDM is to (1) reduce vulnerabilities and increase capacities of vulnerable groups and communities to cope with, prevent or minimize loss and damage to life, property, and the environment, 2) minimize human suffering, and 3) hasten recovery.

The Hyogo framework for action also encourages and promotes Community participation in disaster risk reduction through the adoption of specific policies, the promotion of networking, the strategic management of volunteer resources, the attribution of roles and responsibilities, and the delegation and provision of the necessary authority and resources.

According to Murphy (2007), a review of India's community based approach to preparedness indicates that if the entire local community is involved in the effort of preparedness, then disasters could be tackled with ease when they strike. Disaster management teams consisting of volunteers have been constituted in the villages and trained in various preparedness and response function to deal directly with the various types of disasters that affects them. The community has been able to function through the creation of awareness programmes and knitted units working together towards risk reduction. The committees undertake mock drills intermittently under the supervision of disaster management committees and teams. It is the combined

effort of everyone in the community that serves as the basis of combating disasters and makes a big difference to a scene devastated by a catastrophe. According to Murphy (2007), the experience in India has portrayed that capacity building for the community has been very helpful even in secluded instances such as drowning, burns and other degrees of accidents. Assessment of a disaster vulnerability is best done when the local people are involved since they are the first line of responders and because of their knowledge of the particular environment. Community participation is vital to India's preparedness drive because they are of the notion that the success of any disaster management depends on the local groups.

In Cambodia, the volunteers in the community are the pillar to disaster preparedness. These volunteers, who are chosen from flood prone communities are trained on disaster preparedness. They in turn organize community meetings and explain the need for flood preparedness in the community. This approach to manage flood risk challenges the community to act concertedly in building safer communities. The Cambodian Community Based Flood Mitigation and Preparedness Program was implemented through a core of community volunteers who were trained in participatory risk assessment and facilitation of identification and implementation of community level disaster risk management activities addressed to flooding. The people identified and implemented community level solutions such as water control structures including repairing dams and dikes; cleaning irrigation ditches, culverts, and water gates; and, raising of road levels or constructing small bridges. (Murphy, 2007)

A study by Chhetri (2007) reveal that, in Nepal, community based disaster preparedness is one of the anchors on which disaster preparedness is built on. The acknowledgment of the importance of community participation in disaster preparedness is demonstrated by the establishment of forty (40) community based disaster management units in four (4) major flood prone districts in south east of the country. The aim however is to strengthen community in risk reduction through resource capacity. The units are equipped with relevant logistics including food grain, store bins, hand mikes and stretchers. These disaster management unit also undertake some early warning and small scale mitigation initiatives. The concept of community participation has been most effective in reducing risk and disasters in Nepal. It has ensured commitment from community members and ownership of preparedness programmes.

A study by Kanlisi & Aasoglenang (2013) on the vulnerability and capacity assessment in the Builsa community in Ghana which was aimed at co-documentation and re-invigoration of community knowledge and experiences in disaster management and building the capacity of communities to address the most urgent situations of vulnerability clearly revealed that the Builsa community was not well prepared for any type of disaster given its very low response and recovery capacity. The study, however, indicated that victims of various disaster hazards and disaster events have always made strenuous efforts to cope with to the immediate effects of climate variability by relying greatly on their social capital and limited available local resources while seeking external support in the long term. The study recommended that resources need to be marshaled at the local, regional and national level to

ensure that the activities planned to reduce vulnerabilities in the District are implemented to the letter.

2.15 Conceptual framework

Disasters are inevitable phenomenon's which can strike at anytime and anyplace. There are various forms of and levels of disasters depending from country to country and community to community. Disasters happen in phases. The pre-disaster, disaster and the post disaster phase. However, in anticipation of a disaster, there is a need to stay prepared. Preparedness is however in line with the pre-disaster phase of disaster management where all preparedness activities take place such as early warning which should be people centered, education and training as well as contingency planning amongst others. However, to achieve preparedness, there is the need to strengthen the local capacity since they are the first line of respondents during the disaster situations and they bear the brunt of the disaster. They need to be involved in decision making at the local level and decision making regarding disaster management should not be a top-down approach but a participatory approach. Below is the conceptual framework that would guide the study.

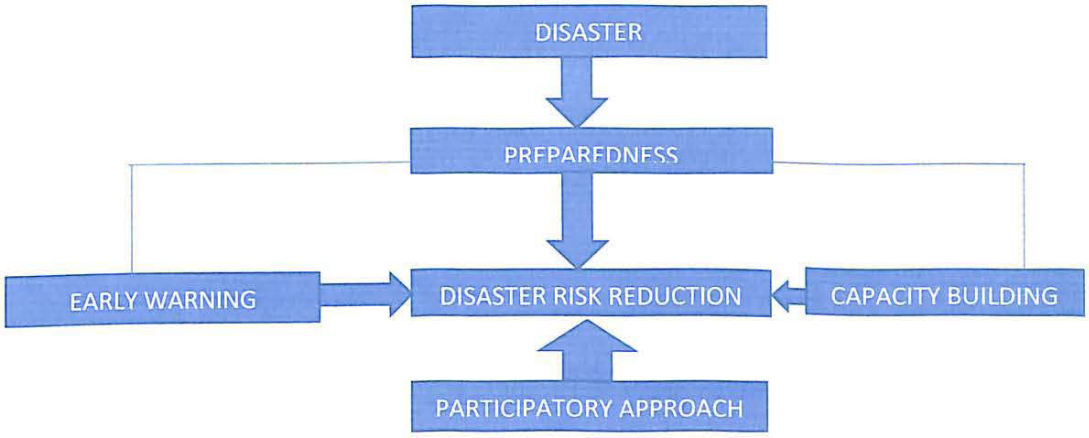

Figure 3: Conceptual framework guiding the study

Conclusion

No two disasters are the same, so too are no two communities. When a disaster, strikes, the adverse impacts can be very disastrous be it at the short, middle or long term. The people at the community level and the poor are the most affected when a disaster strikes thus the need to have some preparedness measures in place which is very vital to the sustenance of the very fiber of a community and to reduce vulnerability. It is important to identify communities at risk of any disasters and introduce risk reduction programmes and strategies to reduce their impact to the barest minimum

From the above reviewed literature, community participation is of essence to the success of disaster management. Facilitation, organizing and mobilizing should be managed and supported by a series of organizational structures from the grassroots to the national level for sustainability. The community based approach corrects the defects of the top-down approach in development planning and disaster management which were unsuccessful in tackling local

needs, maximizing the potential of indigenous resources and capacities, and may have even increased people's vulnerabilities. Policy making should be more bottom-up than the usual case, with greater stress on what can be learned from CBDRM successes and how best to enable, sustain and scale it up. This does not mean to the exclusion of top down solutions that may be appropriate in given situations.

