



**Master Thesis**

**The 2015 June 3<sup>rd</sup> Twin-Disaster in Accra: A Situational Analysis of  
Ghana's Disaster Preparedness.**

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This Master's Thesis is carried out as part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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## ***Abstract***

*The Accra Metropolitan area has witnessed a surge in flooding events and has become an annual occurrence leading to the loss of human lives and properties. Despite efforts by NADMO and its international partners at addressing the problem of flooding, there seems to be little progress. Part of the reasons for a lack of progress has been the non-assessment of social vulnerability factors that predispose people to natural hazards. This study seeks to investigate the 2015 June 3<sup>rd</sup> Twin-Disaster in Accra with an objective of finding out the causes of the disaster and to assess NADMO's role during the disaster situation. One of the key findings is the identification of social vulnerability factors that expose inhabitants of flood prone areas to harm. Interestingly, the study found that there was no link between mitigation and risk reduction initiatives and the vulnerability of people. The study echoes the fact that mitigation and disaster risk reduction initiatives fail to address vulnerability of people and the best way to win this "fight" against perennial flooding is to start addressing peoples' social vulnerabilities holistically. The study conclude that there must be a rethinking of disaster management strategies to incorporate disaster risk reduction initiatives in communities by building resilient communities using a community based approach to build the capacity of local people. The study suggests the use of volunteer group formation as a strategy of building resilient communities.*

## **Acknowledgement**

I give all the Glory to God almighty for the strength and life He offered me. To Him belongs all the glory.

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I say a ‘Big’ THANK YOU to all the respondents who participated in this study, especially, Mr. Gavivina Yao Tamakloe and Mr. Saladin S. Mahama for your valuable input into this study. To the staff of NADMO and AMA, I say thank you.

## Dedication

This work is dedicated to all the people who lost their lives in the June 3<sup>rd</sup> 2015 Twin-Disaster. It is also dedicated to the survivors of the Twin-Disaster.



**Declaration by candidate**

I, Raymond Acquah, hereby declare that this thesis titled “The 2015 June 3<sup>rd</sup> Twin-Disaster in Accra: A Situational Analysis of Ghana’s Disaster Preparedness” has never been submitted to any other University than the University of Agder, Norway for any type of academic degree.

.....  
Raymond Acquah

Date

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## **Abbreviations**

AMA..... Accra Metropolitan Assembly

CBDM.....Community Based Disaster Management

GNFS.....Ghana National Fire Service

GOIL.....Ghana Oil Company Limited

LI.....Legislative Instrument

MMDA.....Metropolitan, Municipal, and District Assemblies

NADMO..... National Disaster Management Organization

NDRC..... National Disaster Relief Committee

NGO.....Non-Governmental Organisation

PTSD..... Post-Traumatic Stress Disorder

UNDP..... United Nations Development Programme

UNISDR.....United Nations International Strategy for Disaster Risk Reduction

# **CHAPTER ONE: Introduction**

## **1.0 Introduction**

‘Natural’ disaster is a term that is frequently used to refer to the occurrence of severe natural phenomenon such as earthquakes, volcanic eruptions, floods, tsunamis, hurricanes, and landslides. The United Nations International Strategy for Disaster Risk Reduction, defines disaster as “a serious disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses which exceed the ability of the affected community or society to cope using its own resources” (UNISDR, 2004:17). Disasters should not be seen as the inevitable outcome of a hazard’s impact but the condition of the people at the time of impact makes it possible for a hazard to become a disaster (Cannon, 1994). Disaster is therefore a result of a natural phenomenon impacting on vulnerable people. In view of this, the study uses the term ‘disaster’ instead of ‘natural disaster’.

Disasters are on the rise and come with many and varied effects to lives and properties all over the world. There were about sixty million casualties during the 20th century due to ‘natural’ disasters with an annual human toll approximated 79,000 casualties on average in the 1990s and most of these cases happened in developing countries (Mechler, 2004). Other effects includes a devastation to life and livelihoods caused by episodic, catastrophic floods that drown people and livestock, sweep away bridges, vehicles and buildings, and force survivors to abandon their homes (Few, 2003). The Indian Ocean Tsunami of December 26, 2004 had a human toll of about 230,000 fatalities and the total economic impact of at least US\$10 billion which made this disaster one of the most destructive events in recent times (Birkman et al, 2010).

The impact of disasters to the development aspirations of developing countries is highly disturbing. There is evidence that the growing disasters have led to increasing vulnerability of many households and communities in affected areas especially in developing countries which mostly increase the economic woes and making it more difficult for the process of recovery (Vaster and Krimgold, 2000). The impact of disasters according to Carter et al, (2007), may result in an increase in poverty and deprivation of the affected areas. The UNDP projects that due to climate change, damages are likely to increase even more in the near future and the hardest hit will be the poor (UNDP, 2008). This makes it imperative that adequate measures are

put in place to ensure that conditions that expose people to disaster are well tackled. Disaster is a development problem resulting from poor decision-making on the part of policy makers (El-Masari and Tipple, 2002) and in view of this, effective disaster management plans through sound decision-making and the involvement of communities affected by disasters can be beneficial towards reducing some of the risks faced by disaster-prone communities in developing countries.

Ghana is one of the developing countries in sub-Saharan Africa that is not an exception when it comes to disasters. Ghana has experienced several forms of disasters in the form of droughts, flood and fire outbreaks within the last decades. Accra, the capital city of Ghana has experienced periodic floods leading to the destruction of goods and properties with many lives lost. The economic lost due to disasters between 1968 and 2014 is estimated to be around US\$ 780,500,000 (Asumadu-Sarkodie, et al., 2015). One of the most destructive disasters to have hit the country was the June 3<sup>rd</sup> flood and fire disaster in 2015 which resulted in the loss of over 200 lives. This disaster has been labelled as the ‘Twin-Disaster’ by many owing to the flood and fire that led to the disaster. The National Disaster Management Organization (NADMO) is the organization responsible for disaster management in Ghana and for some time now, it has come under serious scrutiny for their poor handling of disaster situations in the country including the Twin-Disaster. This study therefore seeks to investigate the Twin-Disaster that occurred on the 3<sup>rd</sup> June, 2015 to find out the role NADMO played during the disaster situation and the social vulnerability factors that exposed people to harm. It is christened;

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A qualitative research strategy was used in finding answers to the research questions guiding this study. As part of the qualitative research methodology, semi-structured interviews, participant observation, text and document analysis was used to help find answers to research questions.

## **1.1 Main Objective**

The main objective of this study is to investigate the causes of the 2015 June 3<sup>rd</sup> Twin-Disaster and to assess NADMO's role in the disaster. To be able to do this effectively, the research questions below guided the study.

## **1.2 Research Questions**

1. What social vulnerability factors contributed to the June 3<sup>rd</sup> Twin Disaster in Accra?
2. What were the social, economic, and psychological effect of the June 3<sup>rd</sup> Twin Disaster on the livelihood of the survivors?
3. What was the immediate response of survivors during and after the June 3<sup>rd</sup> Twin Disaster in Accra?
4. What mitigation and disaster risk reduction initiatives were developed by NADMO during the June 3<sup>rd</sup> Twin Disaster in Accra?
5. To what extent does the current disaster management strategy incorporate community based efforts in disaster risk reduction in Accra?

## **1.3 Problem Statement**

The rationale for choosing the objective and research questions for this study is due to the constant annual flooding situation in the Accra Metropolitan Area which always comes with media highlights. This flooding situation leaves many communities submerged with much destruction to lives and properties. It has become a phenomenon that at the start of every rainy season the topic of flooding resurfaces yet the efforts by authorities to curb it yield little result. Many of the inhabitants of flooding areas are constantly been asked to relocate from such flood prone areas but such calls are not heeded. One of such floods in June 3, 2015 led to the Twin-Disaster resulting in the loss of lives and destruction to properties. Despite this disaster, the flood situation is still the same with residents still leaving in flood prone areas despite several warnings. This behaviour by authorities and residents raises many interesting questions on the mind of the researcher which is the reason why this study was conceived. Issues such as; social

vulnerability factors that expose people to the Twin-Disaster, the kind of disaster mitigation and risk reduction initiatives being used by NADMO are in need of answers.

The EM-DAT, 2014 report on disasters and hazards in Ghana, identified flood as number two cause of death in Ghana. About 3.9 million people were affected by flood events out of which 409 lost their lives between 1968 and 2014 (Asumadu-Sarkodie et al., 2015). Ghana was devastated by floods in June 2010, which left 36 people dead, 33,602 internally displaced, massive damage to personal property and infrastructure (NADMO, 2010). The damaging impacts of floods are complex and varied and many a time causing disruptions to roads, rail lines, electricity supply systems, water supplies and sewage disposal systems. Most of the floods occur mostly in communities in the Accra Metropolitan Area including Kwame Nkrumah Circle and Adabraka. The Twin-Disaster which was the most destructive in Ghana's history occurred in these two communities. The question is why do residents of these two communities still live in these two communities despite the constant flood situations and the damaging effect it is having on them? Why are authorities not able to deal with the problem of flood which seems to be an annual phenomenon? What are the mitigation and risk reduction measures been put in place to ensure that vulnerability factors are reduced?

Kwame Nkrumah Circle and Adabraka are economic hub centres with trading and transport activities. Many people move in to settle there for economic reasons but end up putting their lives at risk of flood. This study is an attempt to assess social vulnerability factors that expose people to flooding with a focus on the Twin-Disaster in 2015 and to also analyse disaster mitigation and risk reduction initiatives by NADMO in the event of a possible future flooding.

#### **1.4 Study Area**

The Accra Metropolitan Assembly covers a total land area of 173 Kilometres square and is located on the coastal parts of Ghana. It lies between longitude 0° 1' W and 0° 15' E and latitudes 5° 30' N and 5° 50' N, respectively (Nyarko, 2000).

The Assembly shares boundaries to the North with Ga East Municipal Assembly and to the West with Ga Central Municipal Assembly. The Southern boundary stretches along the Gulf of Guinea

from Gbegbeyese to the Veterinary Service Office and the Eastern Corridor of the Assembly is the La- Dade Kotopon Municipal Assembly (refer to figure 1 for map of AMA). The population of the AMA according to 2010 population and housing census stands at 1,665,086 with 800,935 males and 864,151 females (Ghana Statistical Service, 2010). However, City Authorities believe that Population is currently about four (4) million.

The Accra Metropolitan Area lies in the dry equatorial climatic zone and experiences two rainy seasons. The first begins in May and ends in mid-July while the second season begins in mid-August and ends in October. There is very little variation in temperature throughout the year. The mean monthly temperature ranges from 24.7°C in August (the coolest) to 33°C in March (the hottest) with annual average of 26.8°C (Dickson and Benneh, 2001). As the area is close to the equator, the daylight hours are practically uniform throughout the year. Relative humidity is generally high varying from 65% in the mid-afternoon to 95% at night (Ghana Statistical Service, 2014).