Preparedness measures should comprise coordination meetings where formal and informal agreements would be drawn, community and local government partnership can be sealed, the identification of resources and, training and education for capacity building amongst stake holder institutions. Investing in the communities' social capital, participatory disaster risk management planning and appropriate management structures and implementation and coordinating mechanism are the key factors for successful CBDRM. However, in the final analysis, the overall success indicators of CBDRM is how resilient the communities are during disaster times and more so, how the communities are finally able to resist disasters

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The quality of any research work is dependent on three variables. These include the sources of data collection, the research methods and the process of analyzing and interpretation of the results. The Weija municipality was used as a case study to ascertain the actual situation on the ground in times of flooding focusing on their preparedness level and mitigation strategies in place. This is outlined in the sections below

3.1 The study site

The GA South Municipal Assembly was carved out from the Ga West district in November 2007 was established by a legislative instrument 2134 in July 2012 with Weija being the municipal capital. It lies at the south western part of Accra and shares boundaries with the Accra Metropolitan Area to the South East, Ga Central to South –West, Akwapim South to the North-East, Ga West to the East, West Akim to the North, Awutu -Senya to the West, Awutu - Senya East to the South East, Gomoa to the South West and the Gulf of Guinnea to the South. It occupies a total land area of about 341.838 square kilometers with about 95 settlements.

The Weija dam is situated in the west part of the Accra metropolitan area. The dam creates a reservoir in the Densu River. The purpose of the reservoir is to retain water for drinking purposes in the west part of Accra metropolitan area. The Densu River flows from Atewa range down to the Gulf

of Guinea. Excess flow from the Weija reservoir discharges into the Densu River which creates a delta Lagoon by the Gulf. The lagoon and delta area constitutes one of Ghana's internationally recognized protected areas (Ramsar sites). The area has a rich bird- and wildlife. Due to the continuous rains during the rainy season, the spillways of the Weija dam has been opened. The spillways have been open for some months, causing flooding in the Weija/Densu valley downstream. The Densu River has flooded homes and businesses along the river banks.

The flooding situation has not had a rapid onset such as the Odaw River which makes the situation less acute. But the ecologically sensitive area downstream the flooded area calls for caution and action. There is informal dumping of waste along the riverbed and that along with pollutants from settlements and businesses could cause severe damage to the protected area. The flooding of the Densu River has caused the flooded households and businesses to discharge of a lot of waste. The waste is composed of destroyed food items from households and markets, destroyed electrical equipment and appliances from households and businesses, destroyed building material, furniture and clothing. The ongoing flooding of the Densu River has stressed the waste management of the affected municipalities with larger amount of waste to be collected compared to normal situation. The waste generated is mixed and bulky. Most of the waste from the flooding has been taken to Sarbah dumpsite. This is the same dumpsite which received most of the waste from the flooding of Odaw River. This contributes to shortening of the lifespan of the dumpsite – which is now reaching its point of closure.

The communities along the Densu River were chosen for this study for various reasons. The communities are amongst the most flood prone areas in the greater Accra region. The communities include Away, Ada kope, Oblogo, Tetegu and Tsokomey.

Fig 4. Administrative map of Weija showing the River Densu and surrounding communities

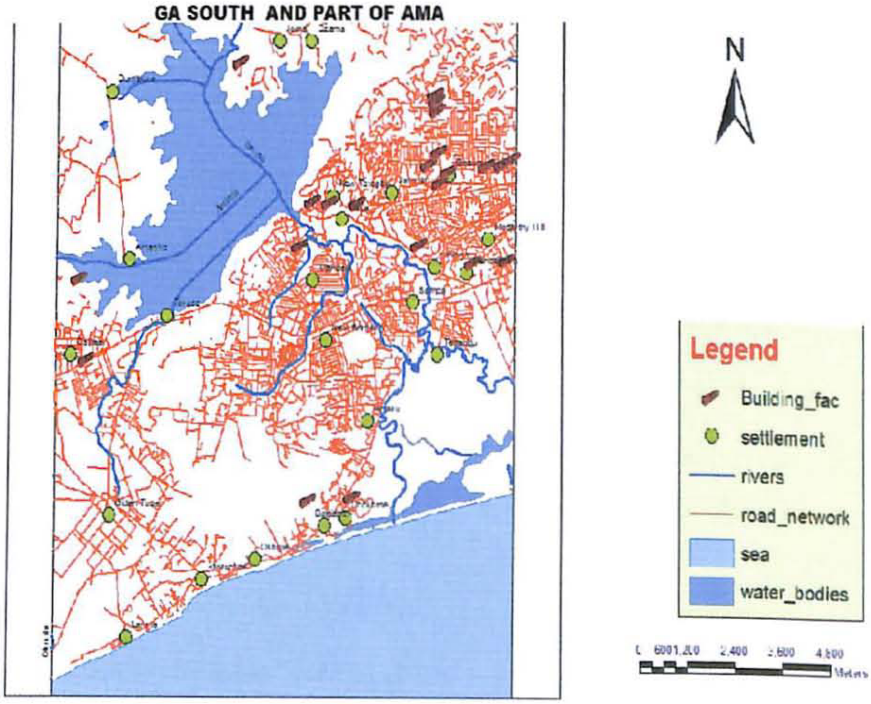

Figure 4. Source: GIS drawing (NADMO)

3.2 Research design

According to Malhotra & Peterson (2006, p.150), research design is defined as a "set of guidelines and instructions to be followed in addressing the research

problem. The main function of the research is to enable the researcher anticipate what the appropriate research decision should be so as to maximize the validity of the eventual results. The study employed both the quantitative and qualitative design method. The quantitative segment is based on the survey questionnaire whilst the qualitative method used is the case study method. This is an approach that uses an in-depth investigation of one or more examples of a current social phenomenon using a variety of sources of data. Furthermore, the aim of using the interview (as a dimension of qualitative approach) is to provide the detailed information about the problem, meaning that the subject (interviewee) speaks for itself. A "case" can be an individual person, an event or a social activity, group, organization or institution.

According to Wimmer & Dominic (2006, p.179), the survey research method allows researchers to examine the interrelationship among variables and to develop explanatory inferences. Babbie (2001, p. 259) further posits that surveys are excellent vehicles for the measurement of attitudes and orientations prevalent within a large population.

According to Cooper & Schinidler (2006, p.23) personal interviews carry the advantages of enabling the interviewer to notice particular reactions and thus eliminate confusion over the questions asked. An advantage of interview is that interviewer could pick up non-verbal data like dread or fear and flexibility among others. Personal interviews will be conducted where the researcher selects the conducive time and place to personally solicit information from the selected segments of the population preferably in their natural environment. A list of open and closed ended questions will be administered in order to probe

the participants to bring out their opinions on the information sought and control the flow of the interview respectively.

3.3 Methodological assumptions underpinning the study

In conducting the research, the researcher relied extensively on the use of questionnaires and in-depth interviews to explore the preparedness level of residents in the study area and also to enquire about the institutional preparedness towards the annual flooding that pertains in the study area. Although there are several ways in the administration of questionnaires, the study employed the self-administered method whereby the researcher administered the questionnaire and the respondents filled it themselves. The researcher adopted this method because questionnaires entail a low cost of administration and a convenient method of data collection. One drawback of this self-administered questionnaire is that respondents cannot ask for explanations if they have problems understanding the question, which makes it even more important to have clear questions to avoid any misunderstandings.

In order to collect the required data, the study employed the purposive sampling technique and the systematic sampling technique in view of the situation pertaining at the study site and the kind of information needed to answer the research questions. Purposive sampling is a non-probability sampling method whereby the researcher uses a pre-determined criteria as a basis for selecting the actual sample for examination or investigation. (Wimmer & Dominick, 2006, p. 472) As the name implies, this method was purposely used to sample key institutions that were directly and indirectly involved in disaster management in Ghana.

According to the 2010 population census, the urban population of the Ga South Municipal Assembly is 411,377. To arrive at the sample size for the study, the systematic random sampling was combined with the simple random sampling method. Sample was drawn from the sampling frame on the basis of a sampling fraction which is equal to N/n where N is the total units in the sample and n is the number of units in the sample. Thus to obtain a sample of one hundred (100) from the population = **411,377/100=411.** However, due to the large sampling frame, the researcher adopted the simple random sampling technique to choosing its respondents.

A sampling size of 50 respondents were drawn from the frame which included respondents from the various communities affected by flooding. Out of this sample size, the researcher attained response from 40 respondents. The data collection instruments were questionnaires for collecting data from respondents in the study area and an in-depth interview guide for the collection of qualitative data from institutions. The development of the questionnaire was based on the objectives the study sought to answer. The questionnaire was made up of both open and close ended questions. The open ended questions would request personal answers whereas with the closed ended questions, responses would be limited regarding the depth of the response. Closed ended questions are classification questions: to classify them into predefined levels.

3.4 Quantitative data collection procedure: Residents in selected communities in Weija

Since the study aimed at accessing the flood preparedness of on resident in the Weija community, the questionnaire was designed and reviewed by experienced researchers and later piloted amongst ten respondents included in the study. The pilot project was intended to access the community's willingness to participate in the research and respond to the questionnaire; their ability to respond independent of the researcher's promptings and also to observe their understanding of the questions. The respondents were not a part of the main data collection process. Based on the outcomes of the pilot project, some modifications were made. This included the language used in the questionnaire, it was made simpler and the number of questions were also reduced. The questionnaire was then approved for data collection. Structured questionnaires were administered to home owners in the selected communities. One field assistant was engaged to assist the researcher in data collection since the communities were vast and were not too familiar with the respondents. The respondents were surveyed to know their views on the preparedness of flooding and to assess flood mitigation measures implemented either by the government or home owners. The field observation was done by walking through the communities, interaction with residents and taking of pictures.

Prior to the pilot study, the researcher sought permission from some leaders in the various communities. For Tetegu and Away, the researcher contacted the sub chiefs of the community for which he made his intentions known through which the researcher was allowed to conduct his research. For

the rest of the communities such as Adankope, Oblogo and Tsokomey, the Assembly men for these areas were contacted. Granted permission, the survey was conducted within two weeks.

3.4.1 Quantitative Data Processing

The completed questionnaire from the survey were numbered for easy identification, coded, scored and processed, with Epidata and Excel software. The Excel software was used to process household responses which was then entered into a database to generate tables for presentation and analysis. Each questionnaire was numbered from one (1) to forty (40). Questions which sought a 'Yes' and 'No' answer were coded '1' and '2' respectively for closed ended questions. For questions which demanded a multi-response, those items were defined in a variable set in a dichotomy group tabulated value 1. In summary, answers to the questions ranged from A-B, A-C, A-D, A-E and A-F for others. Subsequently, a response from an 'A' answer was coded '1', 'B' was coded '2', 'C' was coded '3', 'D' was coded '4', 'E' was coded '5' and 'F' was coded '6'. This ensured that every aspect of the data received equal treatment. The process data was then interpreted and discussed.

3.5 Qualitative data collection process

In-depth interviews were used to collect qualitative data. Prior to the interview, an introductory letter was sent to the respective organizations; National Disaster Management Organization (NADMO) and Ghana Water Company Limited (GWCL) introducing myself and my intentions. The researcher made it clear that the interview was solely for academic purposes

therefore for purposes of anonymity. The interviewees where assigned pseudonyms such is interview 1, interview 2 and interview 3 which was only known to the researcher and the interviewer. Interview one refers to interview with NADMO. Interview two refers to GWCL and interview three refers to residents in Weija. The interviews were recorded using a voice recorder and then transcribed verbatim. The interview which lasted fifteen to twenty minutes was conducted with the spate of one week. The officials were very keen to respond as a way of enhancing the corrective in as far as disaster management was concerned, and also to put forward their concerns regarding disaster preparedness. Their willingness and availability simplified the research process.

3.5.1 Qualitative data processing

Responses from the interview were transcribed verbatim using voice recorder and ascribed themes depending on responses. The interview with NADMO and GWCL were subjected to thematic analysis. Three levels were used in analyzing the data. This is necessary to understand the interviewee's response on the subject matter. The first was open coding - all ideas generated during the interviews were individually identified. Subsequently, in axial coding similar ideas were grouped together paving way for themes to emerge. Finally, in selective coding, themes that emerged were later discussed and the reports written in narrative terms. Results from the study would be analyzed and discussed in the next chapter.

3.6 LIMITATIONS

The approaches used in the study were not without limitations. First and foremost, selected institutions did not give a true presentation of the situation that persist in the study area. Other institutional interviews which could have enriched data collection included Ghana Meteorological Agency (GMA) and Town and Country Planning.

Another constraint was meeting the scheduled interview date. This was because the interviewee was most of the time on assessment tour since it was during the rainy season. This extended the time frame of the interview.

CONCLUSION

The Ga South Assembly is a district that is very prone to flooding in the event of dam spillage. For the purpose of the work, the study collected both primary and secondary data through direct administration of both structured and unstructured questionnaires to a sample of households and some institutions/organization to elicit information through interviews. Response from data collected through primary sources was analyzed through Epidata and the use of Excell and results presented in diagrams. Conclusion will be drawn and recommendations made to conclude the study.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULTS

4.0 Introduction

Away, Adankope, Oblogo, Tetegu and Tsokomey are communities along the Densu River that get affected during flooding. People resident in these communities face one kind of problem after the other during this period. Data collected from this field survey is carefully considered and critically analyzed in this chapter.

4.1 Bio-data of respondents in study area

In a bid to understand the problems emanating from the issues on the ground, it is important to obtain primary data which would serve as a basis for the survey. Obtaining bio data of the respondents is of utmost importance in order to put the situation into perspective.