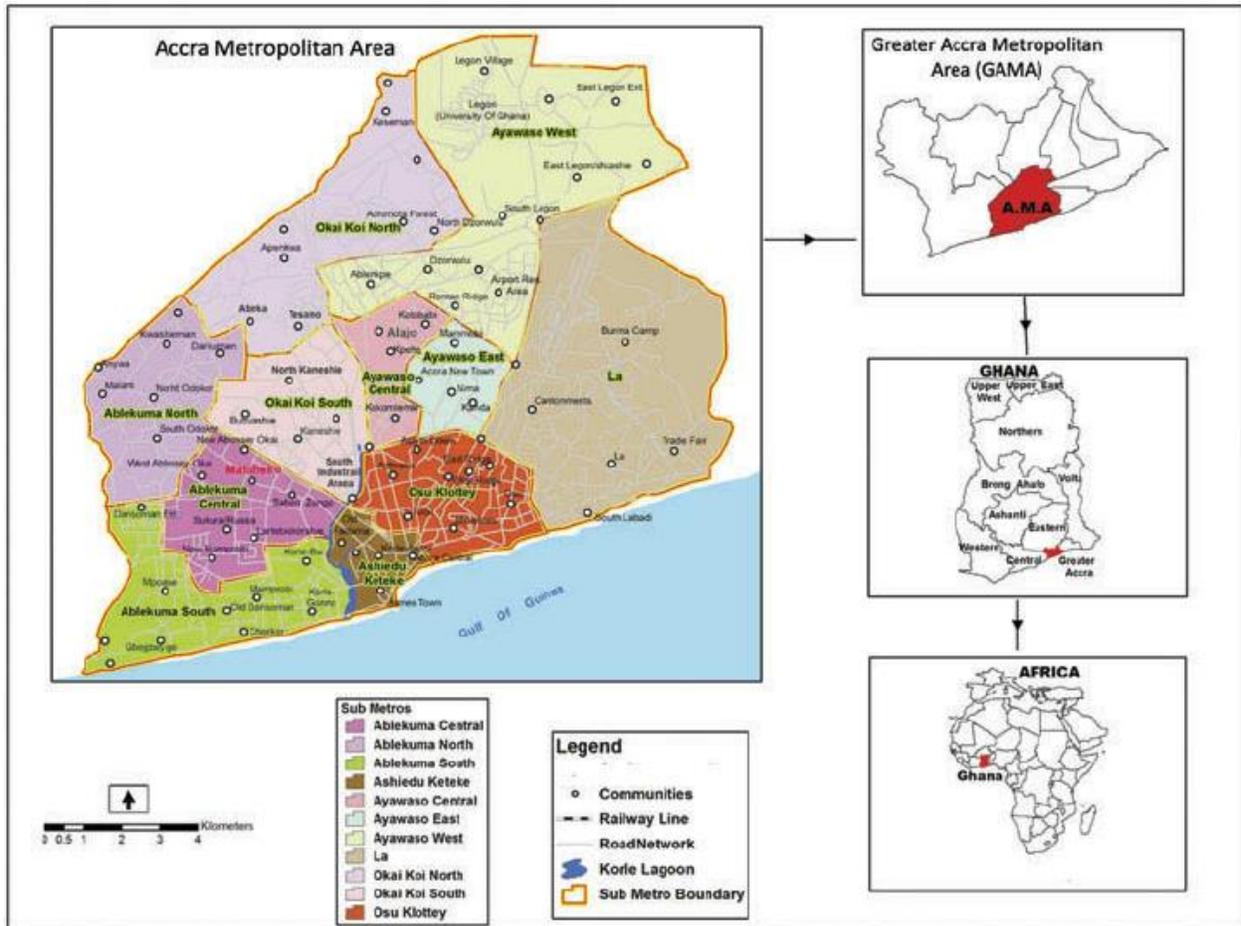
Politically the Accra Metropolitan Assembly (AMA) is one of the two hundred and sixteen (216) Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana. It was established in 1898 after undergoing several changes in terms of name, size, and number of Sub-Metros. AMA was created through a Legislative Instrument (L.I) 2034 under Local Government Act 462.

The Assembly is made up of ten (10) Sub-Metros that include; Ashiedu Keteke, Ayawaso East, Ablekuma North, Okaikoi North, Okaikoi South, Ayawaso Central, Ayawaso West, Ablekuma Central, Ablekuma South and Osu Klottey Sub-Metro. It is made up of 72 communities and 76 Electoral Areas with the city of Accra being the capital and it is also the national capital of Ghana. The Metropolitan Chief Executive is the political head of the Metropolis while the Metropolitan Coordinating Director is the administrative head.

Economically, the Accra Metropolitan Area is the economic hub of the Greater Accra Region and the rest of the country as it hosts a number of manufacturing industries, oil companies, financial institutions, telecommunication, tourism, education, health institutions and other important establishments. These establishments offer job opportunities to many residents of the metropolis and in view of this, the Metropolis continue to attract people from all parts of the country. Some of the occupations here include trading, transport, construction, fishing, farming, services, and the hospitality industry. The indigenous people until recently were mostly engaged

in fishing and farming. About 70.1 percent of the population aged 15 years and older is economically active while 29.9 percent are economically not active (Ghana Statistical Service, 2010). The economically active population, 93 percent are employed while 7.0 percent are unemployed. The private informal sector is the largest employer in the Metropolis followed by the private Formal sector. Areas like Circle and Adabraka are a hub for trading and transport activities and serve as economically busy centres.

**Figure 1: A map showing the Accra Metropolitan Area with the ten sub-Metros including Osu Klottey**



Source: (Amoako and Boamah, 2014)

Socially, there is a huge daily influx of people from various regions and communities for various activities. The relatively high population serves as a market for investors but at the same time it also poses problem for sanitation and waste management. Solid waste is disposed of in the Metropolis through the house-to-house collection system and by public dump. Liquid waste is mostly disposed into gutters through a drainage system into a gutter and through a sewerage system. There are illegal disposal of solid waste into gutters and drains posing health hazards in the metropolis.

The study was carried out in the Osu Klottey Sub-Metro area that is made of several communities including Adabraka and Kwame Nkrumah Circle with a conclusion that the area was noted for flooding (Douglas et al, 2008). This sub-Metro is also noted for housing many low income people living in illegal structures. Such communities are usually considered as informal settlements comprising a range of rental, squatting and informal land security. Over 90% of the list of flood-prone communities is made of such informal settlements. Residents of these informal settlements live in very poor and vulnerable physical and socio-economic conditions (Amoako and Boamah, 2014).

Some of these locations are seen as illegal, and they have very little or no access to basic household and community infrastructure such as water, sanitation, waste disposal, drainage networks, and access roads.

### **1.5 Methodology in brief**

This research makes use of qualitative methodology to find answers to the research questions posed. The choice of methodology depends on the type of research questions being investigated. In view of the research questions and objective of the study at stake, it was necessary to use a method that will help the researcher see through the “eyes” of respondents. Primary and secondary sources of data were used in collecting data in Kwame Nkrumah Circle and Adabraka communities of Osu Klottey Sub-Metro in the Accra Metropolitan Assembly. Semi-structured interviews, participant observation, and text and documents analysis were used as tools to collect data from the field.

## **1.6 Thesis outline**

This thesis is organized into six (6) chapters. The first chapter introduces the study by reviewing the background to the issue of disaster and sets the study into motion by revealing the objective and research questions of the research. The research study area is also discussed for the reader to understand the context within which the study was conducted. Chapter two reviews the relevant literature about the study by discussing some of the international debates on the causes of disaster and its effects. The concept of vulnerability as well as disaster management is reviewed. It takes a broader perspective on views and debates about disaster while considering some of the relevant themes and concepts for the study. It also presents the theoretical framework which guides the entire study. Chapter three presents the research methodology used in collecting data for the study. It provides justification for why the method was selected as well as the tools that was used on the field. It also discusses how the various participants in the study were selected. Chapter four makes a presentation of the findings. The chapter makes the presentation of the findings based on the research questions and the theoretical framework that guides the study. It begins with the demographic characteristics of respondents before the findings are presented. The chapter ends by discussing some of the emerging issues out of the findings that were interesting. Chapter five discusses the findings in relation to some of the concepts considered in the literature review in line with the research questions. The concept of vulnerability is considered in relation to natural hazard and disaster. The effects of disasters are also considered as well as disaster management. Disaster management is discussed in connection with mitigation and risk reduction initiatives as well as community based disaster management strategies. The last chapter, chapter six brings the conclusion of the study by recounting the findings that were made as a way of trying to answer the research questions. A final conclusion is made by a recommendation to move beyond relief.

## **CHAPTER TWO: Literature Review and Theoretical Framework**

### **2.0 Introduction**

This chapter reviews existing relevant literature about the study. It takes a broader look at various relevant debates in the world of academia concerning disasters. It specifically reviews literature about natural hazards and disasters. It reviews debates about disasters, its causes and effects. It also delves into the concept of vulnerability as a concept for understanding disasters and discusses issues about disaster management. The discussion on disaster management is organized into various themes for easy comprehension of the issues at stake in the international circles. It also presents the theoretical framework that will guide the thesis.

### **2.1 Natural Hazards: Disasters, Causes and Effects**

The term ‘natural disaster’ is frequently used to refer to the occurrence of severe natural phenomenon such as earthquakes, volcanic eruptions, floods, tsunamis, hurricanes, and landslides. The interpretation given to these occurrences has favoured the belief that there is nothing to be done when faced with such disasters because of the fact that they are natural occurrences that are seen as unavoidable (Cardona, 2004). On the question of whether disasters are natural or not, Cannon (1994) asserts that hazards are natural but in general disasters are not. He stressed that disasters should not be seen as the inevitable outcome of a hazard’s impact but the condition of the people at the time of impact makes it possible for a hazard to become a disaster. In other words, the vulnerability of people makes a hazard become a disaster. For a hazard to become a disaster, it must affect vulnerable people. This is to say that if a natural hazard like an earthquake occurs in a desert area where there are no inhabitants; there will be no disaster in the sense that no life or property would have been lost. It becomes a disaster when the hazard hit or affects a population that is not adequately prepared. Disasters happen when a natural phenomenon affects a population that is inadequately prepared and unable to recover without external assistance (Cannon et al, 2003; Cannon, 2008). According to the United Nations International Strategy for Disaster Risk Reduction (UNISDR), disaster is “a serious disruption of the functioning of a community or a society causing widespread human, material, economic,

or environmental losses which exceed the ability of the affected community or society to cope using its own resources'' (UNISDR, 2004:17).

On the causes, disasters were seen as acts of God with injuries, death, destructions and disruptions associated with such catastrophic events perceived as punishments that fulfilled the divine purpose of a supernatural being (McEntire, 2001:189). This conceptualisation of disaster is problematic as it ignores the natural processes that trigger catastrophic events as well as the conditions of people that expose people to disasters.

Understanding causes of disasters has since evolved from explanations emphasising natural causes to those linking causes to human actions that creates conditions that exposes people to hazards. Hitherto, disasters were equated with earthquakes, tornadoes, flooding and the likes (Cannon, 1994). This assertion created the impression that such disasters were caused by natural forces only with no link to the conditions that exposed people to such catastrophic events. According to Blaikie et al, (2014) one approach in explaining causes of disaster was naturalist in which all blame is apportioned to the violent forces of nature. This explanation is problematic in the sense that it decouples the causes of disasters from anthropogenic factors and lays the blame solely on natural processes. This natural hazard approach downplayed the role of humans in creating or contributing to all types of catastrophic events (O'keefe et al, 1976; Hewitt, 1983). It also results in ineffective, incompetent and counter-productive solutions to disaster crises. This is because once the problem is wrongly diagnosed, the solution that will be prescribed will equally be wrong. Diagnosing causes of disasters and arriving at natural factors as the only cause will result in solutions that will only be geared towards containing those natural factors identified to the neglect of the human conditions that exposes them to disasters.

Explanations have however, moved towards one that explores the societal construction of disasters (Bolin and Stanford, 1999; Quarantelli, 1998, Cannon, 2008). Disasters are essentially social happenings, created by the interplay of natural and social factors and processes (Blaikie et al, 1994, Burton et al, 1978, Hewitt 1983). It is therefore difficult to decouple the natural and the social aspects of the causes of disasters as Blaikie et al, (2014) stressed that the natural and the social cannot be separated from each other. Disasters are a complex mix of natural hazards and human conditions that exposes people to harm. The natural and physical agents that cause floods for instance cannot be stopped. It is rather the social aspects such as building adequate drainage

system, developing resistant buildings, quality and adequate source of livelihood, early warning signs, creating disaster awareness and preparation, that determine the extent to which a community or society is affected by floods.