Age (years)	Frequency	Percentage
20-29	4	10%
30-39	10	25%
40-49	14	35%
50-60	12	12%

Table 1. ***Source: field Survey, 2015***

In table 1, majority of the respondents from the surveyed communities were aged between 40-49 years which accounted for 35% of the total population. This is appropriate since those between this age group are in a better position to account for the flooding situation in Weija. 30% of the population were

aged between 50-60 years. This was suitable since respondents gave clear and relevant information concerning the issue being investigated. 25% of the population were between the ages of 30-39 years whilst respondents between the ages of 20-29 years accounted for 10% of the population. The results from this survey posits the fact that majority of the respondents aged between 40-49 years forms a greater part of the youth. This is also reflected in the report from the Ghana Statistical Service housing and population census, 2010 that the population of the municipality is youthful (36.1%) depicting a broad base population pyramid which tapers off with a small number of elderly persons. (6.5%). (GSS, 2010).

4.1.1 Gender

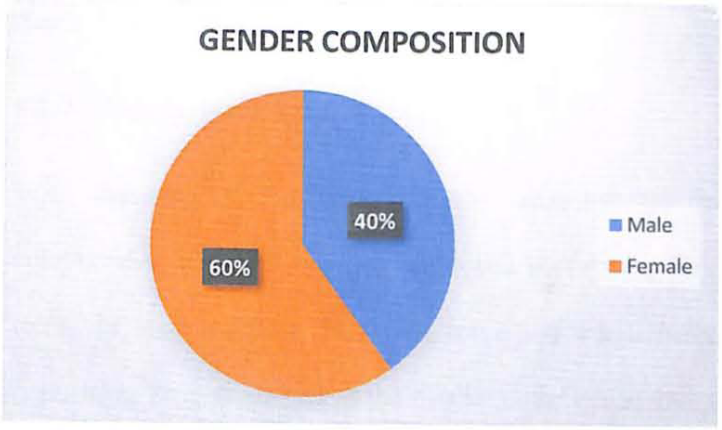

Fig 5. Source: Field survey, 2015

In figure 5 above, respondents in the study area were mainly females accounting for 60% of the total population while the remaining 40% were males. This is because either most male respondents were not available at the time of questioning or most male heads called on their wives to answer the questionnaire. This was also due to the fact that most household entered were

mainly occupied by women. Respondents were mainly traders, fishermen, engineers, seamstress, carpenters and mechanics

This results from the survey is also mirrored by the Ghana Statistical Service (GSS) 2010 population and housing census whereby females constitute 51.1% and males represent 48.9%.

Community name	Total	Number of males	Number of females	Household	Houses
Oblogo	6,168	2,954	3,214	1,520	1,013
Tsokomey	1,968	975	993	401	291
Away	1,688	812	876	422	369
Adankope	32,485	16,183	16,302	7,730	6,568

Table 2 .Source: GSS (2010)

4.1.2 Employment status

With regards to employment status, respondents from the surveyed communities were actively self-employed accounting for sixty five percent (65%) of the population. However, seven and a half percent (7.50%) of the population were employed in the public sector whilst five percent (5%) were employed in the private sector. Seventeen and a half percent (17.50%) were unemployed whilst another five percent (5%) were students. This is presented in table 3 below:

Employment	Frequency	Percentage
Self employed	26	65%
Public sector	3	7.50%
Private sector	2	5%
Unemployed	7	17.50%
Student	3	5%
Total	***40***	***100%***

Table 3. Source, field survey, 2015

4.1.3 Educational Level

Educational level		
JHS	23	57.5%
SHS	13	32.5%
Degree	4	10%
Masters	0	
Total	***40***	***100%***

Table 4. Source. Field survey, 2015

In table 4, Fifty seven and a half percent (57.50%) have attained the Junior High School level, whilst thirty two and a half percent (32.50%) have achieved senior high school level. A meager ten percent (10%) have achieved a degree whilst none of them had attained a master's level of education. This however proves that educational level has a bearing on the community's preparedness towards floods.

4.2 Years resident in community

In trying to ascertain how long most respondents had resided in the various communities, results revealed that thirty two and a half percent (32.50%) representing majority of the population have been resident between four to seven years. Twenty two and a half percent (22.50%) of the population had settled in these areas between 12-15 years. Twenty percent (20%) of the population have been resident between 8-11 years whilst fifteen percent (15%) have resided there for three years and residents who have lived in their communities for over twenty and fifty years make up five percent (5%) of the population respectively. Although five percent may represent a low figure, it would actually help in the discussion and analysis of the research and also appropriate because respondents within this bracket were in a better position to understand the situation on the ground and also to reveal relevant information. This is represented in figure 6 below.

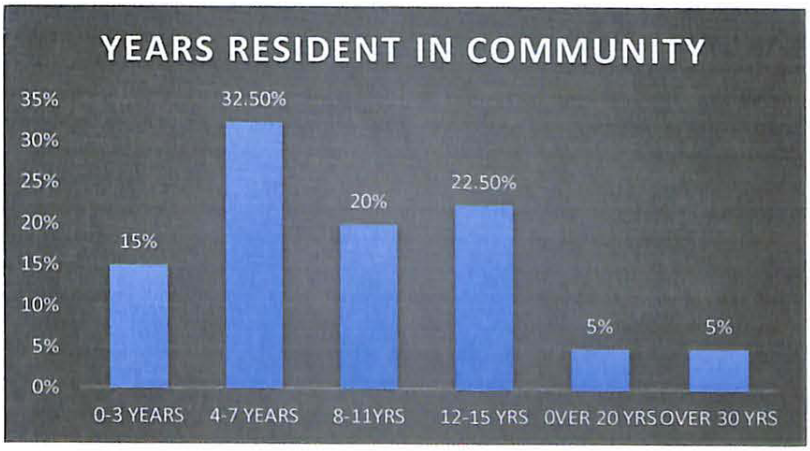

Figure 6 .Source: field survey, 2015

4.3 Disaster types

Most residents were asked the prevalent disaster type their communities. All of the respondents representing one hundred percent (100%) affirmed that flooding is the prevalent disaster type in their communities. This assertion is supported by views from interview 1 who states that

.....the main disaster type which affects the study area is flooding. Flood are dominated by two aspects, the presence of excessive water and the topographical characteristics of the area. Water collects in low areas, flat surfaces close to a river are more prone to flooding. Heavy rainstorms can also cause sudden floods (flash floods).

This definition of flooding concurs with the definition from Andjelkovic (2001) who states that floods are associated with some extreme natural events that happens on a geographical area known as a drainage basin, water shed or catchment area. This revelation is represented in the figure 7 below.

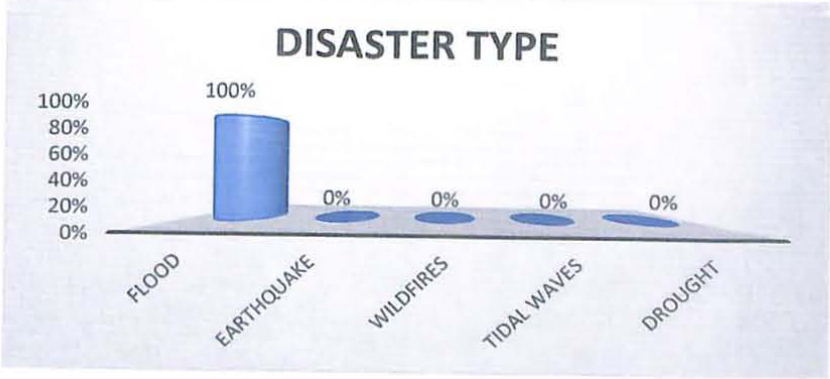

Figure 7. Source: field survey

4.4 Major causes of floods

One major objective of the study was to uncover the major causes of flooding in the study area. Upon careful interaction with the respondents, responses revealed that the major cause of flooding which was due to the spilling of the Weija dam (82.50%) as compared to building on water ways that represented twelve and a half percent (12.50%), poor drainage systems representing five percent (5%) and none of the respondents thought that chocked gutters was one of the causes of flooding in Weija. Most residents living close to the Weija dam have to bear the brunt of flooding and its effects anytime the dam is being spilled. Anytime the dam reaches its limit, the Ghana Water Company Limited needs to spill the water to prevent the facility from damage. In lieu of this, most communities are affected. The recent sp1illage in June 2015 has affected most communities such as Away, Adakope and Tetegu amongst others thus residents had to pack some belongings and live with some relatives on higher grounds.

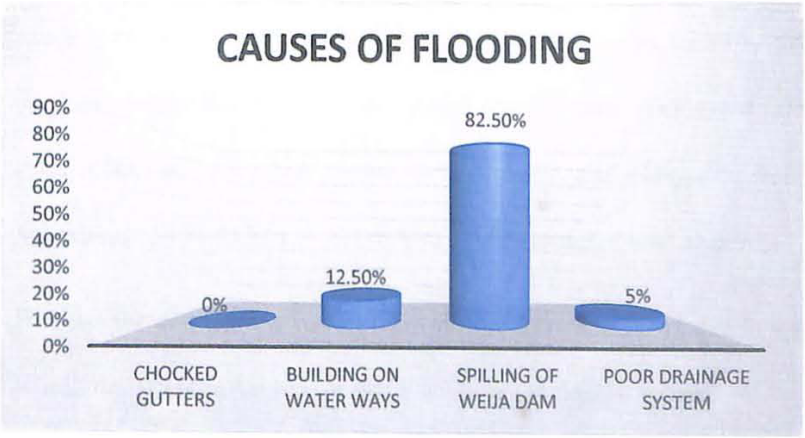

Fig.8 Source: Field Survey, 2015

In an interview with the institutions, the researcher enquired about the major causes of flooding in the Weija municipality. Interview one (1) revealed that

.....the spillage of the dam was the major cause of flooding in the area .The Densu River is a dammed river which supplies half of the portable water for residents in Accra and is also used for agricultural purposes. In addition to the heavy rains causing overflow of the river, spill ways from the dam also cause flooding and in order to prevent overflow of the dam, occasionally the dam is open to allow excess runoff which leads to flooding because of the fast rate and large volume discharged.

Interview two (2) also shares his view on the major causes of flooding in Weija. He posits that

.....it is the spillage of the dam that causes flooding in this area. This is done in order to protect the dam from possible damage from over flows of heavy rains. However, it was not our intention to spill the water since it is spilled at a cost. To power the hydraulic gates with hydraulic oil is very expensive thus we have no choice than to spill. Any eventuality in the dam would not only cost people living around and along the Densu River but almost half of Greater Accra would be inundated with water.

Besides the dam spillage, most residents have erected structures in water ways which disrupts the passage of water anytime the dam is spilled.

This assertion is supported by (Oppong, 2011) when he said floods occur when water bodies are inundated with water and overflows its banks, the excess water spills over.

Despite the fact that the major cause of flooding is the spilling of the dam, the researcher identified other possible causes of flooding. This includes the absence of a poor drainage system in the community. Unfortunately, these systems are not network therefore when there is a heavy downpour, rain water seems to be stagnant. Another problem identified was that of chocked drains. The flooding of the Densu River has caused flooded homes and businesses to discharge a lot of waste. The waste is composed of destroyed food items from households and markets, destroyed electrical equipment and appliances from households and businesses, destroyed building material, furniture and clothing. This eventually chocks up the smooth flow of storm drains in the aftermath of a rainfall. Beyond poor waste disposal that leads to flooding, there is its health implications. The current outbreak of cholera is as a result of this poor practice which has caused some considerable amount of death cases.

4.5 Awareness of residents

Respondents were asked if they received any kind of prior information to the spillage of the dam. This was to form some kind of awareness to the residents and also a form of caution to enable them prepare for any eventuality.

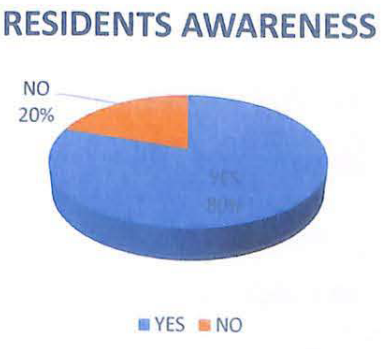

Figure 9. Source: field Survey, 2105

Figure 9 above reveals that in Weija, most of the residents in the various communities representing eighty percent (80%) seem to have some knowledge of the dam spillage whilst the remaining twenty percent (20%) have no knowledge at all. This is one objective the researcher set out to achieve. Response from interview (2) two reveals that

.....residents are given prior notice before the dam is spilled. This allows them ample time to prepare and move to safer grounds. Residents are normally given a time frame of two weeks depending on the level of the dam. As a follow up to the interview, residents were asked what the duration of the information was. The results are explained in figure 9 below.

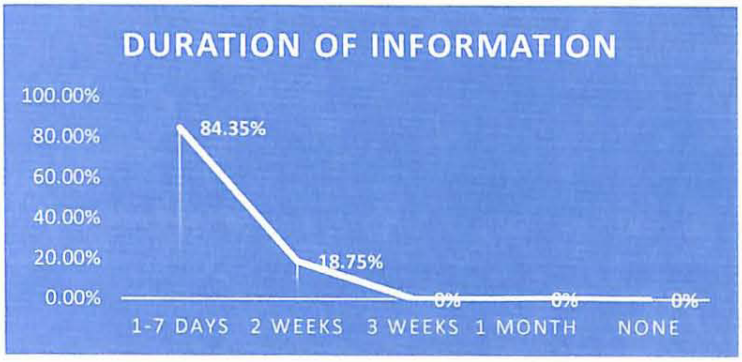

Figure 10. Source: Field survey, 2015

Figure 10 above does not completely agree with response from interview 2. Majority of the respondent (84.35%) are of the view that they are given a grace period of 1 week to prepare for the floods whilst the rest of the respondents representing 18.75% confirmed that they were aware two week prior to the spillage of the dam (floods). The results only goes to prove the effectiveness of the early warning system.