According to McEntire (2000a), disasters are as a result of the deadly and destructive outcome of triggering agents. Triggering agents are natural forces that causes a hazard and as Cannon (2008) asserts, disasters may be triggered by natural hazards (such as wind, storms, or heavy rains) as well as factors he calls social (processes involving economic, political and social factors). These triggering agents are from natural forces such as wind, heavy rains, storms, but it is the conditions of humans that exposes them leading to a disaster. Therefore dwelling too much on natural forces without recourse to social factors misses the point and has the tendency of shifting attention away from social factors that exposes people to the natural forces that are rather essential in tackling disaster situations. A better approach is focusing attention on both natural and social forces that exposes people to hazards leading to a disaster. Even though according to McEntire, (2001) this approach may downplay the power of nature and physical causal agents, it rather brings to the fore the impact of social factors that makes people vulnerable before a natural hazard hit communities and makes their situation worse. It explains how societies create the conditions that make people face hazards differently.

Disasters come with many and varied impacts and affect communities differently due to contextual differentiation and the different levels of exposures. At the global level, economic losses were more than seven times greater between 1992 and 2002 than during the 1960s (van den Berg, 2010). According to the UNDP (2008), due to climate change, damages are likely to increase even more in the near future and the hardest hit will be the poor. This is because of their lack of resources to take protective measures and their inability to cope and recover from disasters. There have been about sixty million casualties during the 20<sup>th</sup> century due to ‘natural’ disasters with an annual human toll approximating 79,000 casualties on average in the 1990s and most of these cases happened in the developing countries (Mechler, 2004).

Other impacts includes a devastation to life and livelihoods caused by episodic, catastrophic floods that drown people and livestock, sweep away bridges, vehicles and buildings, and force survivors to abandon their homes (Few, 2003). The Indian Ocean Tsunami of December 26, 2004 had a human toll of about 230,000 fatalities and the total economic impact of at least

US\$10 billion which made this disaster one of the most destructive events in recent times (Birkman et al, 2010).

Below is a table showing some types of disasters and the number of casualties recorded in the past 2000 years.

**Table 1: Disasters resulting in over 100,000 deaths in the past 2000 years worldwide**

| Type     | Number of deaths (in millions) | No. of catastrophes (millions) |
|----------|--------------------------------|--------------------------------|
| Famine   | 75.0                           | 8                              |
| Diseases | 67.0                           | 9                              |
| Drought  | 9.0                            | 1                              |
| Floods   | 3.0                            | 1                              |
| Tsunami  | 0.3                            | 0                              |

Source: Haque and Etkin (2007)

There is also the psychological effect of disasters on people and especially on children that needs attention. For children, as well as adults, this typically takes the form of anxiety disorders, including Post Traumatic Stress Disorder (PTSD), panic and phobias, and also depression. Among the trauma-related factors, severity and proximity to the traumatic event (the degree of exposure) have emerged as critical variables (Udwin et al, 2000).

### **2.1.1 Positive Impacts of Disasters**

It is no doubt that disasters are characterised by negative connotations, however, there are some scholars who are also of the view that disasters should not be associated solely with negativity but that the larger picture should be clear for all to see. Even though disasters come with lots of damages, they present us with a perfect opportunity for development. There is a growing recognition that the social uproar that follows a disaster provides an opportunity to improve the living conditions of the poorest and most vulnerable members of the society (Pelling and Dill,

2010). Pelling (1999) also notes that there are some people who make financial gains from for instance damaging floods. Technicians and building engineers who work on reconstructing broken down structures make financial gains. Some evidence suggests that disasters are linked to and can provide a space in which significant change can take place in relation to and between socioeconomic, organisational, political and environmental domains (IRP, 2007; DHS, 2000; UNISDR, 2007; Wisner et al, 2004). In other words, disasters present a perfect space for communities to be built into resilient ones and for living conditions to be improved as a way of reducing peoples' vulnerabilities. One difficulty with this assertion is the fact that many of these disasters strike economically weak nations who cannot afford an immediate rebuilding and constantly requires external assistance. This optimistic stance therefore assumes that the economic requirement for improving living standards and building resilient communities are available to all disaster hit nations which might not be the case. Many of them thus resort to external assistance which may add to the mounting external debts of such economies.

The social cohesion in a community also creates an opportunity for it to become resilient. Social cohesion is about sticking together and building social relations and bonds that holds a group together. According to Rolfe (2006) social cohesion is best described as part of social capital in view of the social relations and connections that binds people together for mutual benefits. This cohesion can be crucial in saving lives and properties as community members work together to assist people out of danger.

## **2.2 Vulnerability as a concept for understanding disasters**

Vulnerability has become central for understanding what it is about the living condition of people that enables a hazard to become a disaster (Tapsell et al, 2010). Vulnerability is the exposure of a system to injury or damage. It is defined as being prone or susceptible to damage or injury. Blaikie et al, (2014), defines it as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It is shaped by a set of conditions and processes resulting from physical, socio-political, economic and environmental factors that increase peoples' susceptibility to the impacts of hazards (Ahrens and Rudolph, 2006).

Vulnerability is determined by the degree of risk, susceptibility, resistance and resilience (McEntire, 2000a, 2000b). Risk is the result of proximity or exposure to triggering agents, which increases the probability of disaster and the potential for human or material losses and susceptibility is the product of social, economic, political, and cultural forces and activities that determines the proneness of individuals and groups to being adversely affected by disaster (McEntire 2001, Buckle et al, 2000). The ability of a system or a community or an individual to scale through negative impacts of a disaster and bounce back in the face of adversity is known as resilience. Resilience stresses the ability of a system to deal with a hazard, absorbing the disturbance or adapting to it (Few, 2003). A community's resilience enables it to limit negative effects of disaster and is able to adapt in the face of adversity.

Many scholars differ in their definition of the concept of vulnerability with explanations centring on various aspects of the term. According to Cutter (1996:530), vulnerability means different things to different people. Definitions of vulnerability focus on risk and risk exposures on one hand and coping and adaptation mechanisms on the other. Adaptive capacity is seen as a key component of the concept of vulnerability (Adger, 2000). Adaptive capacity is the ability of a system to adjust to stresses, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (Brooks, 2003). These includes characteristics of communities that will enable them adjust to disasters and the damages and the extent to which they are able to cope with the impacts. These characteristics determine the extent to which people live in disaster prone areas with minimal or no injury to lives and properties after a disaster.

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

According to Twigg (2001), one of the models developed to give disaster practitioners a framework for understanding peoples' vulnerability is the Pressure and Release/Access Models by Blaikie et al, (1994). The basis of the Pressure and Release Model is the recognition that a disaster is the intersection of two opposing forces: the processes generating vulnerability on one side, and physical exposure to hazard on the other side. Increasing pressure can come from either

side, but to relieve the pressure, vulnerability has to be reduced (Twigg, 2001). The Access Model also sees livelihood strategies as the key to understanding the way people cope with hazards and involves the ability of an individual, family, group, class or community to use resources to secure a livelihood. Their access to resources is always based on social and economic relations.

Other definitions of vulnerability also centre on the susceptibility and impact of disasters on the livelihood of people. Adger (2000:739) for instance defines vulnerability as the presence or lack of ability to withstand shocks and stresses to livelihood. In this study however, the exposure model by cutter et al, (2003) is used to identify vulnerability factors. With this model, vulnerability is considered as social conditions that make people vulnerable to extreme natural events. These conditions are responsible for exposing people to harm and thus enable a natural hazard to become a disaster.

### **2.2.1 Social Vulnerability**

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

Social vulnerability includes a combination of factors that determine the degree to which someone's life, livelihood, property and other assets are put at risk by a discrete and identifiable event in nature and in society (Wisner et al, 2004). These factors are not natural but are social creation by humans that endanger the lives of individuals and create a system of inequality that places people in various locations. These emanates from social factors that place people in highly

exposed areas, affect the sensitivity of people to the exposure, and influence their capacity to respond and adapt (Yarnal, 2007).

According to Maskrey (1989) people live in vulnerable regions because they lack the basic knowledge about hazards or because of their inefficient decision-making and management structures in their society. However, this assertion is deplete and unable to explain how decisions of people are influenced by socio-economic constraints. Individuals may have no choice when market forces dictate locations low income groups should occupy which eventually is in vulnerable locations.

Cannon et al, (2003) contends that hazards impact on groups of people that are at different levels of preparedness, resilience, and with varying capacities for recovery. Vulnerability involves much more than the likelihood of people being injured or killed by a particular hazard, and includes the type of livelihoods people engage in, and the impact of different hazards on them. Cannon (1994:19) again argues that, vulnerability is a characteristic of individuals and groups of people who inhabit a given natural, social and economic space, within which they are differentiated according to their varying position in society into more or less vulnerable individuals and groups. Differences in socio-economic factors result in hazards having a different degree of impact.

Social vulnerability is influenced by the degree of preparedness of the individual or group which is a function of the protection available (Cannon, 1994). Most people in developing countries including Ghana are vulnerable in both their lack of preparedness and in their livelihood level and resilience. They are unable to provide self-protection for themselves and the State is unable to offer protection because they (the State) lack resources or are unwilling to offer relevant social protection for political expedience.

The causes of social vulnerability are often explained by the underlying social conditions that are often quite remote from the initiating hazard or disaster event (Cutter, 1996). Wisner (2000) provides an example of this critical social perspective in his discussion of the impact of Hurricane Mitch in Central America in 1998. He contends that the vulnerability of people in this region to flooding and landslides was caused by political and economic issues (e.g. land distribution and public expenditure cuts) as well as the nature of the storm event itself. Pelling

(1997) also shows that the neighbourhoods most vulnerable to flooding in Georgetown, Guyana, tended to be those with low household incomes, poor housing quality and low levels of community organisation.

Cutter et al (2003) contends that there is a general consensus within the social sciences about some of the major factors that influence social vulnerability. These include; the lack of access to resources, limited access to political power and representation, social capital including social networks and connections, beliefs and customs, building stock and age, frail and physically limited individuals, and the type and density of infrastructure and lifelines (Cutter, 2001a; Blaikie et al, 1994; Putnam, 2000). These are social conditions that make people vulnerable to disasters and they vary from region to region.

Social capital is a factor that influences social vulnerability and is also critical in understanding the vulnerability of people. According to Armah et al, (2010), social capital refers to connections within and between social networks as well as connections among individuals. Putnam (1993) went further to define social capital broadly as the features of social organizations, such as networks, norms, and trust that facilitate action and cooperation for mutual benefit. Such networks facilitate action and cooperation during and after a disaster and are useful for mitigating disasters and also helpful in building resilient communities. It also includes people's ability to have access to or contribute to various networks, and systems of mutual support in times of crisis and is an important factor in dealing with hazards (Cannon 2000). Social capital is beneficial in providing access to various resources in disaster situations, including information, aid, financial resources and can become a resource that can be utilized by disaster managers for mitigation purposes.

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

There have been attempts to explain why the poor and marginalized in society are always the ones at risk from disasters. According to Fordham (2003), poorer households tend to live in riskier areas in urban settlements, putting them at risk from flooding, disease and other chronic stresses. The most vulnerable are the low-income people, migrants, those living in flimsy houses, those without insurance or financial reserves, the elderly and the infirm (Few, 2003).

Burton et al, (1993) however argues that hazards are essentially mediated by institutional structures, and that increased economic activity does not necessarily reduce vulnerability to impacts of hazards in general. Decision-making processes that ignores the concerns and needs of society by making people passive actors rather than active, and prescribes wrong doses of treatment to developmental problems. Vulnerable people and places are often excluded from decision-making and from access to power and resources (Adger, 2006; 2003; Pelling, 2003).

However, Cannon (2008) also contends that some people are affected by disasters not because they have been exposed by exploitative processes but they are put at risk because they themselves decide to live in dangerous locations in view of the benefits they gain for their livelihood activities. There is a decision to live in a particular place and that choice is made on the basis of the benefit that decision brings to the individual in terms of the livelihood that is essential for their survival. He calls this “innocent” disasters in the sense that not all disasters can be blamed on class or political causation but then economic processes have led people to seek their livelihood in potentially dangerous location (Cannon, 2008). People are exposed to disasters not because they have been forced by social, economic, or political factors of exploitation but their livelihoods lead them to locate in dangerous places.

The focus should be on the social factors that make people vulnerable to disasters and not just on supporting victims. This study therefore focuses on the social vulnerability factors that lead to disasters. These factors according to Cutter (1996) are explained by the underlying social conditions that are often quite remote from the initiating hazard event. They include a combination of factors that determine the degree to which someone’s life, livelihood, property and other assets are put at risk by a discrete and identifiable event in nature and in society. These factors (social vulnerability factors) are used in this study to describe the conditions that combine and expose people to harm. In this formulation, it is the interaction of the hazard with these social vulnerability factors that produces an outcome (effect). And in this study, in terms of

effects, the focus is placed on social, economic, and psychological effects of the Twin-Disaster on the livelihood of survivors.

### **2.3 Disaster Management: Mitigation, Prevention and Risk Reduction**

Disaster management is an essential planning tool for reducing damages to properties and the loss of human lives in a disaster event. It is important in building resilient communities and in the process reduces the forces that make people vulnerable. According to Cutter et al, (2003), and Adam (2004), mitigation measures are geared towards lessening risks or reducing the negative impact of disasters. Reducing negative impacts of disasters means addressing issues and factors that makes people vulnerable and unable to cope with shocks and stress of disasters. Disaster risk reduction is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).

Many a time when disaster strikes, the immediate response has been to provide relief items to victims. This goes a long way to help them to partially recover but not fully. At the same time, other community members may migrate to other locations as a way of adapting to the situation. According to Cannon et al, (2003), the focus continues to support victims of disaster rather than build up preparedness, resistance and resilience through reductions in vulnerability. Often times, disaster relief and recovery fail to incorporate the need to support livelihoods and future resistance to hazards by reducing vulnerability as well as dealing with the community's immediate needs as a way of drastically reducing risk. The provision of disaster relief may subsidize risk taking and encourage dependence on others while response and recovery operations may ironically augment vulnerability (Mileti, 1999; McEntire, 2001). It is imperative that disaster management should not focus too much attention on response operations alone but should be able to address all aspects of vulnerability with all agents and actors on board. Kullig (2000) asserts that disaster risk reduction should focus on building resilient communities rather than merely responding to disasters.

One important resilient strategy to reduce risks to people and property is by providing early warning information and advice to households on how to respond to a particular disaster risk. This enables people to adequately prepare ahead of an impending disaster. Preparedness involves measures taken in anticipation of a disaster to ensure that appropriate and effective actions are put in place during a disaster. It also includes constructing effective risk messages on what to do before, during, and after a disaster. Providing such information should not be assumed that it will facilitate the adoption of preventive measures as people take it for granted that once the central authorities provide such information, they will equally take responsibility for managing both the hazard and their safety and in the process reducing the likelihood of them attending to risk messages and adopting recommendation (Paton and Johnston, 2001).

McEntire (1999b) believes that some approaches focus too much attention on mitigation and recovery at the expense of preparedness and response measures and activities. Pelling (1999) also suggests that it is the socio-political processes by which people are made vulnerable that are most relevant to mitigation strategies.

In order to address vulnerability to disasters, an understanding of the social context is required. According to Allen (2003), emphasis is moving away from disaster response to preparedness and mitigation, from service provision to the facilitation of community initiatives. One of such approaches is the Community Based Disaster Management (CBDM).

#### **2.4 Disaster Management: Community Based Disaster Management**

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

According to Singh (2010), making plans for locals to mobilise communities for preparing and protecting themselves and for increasing their capacities to cope with and recover from disasters without looking up for outside assistance. This makes the community self-reliant and prepared for response and recovery. For CBDM to be effective there has to be inclusiveness and participation of all the community members to be better informed on what to do when disaster strikes.

The local community is the primary focus of attention in disaster reduction since it is the unit immediately affected by disaster and is the first to respond directly. Through CBDM, people's capacity to respond to emergencies is increased by providing them with more access and control over resources and basic social services (Pandey and Okazaki, 2005). Through CBDM groups, communities that are vulnerable can be transformed to resilient communities that are well able to withstand as well as recover from stress and shocks brought about by disasters. According to Yodmani (2001), Community Based Disaster Management has received wide acceptance because it is considered that communities are the best judges of their own vulnerabilities and can make the best decisions regarding their well-being. The aim of CBDM is to reduce vulnerabilities of people and to strengthen their capacity to cope with hazards.

Hitherto most disaster responses were characterised by a top-down approach with logistics at the centre. This approach had some limitations inherent in them that resulted in a failure to meet vital needs and a general dissatisfaction over performance (Pandey and Okazaki, 2005). This means that the top-down approach failed to address local needs appropriately and even though communities were the ones faced with the negative consequences of disasters, they were not part of decision-making processes to address their concerns.

According to Victoria (2002), there was a call for a shift in perspective from emergency management framework to disaster risk reduction, one that highlighted the significant role of local communities. The top-down approach failed to address local needs, ignored the potential of indigenous resources and capacities, and may have increased people's vulnerabilities (Shaw, 2012; Victoria, 2002). The top-down approach did not also promote participation which is critical for sustainable disaster risk reduction. Alvarez (2006) is of the opinion that the participation of local people is important in designing and planning the process of flood risk management with respect to policy measures and called for the enhancement of indigenous

systems in disaster preparedness. Participation and the application of local knowledge can help to positively address local socio-economic concerns and can empower people with knowledge and skills to contribute to development initiatives.

Due to exposure and proximity to hazardous conditions, local people are the first to respond when disaster hit the community even before assistance come from outside forces. This is where indigenous knowledge is very useful in the sense that they have been living in the community for a long time and understands the local dynamics well enough than aid workers. Shaw (2009) described indigenous knowledge as a cumulative body of knowledge, know-how, practices, and representations maintained and developed by people with extended histories of interaction with the natural environment.

According to Pearce (2002), it is local level bottom-up policies that provide the impetus for the implementation of mitigation strategies and a successful disaster management process. Decentralisation of power and responsibility to provide basic development services from the national level (centre) to lower local government units is critical to CBDM. Decentralization includes the transfer of decision-making to lower levels of governments through the local units and most scholars have called it a switch from government to governance as a change in government process of how local communities are governed (Goss, 2001). This if well done, can enable grassroots participation at the community level together with government officials and expert groups. Singh (2010) asserts that, to organise a disaster resistant community, the principles and process of disaster mitigation must be integrated into local government institutions, community based organisations and NGOs. That is to decentralize the national disaster management plans for them to become more effective and efficient. CBDM is therefore a process that seeks to develop and implement a locally appropriate and owned strategy for disaster preparedness and risk reduction (Singh, 2010:5). Through Community Based Disaster Management approaches, the people's capacity to respond to emergencies is increased by providing them more access and control over resources and basic social services (Shaw, 2012).

Major benefits of CBDM includes building confidence, pride in being able to make a difference, individual and community ownership, commitment and concerted action in disaster mitigation, resource mobilisation, and a wide range of appropriate, innovative and do-able mitigation solutions, which are cost effective and sustainable (Victoria, 2002).

## **2.5 Disaster Management and Development**

Disaster has been described as a problem of development as El-Masari and Tipple (2002) asserts that disaster is a development problem resulting from poor decision-making on the part of policy makers. This indicates that due to development challenges and inaccurate decisions on the part of policy makers, disasters have gain a foothold and impacted negatively on development. The impact of disasters according to Carter et al, (2007), may result in an increase in poverty and deprivation of the affected areas.

There are other studies that also link disasters to the pursuit of economic development and this has to do with unfriendly or unsustainable use of natural resources for the goals of development. Cannon (1994:14) for instance argues that natural hazards can be exacerbated by the pursuit of economic and social goals which are seen as the objectives of economic growth. This mind-set paints a 'gloomy' picture of the impacts of development on the onset of disasters. Haque (2003) also asserts that development activities and programs themselves can aggravate in a subtle way the threat of disasters to people, jeopardize their livelihoods and degrade their societal and environmental resilience. This notwithstanding, disasters also have a negative impact on development as Benson and Clay (2003) argue that the long term impact of disasters on growth is negative. This demonstrates that disasters may stifle development goals and therefore the need to consider it in development planning.

It is therefore important that decision-making on economic development activities should be consistent with sustainable development goals-one that is not detrimental to the environment and does not expose people to environmental risks-in order that people's vulnerabilities to natural hazards are reduced. Building a petro-chemical plant for instance is a good development plan that will ensure that fuel is provided for vehicular movement and for household use. But citing such plants in a location where people reside certainly will pose a threat to people and increase the vulnerability of people to disaster.

However, there are others who also see a positive correlation between disasters and development. Skidmore and Toya (2002) have argued that natural disasters may have positive impact on growth in the long run as there is a reduction to returns on physical capital but an increase in human capital leading to higher growth. What they fail to account for is the fact that

States do not run on the same path of growth and due to contextual differences this situation cannot hold for all countries.

The relationship between economic development activities and disaster threats and their impacts are currently receiving much attention. Emphasis should shift to a more developmental approach to disaster management where mitigation measures and plans are incorporated into development goals of various nations with critical attention to community participation in the planning phase to implementation. Community Based Disaster Management is thus critical and should be part of the development agenda of disaster prone countries with the active participation of community members, government actors, NGOs and experts.

## 2.6 Disaster Management in Ghana

According to EM-DAT, (2014) report on natural hazards and disasters in Ghana, flood has been identified as the number two causes of death in Ghana. About 409 out of 3.9 million people affected by disasters have been killed between 1968 and 2014 as a result of flood events and the economic lost is estimated to be around US\$ 780,500,000 (Asumadu-Sarkodie et al., 2015). There have been several disasters in Ghana’s history but flooding is the most dominant and has now assumed a perennial status which keeps happening year after year.

**Table2: Disasters in Ghana from 1900 to 2014**

| Disaster   | Number of events | Number of people killed | Total number of people Affected | Damages US\$ |
|------------|------------------|-------------------------|---------------------------------|--------------|
| Drought    | 3                | -                       | 12,512,000                      | 100,000      |
| Flood      | 17               | 409                     | 3,884,990                       | 780,500,000  |
| Epidemic   | 19               | 875                     | 33,799                          | -            |
| Wildfire   | 1                | 4                       | 1500                            | -            |
| Earthquake | 1                | 17                      | -                               | -            |

Source: EM-DAT 2014 (Adapted from Asumadu-Sarkodie et al, 2015).

Records from the Ghana Red Cross Society in collaboration with United Nations office for Coordination of Humanitarian Affairs shows that the flood that occurred in June 2010 affected 33,602 people with almost 15,000 people living in temporary shelters as a result of displacement by the flood while 36 died (Oteng-Ababio, 2013).