4.6 Preparedness

Another objective of the study was to understand resident's preparations towards floods in the study area. The table below presents the results of the immediate measures residents take in order to prepare towards flooding. A large majority of the respondents (35%) actually pack some personal belongings with them whilst a score of thirty percent (30%) actually do not make any preparations towards the floods simply because they do not have anywhere to go. This is also partly due to poverty. They would prefer to stay and experience the floods and its impact. Results are presented in figure 11 below.

Figure 11. Source: Field Survey, 2015.

Some residents (25%) also revealed that they move in with some relatives on higher grounds until the floods subside and the remaining respondents only harvest some crops and other food items in anticipation of the event.

4.7 Early warning

As part of preparedness, another objective sought to verify if there was any effective early warning system in place towards flooding. The survey revealed

that majority of the respondents representing eighty three percent (83%) confirmed they had in place an early warning system whilst the remaining respondents representing 17% claimed they did not have in place any system at all. When asked what form it occurred, response revealed that public announcements was the major form of early warning which represented ninety three percent (93%) whilst five percent (5%) of the total population said they received door to door notices from community leaders. A meager percentage of two percent received letters whilst none of the respondents felt that sirens were a form of early warning for communities. This is shown in figure 12 below

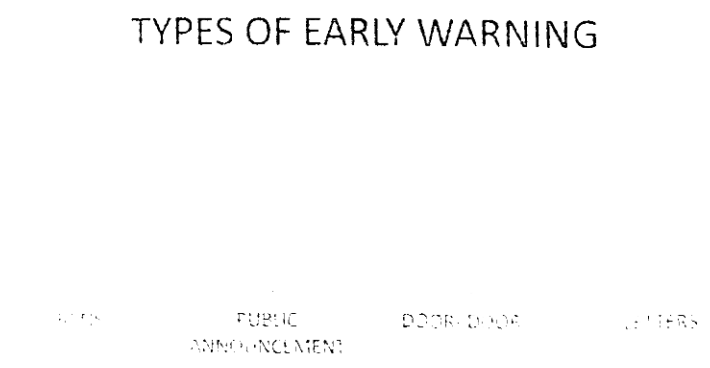

Figure 12. Source: Field survey, 2015

.....disaster volunteer groups (DVG's) are trained to identify hazards that may result in disaster and sound the warning for the necessary action to be taken as well as to support response operations.

The use of disaster volunteer groups proves the notion that early warning in Ghana is people/community centered and participatory. This

simply means that planning and decision making is not a top-down approach but vice-versa. It involves the people in the community which makes them feel a part of the decision making process. This practice is however in line with the United Nations report, 2006 which emphasizes that early warning systems or practices must be community centered.

When asked how they understood the early warning indications, responses from interview three (3) revealed that s

.....***since it is a yearly phenomenon, at the sound of the siren around the period when the dam is occasionally spilled, we become consciously aware of the event about to take place. However, prior to the sounding of the siren, we do receive some radio messages.***

This view expressed by the respondents however supports the study conducted by Kelman, (2014) who opines that for effective response of at risk communities and those who have to respond must understand the warning message. However, a failure in such communication was the June 3, 2015 flood and fire disaster that gutted the country where scores of people lost their lives and property due to lack of efficient warning signals.

Another such failure is supported by a study by (Seng, 2014) where thousands of people lost their lives in coastal cities and communities in the December, 26 tsunami.

In terms of community participation, the interview one (1) revealed that

.....***NADMO had formed over five hundred disaster volunteer groups in various communities in the country. These groups are spread in all the regions and are located within the country. Currently, these groups are***

being trained to acquire some skills in various vocations. These include but not limited to fishing, farming, gari processing and other income generating activities. This is aimed at generating some kind of employment in the community and also reducing the poverty drive in the country. The driving force behind the formation of the disaster volunteer groups was to make disaster management at the community level participatory and also serve as a form of employment to generate some level of income. The disaster volunteer groups serve as the first point of call in disaster preparedness. They are trained to detect signals of upcoming disasters and relay the information to residents in the community as well as undertake search and rescue operations before receiving external assistance.

As a part of early warning, NADMO is building capacity most importantly at the community level. Disaster management courses are being taught as part of school curriculum and disaster clubs are also being set up in most schools to train and equipment people with the necessary skills needed in disaster management. The organization has been taking advantage of the International Day for Disaster Reduction (IDDR) celebrations to climax its awareness creation, disaster mitigation and prevention activities to the public. Hazard mapping of the identified disasters have been prepared at the national, regional and district levels. This act of inculcating disaster management courses in school curricula is supported by a study conducted by Niskala (2005) who posits that this practice is prevalent in Cuba

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center serves as a link between the headquarters, communities regions and the district to send early warning signals.

4.8. Preparedness and mitigation measures

Preparedness and mitigation was an integral part of the research, thus the researcher sought to find out who carried out preparedness and mitigation measures against floods in the study area. Results revealed that Ghana Water Company was the main institution carrying out such measures. NADMO per the opinion of the respondents played second fiddle to Ghana Water Company. Community leaders and assembly men represented fifteen percent (15%) and seven percent (7%) respectively whilst none of the respondents felt that landlords played no role in the preparedness and mitigation measures towards flooding in the community.