The last two decades has seen many high profile disasters, including the May 09, 2001 stadium disaster in Accra in which 126 football fans died, the June flood in 2006 which resulted in 23 deaths and the incidence of commercial fires which have become a daily occurrence (NADMO 2011; Oteng-Ababio and Osman 2012; Oteng-Ababio, 2013). In June 2001 torrential rain caused widespread flooding in Ghana and particularly Accra, leaving 11 people dead and over 100,000 without homes (Ahadzie and Proverbs, 2010). Then in June 3, 2015, Ghana was hit by one of the deadliest disasters ever recorded in its history; the “Twin-Disaster” which claimed over one hundred and ninety lives with damages to properties. These catastrophes affect society and the economy significantly and have become a great concern for civil society as well as the government (UN-Habitat, 2011).

Accra, the capital city of Ghana has seen a constant increase in its population mainly due to consistent migration from rural areas and other peri-urban areas in search of improved living conditions including jobs. Most of these migrants as well as some of the natives live in slums that are characterized by poor construction, cramped spaces, deplorable sanitary conditions, and a lack of basic neighbourhood amenities. These people are often highly exposed to risk in all its forms from crime and violence to economic exploitation and environmental hazard (Arguello et al. 2012; Songsore, 2008).

Some of the causes of floods in Ghana can be linked to sea level rise as a result of climate change, throwing of garbage into water bodies as well as buildings along water ways (Bempah, 2011). Due to heavy rains, most rivers in the city such as the Odaw River overflow their banks and in the process submerge many roads and cause damage to lives and properties. Whenever it rains heavily in Accra, the main tunnel that stretches from Odorkor and finally passes under the Obetsebi-Lampitey Circle into the Korle Lagoon is heavily choked with garbage, mainly plastic waste (Karley, 2009).

The body mandated by law to be responsible for disaster management activities in Ghana is the National Disaster Management Organization (NADMO). According to Oteng-Ababio (2013), the drive towards disaster management began with the establishment of the National Disaster Relief Committee (NDRC) in the early 1980s whose main focus was to assist disaster victims with relief items. The operations of this committee was later transformed into NADMO, an organization which was established by an Act of Parliament, (Act 517 of 1996) to manage disasters and similar emergencies and rehabilitate persons affected by such disasters. Their main functions under the Act include:

- Prepare National, Regional and District Disaster Management Plans for preventing and mitigating the effects of disaster.
- Ensure the establishment of adequate facilities for technical training and institution of educational programs to provide public awareness, warning systems, and general preparedness for its staff and the general public.
- Coordinate local and international support for disaster or emergency relief services and reconstruction.

NADMO has a well laid structure and it is represented across the country in the various local assembly units in a decentralized manner. Disaster risk reduction is very central to disaster management and involves planning and acting in a manner geared towards reducing vulnerability and working to prevent hazards from taking the shape of a disaster. The National Disaster Management Organization of Ghana has such thinking with a vision to enhance the capacity of society to prevent and manage disasters and to improve the livelihood of the poor and vulnerable in rural communities through effective disaster management, social mobilization and employment generation. This is achieved by coordinating the resources of Government institutions and Non-Governmental Agencies and the Private Sector and developing the capacity of individuals and communities in the Prevention, Response and Recovery from disasters. (NADMO 2010:6).

Oteng-Ababio (2013) argues that despite these sound ideas, implementation is very challenging. This makes it difficult in helping reduce vulnerabilities of many residents especially in flood prone areas like Accra and reduces the task of NADMO to search and rescue as well as the distribution of relief items to survivors of disasters. Although such events at times assume

gargantuan proportions, they also at the same time provide some opportunities for the authorities to redevelop some downgraded and/or informal settlements (Vale and Campanella 2005). The Sodom and Gomorrah area in Accra is an example of an area that was full of slums and ghettos and was sitting on a water way. The evacuation of the residents and their properties there provided a rare opportunity for its redevelopment but was met with financial challenges.

On occasions where authorities embark on redevelopment after a disaster, the resultant high-value land property tends to be far and above the financial reach of those originally affected, forcing the poorer residents, who normally lack the political and social capital, to relocate. The redevelopment of the Makola Market in Accra after the 1992 fire outbreak is a case in point (Oteng-Ababio and Sarpong 2012). Such opportunities to redevelop are challenging since government expenditure is always very high with other sectors of the economy also demanding their share of the national cake.

## **2.7 Theoretical Framework**

According to Cannon (1994), hazards are natural and that it is the condition of the people that makes it possible for a hazard to become a disaster. These conditions are factors that make people vulnerable to catastrophic events. Vulnerability is a characteristic of individuals and groups of people who inhabit a given natural, social, and economic space within which they are differentiated according to varying position in the society into more or less vulnerable individuals and groups (Cannon 1994).

In this study, it is theorized that natural hazard will hit a vulnerable population who have been exposed by various vulnerability factors. These factors include socio-economic factors that have been considered here as social vulnerability factors that expose individuals and groups to varying degrees of disaster impact. These factors expose people to natural hazard leading to a disaster (Twin-Disaster). Disasters come with varying degrees of effect (can be positive or negative); these effects according to this study are categorized into social, economic, and psychological. These three categories of effects have a direct impact on the livelihood of the people and this has the potential of impacting on their vulnerability level for subsequent natural hazards. A negative social, economic, and psychological impact of the disaster on their livelihood may increase the

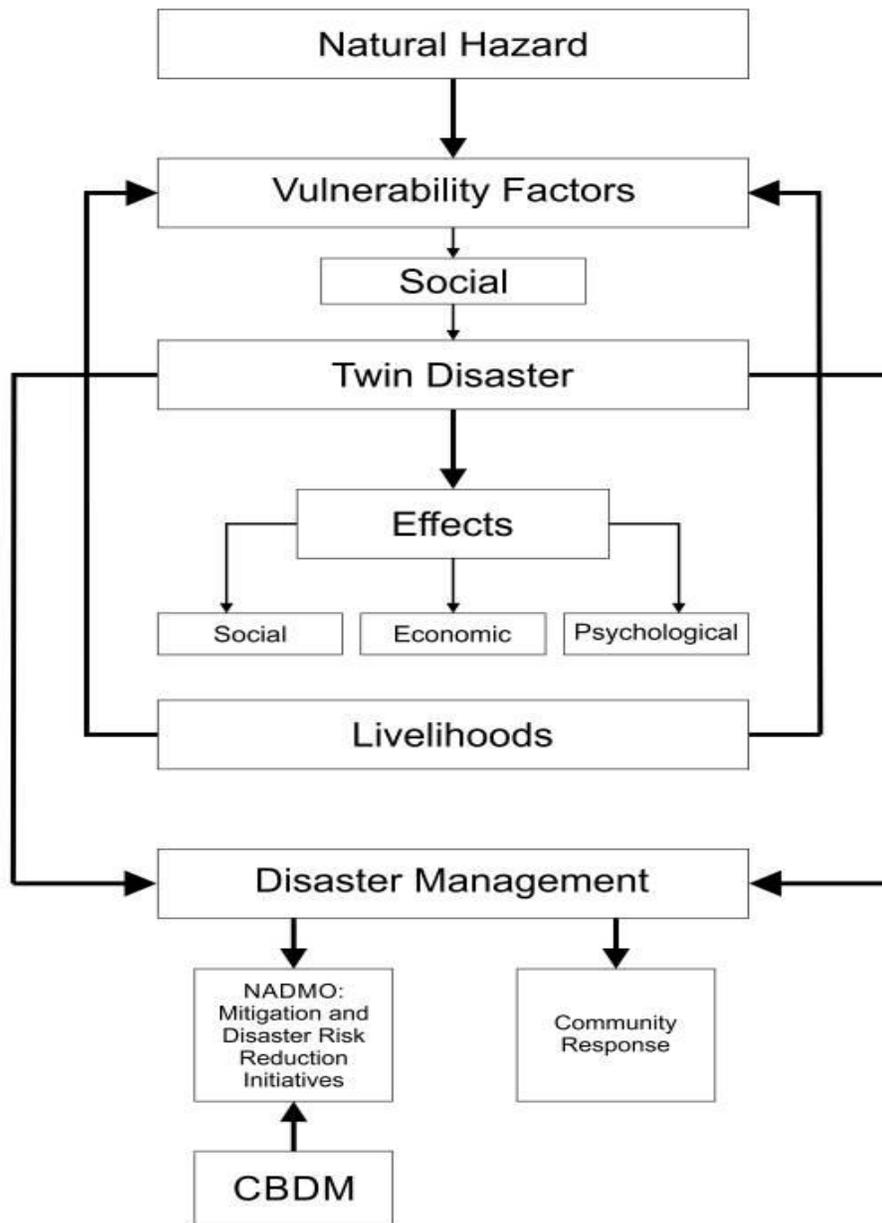
vulnerability factors that enable a hazard to become a disaster. Under the framework, Disaster Management is also considered in a bid to tackle the Twin-Disaster. NADMO's disaster mitigation and risk reduction initiatives are gauged against Community Based Disaster Management strategies as well as community response in disaster situations.

This study seeks to find out more about Disaster Management in view of the 'Twin-Disaster'. After the devastation of lives and properties by the Twin-Disaster, NADMO embarked on its mandate of disaster management. In view of this, the study seeks to find out the mitigation and risk reduction initiatives put in place by the National Disaster Management Organization (NADMO) and further try to find out the community's response to the Twin-Disaster. The study seek to find out the extent to which current disaster management strategies incorporate community based disaster management efforts in disaster risk reduction initiatives. Refer to figure 1 below for theoretical framework.

## **2.8 Summary of Literature Review**

This chapter reviewed relevant literature on causes of disaster, its effects and the concept of vulnerability. It also reviewed literature on disaster management while delving into concepts like mitigation, risk reduction, and community based disaster management. These are very relevant to this study as it deals with some of the known issues of concern under the study. Identified social vulnerability factors in this study will be useful to policy makers to formulate mitigation and risk reduction plans that will be geared towards addressing such factors and will also add to existing knowledge. Vulnerability has become an important concept for understanding disasters and knowing the factors that put people in risk of a disaster is an important step in fashioning solutions to mitigate negative impacts to lives and properties. Identified effects of disaster on livelihood will provide an understanding of the vulnerability of people to subsequent disasters and to aid policy formulation in providing assistance. The theoretical framework guiding this research was also discussed and that will form the basis for discussion and analysis of the results of the study.

**Figure 2: Theoretical Framework**



Source: Author's construct based on reviewed literature

## **CHAPTER THREE: Methodology**

### **3.0 Introduction**

According to Bryman (2012:45) a research method is simply a technique for collecting data. It is a general research strategy that outlines the various ways by which a research project is carried out. The choice of any research method should largely be appropriate to the research questions under consideration (Bryman, 2012). This means the choice of methodology is dependent on the type of research problem and the theoretical approach. The choice of research methods for this study is the qualitative research method and is discussed in the preceding sub-sections of this chapter.

### **3.1 Quantitative Methodology**

According to Tashakkori and Teddlie (2010), quantitative methods can simply be defined as the techniques that are connected with the gathering, analysing, interpreting, and presenting of results in numeric form. The data produced is displayed using mathematical and statistical techniques where the researcher relate the explanation of the numbers to the research questions been addressed. This method is seen to be scientific in that it is standardized so that it can easily be replicated.

Quantitative data can be analysed using both descriptive and inferential statistics. In this type of research methodology, samples are usually large, representative in order that the results can be generalized and also implies the testing of hypotheses which can then be verified or falsified (Fitzgerald and Howcroft, 1998:10). This research methodology has been associated traditionally with positivism and objectivism (Fitzgerald and Howcroft, 1998). In positivism the focus is on the observable, measurable, and the generalizable; that is, knowledge is arrived at through the gathering of facts that provide the basis for laws (Bryman, 2012). The emphasis is not on individual meanings even though individual characteristics are recorded but the general and collective meaning stemming out of inferences made from data presented in numerical forms. The results from this methodology are devoid of researchers' personal beliefs and values but generally scientific and so deemed to be objective.

In quantitative research methodology, data can be collected using tools such as questionnaires, structured observation, and structured interviewing. Quantitative method is credited with the advantage of capturing heterogeneity and variance by making it easy to collect information about great numbers of persons (Kelle, 2006). This is to make results representative and to aid generalization. It is however criticized for failing to distinguish people and social institutions from ‘the world of nature’ and that is to say it fails to recognize the fact that people interpret the world around them (Bryman, 2012:179). This relates particularly to the reliance on the application of ‘objective’ scientific methods which does not recognize the fact that people construct the world around them.

### **3.2 Qualitative Methodology**

Qualitative research methodology has been defined by Tashakkori and Teddlie (2010) as techniques associated with the gathering, analysis, interpretation, and the presentation of narrative information. This approach emphasizes words as opposed to numbers in quantitative methodology. It is an approach that is useful in studying problems that require deeper analysis and understanding of social phenomena. It is argued that human behaviour is subjective, complex, and sometimes contradictory and as such, the need to use methods that would allow to explore the emotions, meanings, intentions, and values that make up life world (Clifford et al., 2010).

The emphasis is on considering the meanings different people ascribe to their lives and the process which operate in particular social contexts. The approach is an epistemological one which is described as interpretivist by which the emphasis is on the understanding of the social world through the analysis of the interpretation of that world by its participants (Bryman, 2012:380). This method allows people to express themselves about their experiences by describing and explaining their lives in their own words. The result of this approach is not easily generalizable but provides an in-depth detail of what is studied. Qualitative methodology therefore generates richness and in depth information with great explanatory power (Holland and Campbell, 2005:5).

The tools used in collecting data under qualitative methodology includes, Interviewing, Participant observation, Focus group discussions, and qualitative analysis of text and documents. Qualitative methods in general have been criticized for being too subjective and containing very few units but many variables, which makes it difficult in making generalizations (Limb and Dwyer, 2001).

### **3.3 Choice of Methodology**

The most appropriate research methodology for any study is dependent upon the types of questions it seek to ask and the kind of information required (Clifford et al., 2010). In other words the kind of research questions posed determines the choice of method to adopt in conducting the study. A qualitative methodological approach is used in this study to find answers to the research questions posed. This is done to enable answers to research questions to be viewed through the eyes of the respondents in this study. The natural order of reality is seen and perceived differently by different people and groups (Silverman, 1993) and therefore the need for interpretive methods which can grant special attention to the knowledge and understanding of individuals and groups (Robinson, 1998). In arriving at the social factors that exposed people to flooding and for that matter, the Twin-Disaster, it was important that respondents were given an opportunity to express their views and share their experiences so as to appreciate what in their view represents the social vulnerability factors that expose them to flooding. It is also described as constructionist, implying that social phenomenon are the outcomes of interactions between individuals and not an entity out there which is separate from those involved from its construction (Bryman, 2012:380). In view of this, it was imperative to have interactions with respondents to enable them give detail information about the conditions they were living in and how they are able to adapt to dangerous conditions. This information requires a method that provides the platform for interactions and this makes qualitative method the right choice for this study. It is also referred to as a social interactionist approach where meanings are constructed out of interactions with respondents (Gatrell and Elliott, 2009:30). Such interactions provided meaning for why people still live in such environments despite the risks they face.

This methodology was critical to this study in view of the fact that it granted the opportunity to interact with respondents to allow them explain their experiences in their own words.

### **3.4 Research Design**

According Bryman (2012), a research design provides a framework for the collection and analysis of data and there are five of such research designs namely: Experimental, Cross-sectional, Longitudinal, Case study and Comparative designs. In this study a case study design is used to find answers to the research questions by allowing respondents within case study setting to air their views.

This research design affords the opportunity to do an intensive analysis of the issues at stake within the setting (Bryman, 2012:66). It provides an opportunity to interrogate and understand the behaviour and experiences of people within the area under study. A careful and intensive analysis of the June third twin disaster in 2015 at Kwame Nkrumah Circle and Adabraka communities in Accra will provide an insight into Ghana's disaster preparedness. A case study design was used in view of the fact that the Twin disaster occurred within a particular setting and this type of design afforded the chance to do a detail analysis of social vulnerability factors that led to the disaster. It also enabled the rest of the research questions to be answered from the lenses of the respondents who participated in the study. It helped in providing a detailed account of events in the setting.

### **3.5 Data Collection Instruments**

In this study there were various instruments that were deployed on the field to collect data for analysis. The instruments used in collecting data for this study includes interviews, Observation, as well as Text and documents analysis.

### **3.6 Interviews**

In this study, interview as a tool for collecting data under qualitative methodology, was used to illicit response from informants. Interviews have been described as ‘conversation with a purpose’ (Cloke et al., 2004). Their purpose is to give insight into people’s experiences with conversations varying from structured, semi-structured and unstructured formats (Silverman, 1993). This method enables respondents to be active subject, mediating and negotiating what is told to the interviewer in their own words. There are however two main types of interviews under qualitative research and these are unstructured and semi-structured interviews. In this study however, the latter is used to find answers to the research questions under study.

Semi-structured interview was used and it was guided by an interview guide where the researcher had a list of questions covering the various topics under study. This allowed for the free flow of conversation while ensuring that all relevant topics to the research were explored (Kitchin and Tate, 2013). The interview guide ensured that there was direction without deviation and it covered the subject matter of the research. This made the process very flexible as it allowed the researcher to gain responses from respondents while following up with relevant questions as a way of further probing responses to gain a deeper understanding of the issues as they related to topics under study. The interview session with officials of NADMO for instance provided the opportunity for detail response about mitigation measures they put out before and after the Twin Disaster. It also allowed other respondents an opportunity to share their experiences regarding the issue of flooding in Accra in their own words.

In all forty-two (42) respondents were interviewed in total and provided detailed information that helped provide answers to the research questions. All interviews were conducted in person by the researcher.

The views expressed by respondents were captured on a tape recorder. This was done to allow the free flow of the interview process without interference from the interviewer to write responses constantly in a book. There were also field notes taken by the interviewer that recorded the salient points of every interview. This did not cause any interference with the responses of the interviewee as they were not interrupted to allow the interviewer to write. The researcher took notes of the salient point in his field notebook as the responses were coming. These

responses were directly in sync with the research questions and were to serve as a summary of salient points covering the topics under study.

### **3.7 Tape Recording**

A tape recorder was used during interview sessions to capture all the conversations that took place during the data collection process. This enabled the researcher to fully focus on the interaction with respondents while concentrating attention on the responses provided in order to ask follow-up questions where necessary and to probe further on responses provided. This also enabled the researcher to pay more attention on how to conduct the interview without struggling to get all the words on paper which would have distracted the interview process. The interviewer is supposed to be highly alert to what is being said in order to also draw attention to any inconsistencies in the answers provided by interviewees (Bryman, 2012).

A tape also produces an accurate and detail record of issues discussed without missing a point while concentrating on conducting the interview (Flowerdew and Martin, 2013). Tape recording also helped in listening to the interview over and over again in order to identify and cross-check all the salient points and to identify any missing link between responses and research questions for remedial measures.

This strategy of using tape recorders to capture responses is however not liked by everybody and this can prevent people from speaking their true feelings about the study (Robinson, 1998). This can be due to the fact that some respondents perceive it as a means of surveillance (Gatrell and Elliott, 2009). Many people in Ghana do not like to be taped and this can be a source of disadvantage for the study. However, all respondents were briefed on the objectives of the study and told it was strictly for academic purposes and were assured of strict confidentiality and the fact that their responses were not going to be used for any surveillance purposes. All respondents were massively in agreement by consenting to the use of the tape recorder except one security entity that refused the researcher from using the tape recorder. Also because many of the interviews were conducted near the streets, there was noise in the recording which made it sometimes difficult to hear certain words clearly. This however did little to affect the study as the field notes served as a complimenting tool that helped identify the gaps.

### **3.8 Observation**

This method enables the researcher to immerse himself in a setting watching activities taking place in front of their eyes while recording their impressions in field notes, tallies, photographs and other forms of material evidence (Flowerdew and Martin, 2013).

In observation a researcher can be passive or active. Observation has a direct focus on the behaviour of people with the view of learning about the meaning behind their actions (Kitchin and Tate, 2013). In this study, the researcher did not participate actively in any activity but observed passively and took notice of building structures that were destroyed during the Twin disaster. He also observed damages that were done to vehicles and buildings. The researcher observed that there were inadequate refuse bins in the study area which made it easy for residents to dump solid waste in gutters. The observed facts were captured in the field notes. This method complimented the other data collecting techniques by reviling at first-hand the impact of the disaster on livelihood within the study area.

### **3.9 Text and Documents Analysis**

These were the other means of secondary data collection that was used to compliment the primary ones. Secondary data are important resources that provide guidance to researchers and are a vital source of reference for primary data collection (Flowerdew and Martin, 2013). Text and documents were sourced from books, articles, related thesis, internet sources and other relevant literature. These were critically examined to identify the themes that were relevant to the research questions for retrieval.

### **3.10 Sampling**

Sampling is one of the most important aspects in the research process. A sample is a subset of the population of interest to a research. In view of the fact that it is practically impossible to consider the entire population of interest owing to the constraints of time and cost resources, sampling becomes very critical (Bryman, 2012). There is the probability sampling and non-probability sampling and in this study the latter is used. The goal was to sample participants who

were very relevant to the research question of the study and this was the reason why this approach to sampling was adopted. Two types of non-probability sampling methods were used, namely purposive and snowball sampling.

Purposive sampling is a method of sampling where the respondents are selected in a strategic way so that those sampled are relevant to the research questions (Bryman, 2012). This method of sampling was used to sample participants from the National Disaster Management Organization (NADMO). NADMO is the organization set up by the government of Ghana to be in charge of disaster management and in view of their experience and the fact that they directly participated in the management of the Twin-Disaster; it was very crucial sampling them for this study. The NADMO officials were sampled from the national headquarters and the zonal office where the Twin-Disaster took place.

The Accra Metropolitan Assembly (AMA) was also critical to this study by virtue of the fact that they represent the local assembly responsible for the development of the whole of Accra including the study area. Officials from AMA were purposively selected from the main office and the sub-Metro office where the disaster occurred. The Ghana National Fire Service was also sampled purposively because they are experts in firefighting and partnered NADMO in managing the Twin-Disaster. Four NGOs were also sampled purposively because of their experience in disaster situations and purposely because of the role they played in the Twin-Disaster. Two of the sampled NGOs participated in the study but the other two were unable to participate.

Kwame Nkrumah Circle (also known as 'Circle') and Adabraka were purposively selected due to the fact that these were the areas where the twin disaster occurred and was very critical to the study. In view of this the respondents were selected from these areas for the study. Before the selection of respondents for the interviews, a reconnaissance survey was carried out by the researcher in the study area to take a look at the area in order to identify households in the study area that suffered the Twin-Disaster for sampling purposes and to also make some initial contacts.