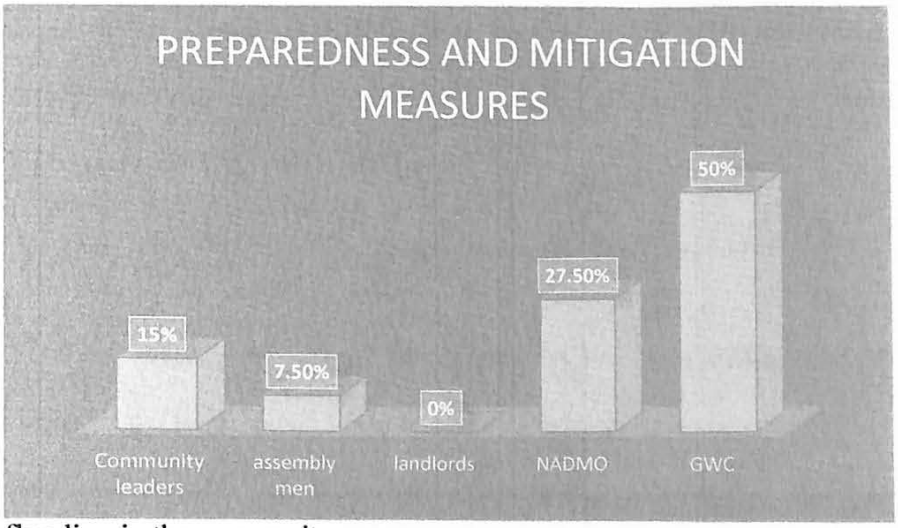

Figure 13. Source: field survey, 2015

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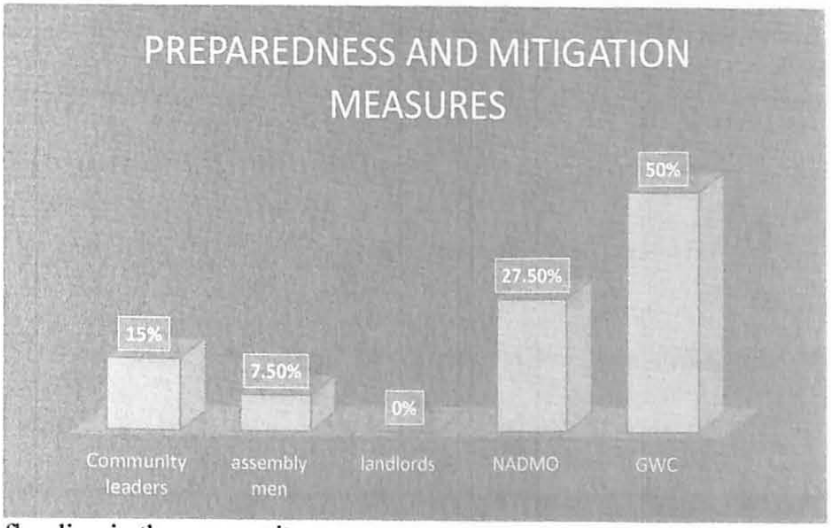

Figure 13. Source: field survey, 2015

When asked what preparedness plans/measures there were in place towards flooding in the municipal assembly/district, interview one (1) explained that

.....district assemblies keep following up strongly on development by putting in place drains that are good enough to carry the volumes of water that causes flooding in the community. However, this has not been able to measure up to the level of development therefore the shortfall is where the problem is. As a part of preparedness measures, there is a contingency plan in place at both the district, regional and national level in times of disasters. Wireless messages are sent out to all regional ministers to identify flood prone areas likely to emerge due to development, to know the total population in the flood prone areas and to know those likely to be affected in the event of flooding. Other preparedness measures include public education and sensitization as well as the activation of standard operating procedures (SOP's). This includes meeting with all heads of units, activating the urban search and rescue team. Transport services on standby, informing all collaborating agencies as well as activating all emergency contact numbers that can be used by most radio and TV stations.

However, interview two (2) on preparedness measures concluded that

..... the agency has no system for the regulation of floods however we work hand in hand with collaborating agencies such as the NADMO to create awareness of the impending disaster and also educate residents in the community and advise them accordingly. I would however recommend that residents in flood prone areas should practice the conservation of water and also encouraged residents living in areas in and

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around the Densu River to relocate to higher grounds and also stockpile some food items in the advent of any eventuality.

Conclusion

As much as the community play an important role in the management of disasters, the institutions also play an equally important role. The graphic presentations in this chapter clearly indicates that residents in the communities take the flooding phenomenon in their strides. The next chapter would provide possible solutions to the flooding situation in Weija

CHAPTER FIVE

SUMMARY, IMPLICATION AND CONCLUSION

5.0 Introduction

This chapter summarizes the findings of the research, its implications, conclusions and makes recommendations for future research. The major findings are summarized below with reference to the objectives of the study

5.1 Causes of flooding

Results from the study reveal that the dam spillage is the main cause of flooding the communities situated along the Densu River. This wouldn't have been the situation if activities of companies such as Panbros Limited, Caitec group of Companies did not pose a problem. The situation that persist at the Weija dam is as a result of sand belt that does not allow the flow of water to enter the sea whenever the dam is being spilled

Another cause of flooding which was observed by the researcher was building of all sorts of structures such as churches and some companies which have been erected on waterways. Careful interaction with assembly men in the area revealed that most of these buildings have been put up without permits and several attempts to relocate them have proved futile. These buildings obstructs the flow of water anytime flooding occurs.

Another cause of flooding which was identified was the indiscriminate disposal of waste by people living in the communities. This waste which is composed of destroyed electrical appliances, destroyed building materials and empty water sachets has however led to the chocking of drains. One

interesting observation made by the researcher was the fact that the drains in the communities were inadequate and not networked. This activity however prevents the free flow of water anytime there is a down pour thus contributing to flooding in the community. Related to waste disposal is the outbreak of diseases such as malaria and cholera which can lead to death if not attended to.

5.2 Early Warning

Early warning plays an important role in preparing for disasters. The prevalent mode of warning in the communities is the use of Megaphones. Other modes of delivering warnings include the use letters and also door to door messages. Some community members parade the communities in vehicles sounding warning messages using a megaphone to alert residents on an impending disaster before it strikes.

Besides the use of megaphones as a form of early warning, there is the presence of the disaster Volunteer Groups who are spread in all the regions and located within the country and are skillfully trained to identify hazards. Besides been trained for hazard identification, they are also being trained in some income generating activities which enables them support themselves financially

As part of early warning, NADMO is building capacity at the community level. Disaster management is been taught as part of school curriculum and clubs are being set up in most schools at the district, regional and national level. Educational programmes on early warning and awareness creation are also been organized on radio and TV stations

NADMO is currently operating twenty four hour operations monitoring room to all regional and district offices as well as operating an emergency operating center which serves as a link to the regions and districts to detect signals of impending disasters.

5.3 Preparedness and mitigation measures

Every country and community need to stay prepared towards disasters. In Ghana, preparedness and mitigation measures are carried out by NADMO as one of their core functions. However, in the study community, majority of the residents are of the view that these measures are carried out by Ghana Water Company limited. This is because warning signals are given by the GWCL reason being they are always on the ground before the floods occur. NADMO only comes to the scene only when the disaster occurs to assess, acquire data of displaced people and distribute relief items. However, what the residents fail to realize is that NADMO and GWCL work hand in hand towards preparedness and mitigation measures in the community.

5.4 The role of related institutions

With regards to the general state of preparedness, interview one concluded that

..... ***We provide and stockpile warehouses with non-perishable food items, tent age, water storage containers, clothing, medical and hygiene supplies, sanitation materials, enough stocks of tents and pre-fabricated housing units to be purchased. We also undertake pre-positioning of stocks throughout the country to allow for flexibility. We further set up and equip emergency operating centers and put in place appropriate communications systems using a combination of traditional and modern system as***

appropriate at various levels at the city. Finally, we earmark open spaces, parks and schools, churches, etc (safe haven) at all levels to facilitate early relocation of displaced persons.

Interview two adds that....

.....we don't any preparedness plans. However, to carry out their duties effectively, we would continue to work hand in hand with NADMO to send out warning signals with any pending disaster and also monitor the water level of the dam to ensure that spillage of the dam would not cause havoc thus reducing the impact on residents in the community.

Interview three concludes that

..... Currently, the disaster volunteer groups in the community are inactive due to inadequate capacity development to provide advice on disaster issues in the community. We also lack education about disaster preparedness in the community and also need a more efficient warning system to create awareness in the community.