Snowball sampling was also used in this study due to the fact that the initial group of respondents pointed out other residents who were affected and led the researcher in identifying

them for the study. Snowball sampling is a sampling technique where the researcher samples a small group of respondents relevant to the study and these participants propose other respondents who have had similar experiences or characteristics that is relevant to the research (Bryman, 2012:424). The initial contacts with the first household led me to discover other groups within the study area who also suffered from the disaster. This was helpful in the sense that some of the people were indifferent to the study owing to their expectation of being offered financial reward for participating making it difficult to reach them. It also helped broaden the scope for participants as many other respondents were easily identified.

With snowball sampling, it was easy reaching other participants proposed by the initial contacts for variation in views. It also made it easier for the researcher in establishing rapport with respondents and winning their trust and confidence because he was introduced to them by their own neighbour (Bryman, 2012).

After selecting the participants, interviews were arranged and scheduled at a time and place that was convenient to the participants.

**Table 3: Respondents to the study**

| Category  | sampled | No. that participated | Non participation |
|-----------|---------|-----------------------|-------------------|
| Survivors | 31      | 31                    | 0                 |
| NADMO     | 4       | 4                     | 0                 |
| AMA       | 4       | 4                     | 0                 |
| NGOs      | 4       | 2                     | 2                 |
| GNFS      | 1       | 1                     | 0                 |
| Total     | 44      | 42                    | 2                 |

Source: Author (Fieldwork, February 2017)

As indicated in table 3 above the total number of sampled participants was 44 out of which 42 participated. Two of the sampled participants were unable to respond to the study.

### **3.11 Data Analysis**

According to Bryman (2012) qualitative data that is collected is first transcribed and coded taking theoretical ideas as well as the main themes of the study into perspective. This was what guided the analysis and so after collecting the data I transcribed the interviews and coded them. The transcription and coding was to organise and give meaning to the data. After coding I put them into themes reflecting the research questions that were guiding the study. I considered the theoretical framework while putting the themes together. All the field notes I had whilst observing were also coded and placed in themes according to the research questions. I then considered the relationship between the themes and how they related to existing literature on the study to be able to do a meaningful analysis. In view of this the analysis of the findings incorporated existing literature on the topic under study.

### **3.12 Challenges Encountered in the Field**

There were a number of challenges that were encountered during data collection on the field which are discussed here.

The timing of the data collection exercise coincided with Ghana's general election and a subsequent change in government. In view of this many key informants in NADMO and AMA were not available for scheduling appointments. This was partly because of attacks by perceived supporters of the new government which had won the elections and the subsequent seizure of many State installations including NADMO. In view of this many workers in institutions like NADMO were not punctual at work and that made it difficult in scheduling interview with key informants.

Also after making contacts with survivors of the Twin-Disaster, it was very difficult making appointment with them in view of the fact that most of them were busy traders who had little time to spend. I wanted a good atmosphere where the interview could flow freely without any hindrance and their unavailability presented a challenge for me. We finally agreed to have the interview at the premises where they were trading.

The setting for the interviews with survivors of the disaster also presented another challenge. As stated above most of these participants were traders who trade on the street and in view of their unavailability, the only option left was to have the interview at their workplaces (on the street). This was challenging because the sites were full of noise and I had to sound loud to be heard and keep explaining questions over again for me to be heard clearly. This also affected the quality of the recordings as the noise level was high as a vehicle passes by.

Also some of the traders at the time of the interview had no one to handle their wares for them to free them in order to take part in the study. In view of this they kept interrupting the interview session to go and attend to customers and return for the session to continue. We had to keep pausing the interview session any time a customer showed up. This might have affected some of the responses given as they might be hurrying their responses for me to finish and depart so they attend to their customers. I had that view in mind so most of the other survivors who had time with me in their home setting in a relax atmosphere where the interview was held in a serene atmosphere corroborated many of the responses given by the survivors whom I engaged on the streets. So even though the effect was minimal on the entire study it took much of the time and affected other interviews scheduled for that same day. I had to keep rescheduling other appointments while attending to others to ensure I capture all the survivors of the disaster sampled.

Almost all survivors sampled for interviews were unable to communicate in English language but the researcher was able to communicate in the 'Twi' language which they spoke but there was a challenge of translating certain words in Twi language. Words like 'exposed', 'risk', and 'social structure' were difficult to translate and therefore I had to keep describing these words in the Twi language for it to be understood which took a lot of time out of the interview.

It was also difficult to sample some of the survivors to participate in the study. This was due to the fact that they claimed too many people keep coming there to ask them questions about the disaster but they do not see any improvement in the flood situation there and therefore see no reasons why they should keep responding to many more questions. I had to keep explaining the purpose of the study and the interview to them that it was purely an academic exercise that will aid me complete my masters' study. Those who had these views on hearing the objective of the study still demanded monetary incentives before participating. It was very depressing in the

beginning since I did not have enough monetary resources at my disposal but I had to part with some money to gain access to some of them. This has the tendency of raising ethical issues where giving money out could mean inducing or coercing respondents to participate. It was rather not the researcher's intention to induce respondents to participate. As the only way of gaining entry in a study that had a limited time to conduct, I had to give out such monetary incentive to gain access. Interestingly, once I got the access they led me to other survivors who gladly took part in the study without demanding any monetary reward. It was equally challenging getting some of the survivors to sign consent forms. Most of them could not read and write in English language and anything that had to be signed, they said they were very careful. I took time to explain the content of the consent forms to them to understand well before agreeing to append their signatures on.

Another challenge on the field was the inability to sample the views of UNDP and the Catholic Relief Agency. These were NGOs who were equally relevant to the study but after sending a request letter to conduct the study with them, responses was not forthcoming from them. Even after several reminders no date was fixed and time was not on my side to keep waiting. This however did little to affect the study as other NGOs like the Red Cross Society of Ghana who participated in the management of the Twin-Disaster, agreed to participate.

It was also difficult to access the report by the government committee that came out with a white paper on the Twin-Disaster. This was because according to the Ghana National Fire Service, the report was very sensitive and there were certain names that needed not to be disclosed. In view of this it was not to be handed to the public for now until there is the legal right to release it. However, I was able to get the report from NADMO which formed the basis for the committee's report which was relevant for the study.

One of the difficult moments in the interview sessions was my inability to control my emotions with one of the survivors who had lost the father, mother, and a sister in the disaster. She was responding to a question of how she felt after the disaster. She re-countered the incident and how she lost her family and in the process she started weeping. I felt very bad and embarrassed thinking I had reminded her of that sad event and I felt sorry asking that question even though it was an important question for the study meant to gauge the psychological effect of the disaster

on her. This affected the subsequent interviews and because it was a necessary question I had to re-adjust it to make it the very last in the interview schedule.

Even though I sought permission before taping interviews, I was refused the use of tapping when I got to the Ghana National Fire Service (G.N.F.S). According to them, because it is a security entity they do not allow researchers to use tapes on their premises. This was a bit challenging as I had to write with an unusual speed while asking and listening to responses at the same time.

### **3.13 Ethical Issues**

One of the most critical issues of concern in research is the ethical considerations and how the researcher goes about it. This can be said to be the standards and principles that govern the conduct of research. Diener and Crandall (1978) discuss ethical issues and categorized them under four main areas. These areas include harm to participants, invasion of privacy, informed consent, and whether there is deception.

Issues regarding harm to participants mean researchers need to be careful and ensure that their research does not inflict any harm on participants. According to Bryman (2012), the issue of harm to participants has to do with how researchers maintain the confidentiality of records. This means the identities and records of participants should be handled with confidentiality. The findings should also not reveal the identities of the participants as this can be harmful to them. Following closely is the issue of the right to privacy which empowers participants with the right to their privacy. This means that respondents to a study have the right to withdraw from the study and can refuse to answer any question they consider as inappropriate (Bryman, 2012:136).

It is argued that there are more ethical difficulties in maintaining confidentiality and privacy of informants engaged in the research when it comes to qualitative methods than in quantitative methods (Cloke et.al, 2004). In this study before the commencement of any interview, I explained the objective of the study to the participant to ensure that he or she understands what they are doing. I assured them that they were going to remain anonymous in the study and their responses and records were going to be treated with strict confidentiality. In doing so the names and responses in this study has not been attributed to any of the respondents and the names cited

in this study are not the real names of respondents. This is because of the importance of the issues of confidentiality and anonymity in research ethics (Clifford et al, 2010). Some questions during the interview were quite personal and emotional and some respondents were in tears when responding. As suggested by Bempah (2011:44), counselling was given and the interview session was discontinued.

With regards to the issue of informed consent, potential respondents should be given much information about the study and the role to be played by participants so as to make an informed decision about participating or withdrawing from the study. According to Bryman (2012), the advantage of this is that it gives respondents the opportunity to be fully informed of the nature of the study and the implications of their participation from the start. In all the organizations I visited I presented an introduction letter from the institution I was coming from (University of Agder) and explained the objectives of the study to participants. I presented this letter to other participants as well and for those who could not read, I explained the letter and objectives of the research to them. I made them understand that participation in the study was voluntary and that they could withdraw at any time. With the understanding of participants with regards to the objectives of the study, I sought their consent by taking them through the consent form for them to sign it.

Permission was sought from individual informants and the objective of the subject under study was well explained and ample time given to them to prepare their minds well. I also made sure I explained to them that all information they provided to me was going to be treated with confidence. I assured them that they were going to remain anonymous. This is because of the importance of the issues of confidentiality and anonymity in research ethics (Clifford et al, 2010). I knew how difficult it is in Ghana for people to be taped during interviews so I had to explain very well the intention of taping the conversation to make the interview process smooth and fast to allow uninterrupted responses during interviews. For every interview I had, there was consent sought for the use of tape recorder and I only use it when permission is given me.

Another ethical principle is that of deception which occurs when research is presented by researchers as something other than what it sought to be (Bryman, 2012). I explain the objective of this study to all participants that it was a study that will add to the body of knowledge and not one that will bring any monetary benefit to anyone and also that I am not working with any relief

organization or government agency but that it was purely an academic exercise. In the course of this study, one of the respondents in one of the organizations wanted me to use the study to solicit support for their organization. That would have been deception and a breach of ethical principles if I had agreed to do that just to get the interview I wanted. I explained the objective of the study and alerted the respondent that I was only a student doing field work for my final thesis work.

Ethical consideration is thus very crucial in research as it ensures the credibility and quality of study if adhered to by researchers. All the above ethical issues were strictly abided with to ensure quality and credibility of findings.

## **CHAPTER FOUR: Presentation of Findings**

### **4.0 Introduction**

This chapter presents the findings of the study. The findings are based on empirical evidence gathered in the field from forty-two (42) respondents who were interviewed. They include key informants from National Disaster Management Organisation (NADMO), Accra Metropolitan Assembly (AMA), Ghana National Fire Service (GNFS), Ghana Red Cross Society and Africa 2000 Network, Ghana. Other respondents were survivors of the Twin-Disaster who also took part in the study. ‘Survivors’ as a term is used here to include individuals as well as victims who were affected by the Twin-Disaster. The discussion of the findings takes into consideration related issues raised in the literature review.

This chapter begins with a presentation of the demographic characteristics of the survivors who took part in the study. Tables are used to aid the presentation of the demographic characteristics which includes; age of survivors, sex, education, marital status, and occupation of survivors.

The findings are then discussed and presented in relation to the research questions guiding the study as well as the theoretical framework. This chapter has been divided into sections and sub-section to aid the organisation of the information presented.

The research questions guiding the study stated earlier are;

1. What social vulnerability factors contributed to the June 3<sup>rd</sup> Twin Disaster in Accra?
2. What were the social, economic, and psychological effect of the June 3<sup>rd</sup> Twin Disaster on the livelihood of the survivors?
3. What was the immediate response of survivors during and after the June 3<sup>rd</sup> Twin Disaster in Accra?
4. What mitigation and disaster risk reduction initiatives were developed by NADMO during the June 3<sup>rd</sup> Twin Disaster in Accra?
5. To what extent does the current disaster management strategy incorporate community based efforts in disaster risk reduction in Accra?