5.5 Conclusion and implications

Whether natural or man- made disasters are the routine of many places including Ghana. When this occurs, most lives and properties are affected. The research set out to enquire about how prepared residents in the study area were in anticipation of disasters but more specifically, flooding which is the prevalent form of disaster in the community. After analyzing and interpreting the results of the survey, it was evident that most residents were not prepared for disasters no matter the time frame they are given prior to the spillage of the dam. They also acknowledged the fact that flooding, specially flooding from

the spillage of the dam was an annual affair that requires serious attention. Most people still reside in surrounding communities situated near the river for various reason such as poverty, easy access to land and simply because they have no place to go. This problem of urbanization has led to haphazard erections of buildings in this community which has also in effect obstructed the courses of waterways.

Adequate preparedness is a pre-requisite to disaster management and this light, several policies and measures already in place must be activated. Discussions from the Weija community revealed that although the communities are the worst hit in times of disasters, they do not have in place measures that can help curb the situation anytime it occurs. In terms of their general state of preparedness of the community, they pleaded for a more effective early warning system besides what they currently have in place. A discussion with the disaster volunteer groups also revealed that they were not well equipped to advice on disaster issues in the community. In a nut shell, they lacked the needed education which would enable them serve as the first point of early warning in the community. The same view was aired by the residents in the various communities. They need some kind of education on the dos and don'ts on flooding

It is evident from the study that community based approach (where the local community is taken as the primary focus of attention in disaster reduction) to flood preparedness is viable. This research has provided the opportunity to tap into structures and mechanisms and capability building activities with the community disaster committees and volunteers. A successful institution and management of the CBDP approach to disaster will require integrated

coordination, cooperation and commitment from all members of the local community and a full support from the government.

5.6 Recommendations and further research directions

From the researcher's standpoint, CBDP is imperative for the development of the research community. The drawing up of the preparedness plan should not be a top-down approach but rather participatory in nature. The CBDP approach should require that empowerment be entrusted to the local community in decision making with regards to organizational arrangements and utilization of resources.

Again, deducing from the respondent's point of view the disaster volunteer groups who play an active role in disaster preparedness in the Weija community must be empowered with the necessary resources to take action in times of disasters. Training workshops must be compulsory for every resident; members of the community and must be informed about the evacuation routes and the manner in which instructions should be followed once disseminated during disasters. Volunteers/interns will assist (especially elderly, disabled and younger children) and lead during evacuations to avoid major confusions and frustrations. Community members will be made aware during workshops about the communication tools that will be used before, during and after a disaster.

Areas around the Weija dam has been declared as a green belt zone thus city authorities should ensure that buildings are not erected in this location in order to prevent any casualty in the near future

With the recurrence of flooding in the Weija community, it can only be curbed if we can only emulate what has been done at the Korle Lagoon road where stones (boulders) have been laid into the sea to prevent it from pushing sand to seal the estuary. Also Ghana Water Company should not wait for the dam to reach its limit before spilling. There should be constant monitoring of the dam.

Future studies should explore the state of disaster preparedness on the part of NADMO and its collaborating agencies.

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APPENDIX A

Questionnaire

Introduction

This questionnaire is part of the research on the how prepared residents of some communities in Weija are in times of flooding (spillage of the Weija dam). You are entreated to truthfully answer every question to the best of your knowledge. Response to this questions would be used solely for the purpose of this study. Confidentiality of your response is however assured.

Section A

Profile of respondents

1. Age (years)

a) 20-29 b) 30-39 c) 40-49 d) 50-60

2. Sex

a) Male b) female

3. Employment

a) Self-employed b) public sector c) private sector

d)other (specify).....

4. Educational background

a) JHS b) SHS c) Degree d) Masters

5. Profession.....

SECTION B

6. What community do u reside in?

.....

.....

7. How long have you resided in this community?

a) 0-3 years b) 4-7years c) 8-11 years d) 12-15 years

8. What kind of disaster occurs in this community?

a) Flooding

b) Earthquakes

c) wildfires

d) tidal waves

e) droughts

9. How often does it occur?

a) Yearly b) twice in a year c) three times in a year

d) Four times in a year

10. During which month of the year does it occur?

.....

11. Has your household experienced flooding before? a) yes b) no

12. If yes? Why are you still staying in this community?

a) Affordable housing

b) Proximity to work place

c) Easy access to land

d) poverty

e) other (specify).....

13. How long does the flooding situation last? a) I day b) 2-4 days

b) 5-7 days d) other

(specify).....

14. What would you say is the main cause of flooding in your community?

a) Chocked gutters b) building on water way c) Spilling of the Weija dam d) poor drainage systems

15. Is the community pre-informed of the spillage of the dam?

a) Yes b) no

16. If yes, what is the duration of this information?

a) 1-7days b) 2 weeks c) 3 weeks

d) 1 month

d) None

17. How do you prepare towards the floods to reduce the impact on the community?

18. Who carries out the preparedness and mitigation measures against the floods?

a) Community leaders d) NADMO

b) Assembly men e) other (specify)

c) Land lords

19. As a community, do you have in place any kind of early warning system in place? a) yes b) no

20. If yes, in what form does it occur? a) sirens b) public announcements

c) Door to door alerts d) other

(specify).....

21. In times of disasters, do you receive international assistance? a) yes

b) no

22. Which agency / organization comes to your aid in times of disasters

a) NADMO

b) Sub- metros

c) NGO'S

d) Environmental Protection Agency

e) other (specify).....

23. What do they do to help?

a) Provision of relief items (blankets, mattress, buckets, rice, oil, etc)

b) Training of local capacity

c) Rescue operations

d) Education on preventive measures

e) Other (specify)

24. Are you aware of any programmes or projects designed to reduce the incidence of flooding in the community? a) yes b) no

25. If yes, can you mention a few?

a).....

b).....

c).....

14. If yes, kindly mention a few.
15. Do you collaborate with other agencies in flood preparation? Kindly mention a few.
16. Does the organization have in place any warning system that gives prior information before the onset of flooding? In what form does it take place? And is it people centered/ participatory?
17. Is there any project /programme in place for capacity building in preparation towards floods?
18. Is there in place any preparedness or contingency plan? What does it consist of?
19. Do you train the communities in flood preparedness? What does the training entail?
20. Any further comments/advice?

APPENDIX C

INTERVIEW WITH OFFICIALS FROM GHANA WATER COMPANY

1. Name of respondent.....
2. Name of

   institution/organization.....
3. Position held

   .....
4. Core functions of the institution/organization
5. What is the main reason for spilling the dam?
6. How many times in a year is the dam spilled?
7. Do you give the residents any prior warning before the dam is spilled?
8. What is the duration for this warning exercise?
9. Do you collaborate with other agencies in discharging your duties?
10. What role do they play?
11. Do you give the affected victims any form of compensation?
12. Moving forward, what advice would you give to communities in Weija and the general public?