## **4.1 Demographic Characteristics of Respondents**

This section presents the demographic characteristics of survivors of the Twin-Disaster and this is critical in order to reveal the category and the status of people who participated in the study. The demographic characteristics include; age, sex, education, marital status, and occupation.

### **4.1.1 Survivors**

In all, a total of thirty one (31) survivors took part in the study from Kwame Nkrumah Circle (Circle) and Adabraka communities. Out of the total, nine (9) were from Adabraka community while the remaining twenty two (22) were from Circle. It must be emphasised that there was no special sampling method used for selecting this group of respondents apart from the snowball sampling that revealed the survivors and gave the researcher entry. The disparity in sampling in the two communities was due to the fact that at the time of visit at the Adabraka community, many of the residents were not present.

### **4.1.2 Survivors: Age**

From the findings, the majority of survivors of the Twin-Disaster who took part in the study were between the ages of 18 to 31 years. This happens to be the economically active age group in this Metropolis. The age distribution of the population in the two communities according to the Population and Housing Census in 2010 shows that it peaked at the age group of 20-24 years and between 25-29 years which represents 12.4% and 11.5% of the age groups respectively (Ghana Statistical Service, 2014). This is almost the same from the findings as can be seen in table 4. This age group is also mostly engaged in trading activities and many of them were affected by the disaster. From the findings, the age group with the least survivors who took part in the study were in 46-52 years.

**Table 4: Survivors: Age**

| Tally | Frequency | Percentage |
|-------|-----------|------------|
| 18-24 | 14        | 45.2       |
| 25-31 | 11        | 35.5       |
| 32-38 | 3         | 9.7        |
| 39-45 | 2         | 6.4        |
| 46-52 | 1         | 3.2        |
| Total | 31        | 100        |

Source: Author (fieldwork, February, 2017)

#### **4.1.3 Survivors: Sex**

From table 5 a total of 58.1% female and 41.9% male survivors took part in the study. According to the population census of the area in 2010, there were a total of 1,665,086 people in this Metropolis consisting of 51.9% females and 48.1% males. So clearly from the census, females form the majority of the population here. From the findings, more females took part in the study than males. This may be attributed to the snowball sampling where the researcher was introduced to survivors of the disaster who happened to be mostly females. It also reflects the sex composition of the area which is dominated by females.

**Table 5: Survivors: Sex**

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male   | 13        | 41.9       |
| Female | 18        | 58.1       |
| Total  | 31        | 100        |

Source: Author (fieldwork, February, 2017)

#### 4.1.4 Survivors: Education

Assessing the level of education of respondents was necessary to understand their interpretation of events around them pertaining to the study most especially about the Twin-Disaster. From table 6, 12.9% of the survivors had no education but the rest of 87.1% had some form of education from the primary to the tertiary level. According to the District Analytical Report of the Population and Housing Census in 2010 by the Ghana Statistical Service (2014), 89% of the population in the Accra Metropolitan Assembly (AMA) are literate and 11% are non-literate. The educational background of respondents in this study can be said to reflect the dynamics in the aforementioned report. The highest educational attainment of respondents from the findings is at the primary school level. The literacy of the respondents was critical in understanding how survivors perceived social vulnerability factors. Many of the survivors found it difficult to read and write in English language and this is understandable due to their level of education. They however showed a high level of understanding of social vulnerability issues and flood adaptation strategies.

**Table 6: Survivors: Education**

| Level of education | Frequency | Percentage |
|--------------------|-----------|------------|
| No education       | 4         | 12.9       |
| Primary            | 15        | 48.4       |
| Junior high school | 7         | 22.6       |
| Senior high school | 3         | 9.6        |
| Tertiary           | 2         | 6.5        |
| Total              | 31        | 100        |

Source: Author (fieldwork, February, 2017)

#### 4.1.5 Survivors: Marital Status

According to Ghana Statistical Service (2014), marriage may be defined as a social institution which establishes the legitimacy of children and it serves as a means for procreation, mutual support and companionship. Marriage in Ghana is based on legal contractual relations between a

man and a woman. From the national population census in 2010, the highest number of people in this Metropolis that were never married was 49% while 36% were married. From table 7 below, 29% of survivors were married while 64.5% were not married but single.

**Table 7: Survivors: Marital Status**

| Status   | Frequency | Percentage |
|----------|-----------|------------|
| Single   | 20        | 64.5       |
| Married  | 9         | 29         |
| Divorced | 0         | 0          |
| Widow    | 2         | 6.5        |
| Total    | 31        | 100        |

Source: Author (fieldwork, February, 2017)

#### **4.1.6 Survivors: Occupation**

One of the objectives of the study was to examine the effects of the disaster on the livelihood of the survivors and in view of that, it was necessary to examine the occupation of the survivors. According to the Ghana Statistical Service (2014), occupation refers to the type of work a person is engaged in or a person's principal or usual work or business especially as a means of earning a living. In this study table 8 displays the occupation types that the survivors were engaged in before the disaster and for which they still engage in. In the exception of one survivor who was a student, all respondents who were survivors of the disaster engaged in an occupation. The highest occupation from the findings that survivors were engaged in was trade/sales. This category had as much as 74.2% of survivors who took part in the study engaged in it. According to the Ghana Statistical Service (2014), in this metropolis (AMA), 70.1% of the population from 15 years and older were economically active while 29.9% were inactive and 93% of the economically active population were employed. From the census, majority of the population (38.5%) were engaged in service and sales work. This also reflects the findings on the ground where majority of survivors sampled engaged in trade/sales related activities.

**Table 8: Survivors: Occupation**

| Occupation   | Frequency | Percentage |
|--------------|-----------|------------|
| Receptionist | 1         | 3.2        |
| Trade/Sales  | 23        | 74.2       |
| Shoemaker    | 1         | 3.2        |
| Driver       | 3         | 9.7        |
| Caterer      | 2         | 6.5        |
| Student      | 1         | 3.2        |
| Total        | 31        | 100        |

Source: Author (fieldwork, February, 2017)

#### **4.2 Social Vulnerability Factors that led to the Twin-Disaster**

According to the respondents in the study, the June 3<sup>rd</sup> 2015 Twin-Disaster was caused by flood and fire and thus the name “Twin-Disaster”. This section will present the identified social vulnerability factors from the findings that contributed to the disaster. These factors made people vulnerable and exposed them to harm in the Twin-Disaster.

There were various social vulnerability factors that led to the twin-disaster and in this study these factors are discussed as social factors that exposed people to harm leading to what is now called the ‘Twin-Disaster’. Social vulnerability factors are explained by the underlying social conditions that are often quite remote from the initiating hazard event (Cutter, 1996). It includes a combination of factors that determine the degree to which someone’s life, livelihood, property and other assets are put at risk by a discrete and identifiable event in nature and in society (Wisner et al, 2004) and in this study, that discrete and identifiable event in nature was the rainfall that resulted in the flooding associated by the fire.

Cutter (2003) identifies an exposure model which is described as the identification of conditions that make people vulnerable to extreme natural events. These conditions expose people and social groups to harm from a natural event and according to the findings, the identified social vulnerability factors that made people vulnerable to the disaster were;

- Poor drainage system
- Poor solid waste disposal
- Attitude of people toward flood
- Lack of disaster awareness and preparation
- Building along water ways
- Increase in population
- Poverty
- Citing of GOIL filling station

#### **4.2.1 Poor drainage system**

Poor drainage was identified as one of the vulnerability factors that exposed people to flooding in Kwame Nkrumah Circle and Adabraka. According to the Executive Director of the Africa 2000 Network, Ghana (an environmental NGO), one of the major factors that exposed people to harm during the flood was the poor drainage system in Kwame Nkrumah Circle and Adabraka. He explained that excess water resulting from domestic sources and rainfall is carried by gutters and empties into the Odaw River but these gutters are choked by silt and debris. As a result the free flow of excess water is impeded and prevented from flowing and result in flooding. He stressed that it was the government's responsibility to desilt the Odaw channel of all debris and to enable the free flow of water.

The Chief Disaster Control Officer of NADMO said there were factors that led to the disaster and one of such factors had to do with the drainage network in the area. He explained that there exist an underground drainage system for the Kwame Nkrumah Circle and Adabraka communities with nostrils (figure 3 shows one of the nostrils), that allow gases to escape to prevent explosion. "Unfortunately, this underground drainage is choked with silt and other debris thus preventing it from carrying much water as it should. In view of this situation the excess water from the underground drainage sips out through the nostrils and overflow on the surface of the ground leading to flooding. Many of the drains that carry water into the streams and empty into the sea have been silted by human activities" (Personal interview: 19.01.17). Explaining further, he said the main river that receives all the excess water from all the drains and gutters in the study area is called the Odaw River but this river is full of silt and debris. In

view of this all excess water coming from the drains and gutters sometimes recede because the banks of this River overflow. This is one of the major reasons why there is always flooding at the least rainfall in the study area. He suggested that if the authorities will desilt all the drains, there will be the free flow of water to prevent flooding. This suggests that the authorities' inability to desilt the drains to enable the free flow of excess water also contributed to the poor drainage network.

One of the survivors of the disaster was also of the view that the gutters in Adabraka were inadequate and excess water always struggle to find passage. "Where there are gutters they are poorly constructed such that they are so small and easily overflow when it rains resulting in floods" (Personal interview: 10.01.17).

According to the Disaster Management Co-ordinator of the Ghana Red Cross Society, the gutters there were too narrow and shallow. He said; "the gutters are too small and unfortunately choked by silt and filth" (Personal interview: 15.02.17). The Sub-Metro co-ordinator of NADMO for Circle and Adabraka corroborated the drainage problem. He stated that one of the factors responsible for flooding in both communities was the choked gutters which always prevented the free flow of water through the gutters into the big drains.

The poor drainage system in the area according to the findings was one of the factors that made people vulnerable to the Twin-Disaster by exposing them to harm. The drainage system was supposed to enable the smooth passage of water as well as to aid its free flowing through the drains and gutters into the river but the drains are choked and prevents excess water from flowing freely. This condition permits the inundation of water when it rains leading to flooding. According to the findings, the poor drainage system here is attributable to poor disposal of solid waste. The next section delves into that aspect of the findings.

**Figure 3 Showing nostril of an underground drainage system which releases gas from beneath**



Photo: Author (Fieldwork, February 2017)

#### **4.2.2 Poor solid waste disposal**

The Disaster Management Co-ordinator of the Ghana Red Cross Society indicated that poor solid waste disposal was a factor that resulted in floods in the area. According to him residents illegally dispose of solid waste into gutters and drains. A 52 year old trader in an interview said; “many people throw their refuse into the gutters at night and this end up choking the gutters thus preventing the free flow of water when there is a downpour” (Personal interview: 17.01.17). Explaining why some residents engaged in illegal disposal of solid waste, she went on to state that it was partly because those in charge of collecting solid waste from the household do not do the collection regularly. A situation that leaves many households in Circle with uncollected solid waste which can cause illness and people then decide to dispose them illegally into gutters and drains to prevent illness. The Sub-Metro Co-ordinator of NADMO for Circle and Adabraka indicated that a research they carried out concerning why gutters got choked resulting in floods,

showed that people threw waste materials in gutters and this prevented the free flow of water leading to flooding in both communities. He said; “many people gather solid waste materials in rubbers and throw them in gutters when the rains start falling with the view that the rain will wash the solid waste materials away but it rather goes to block the drains” (Personal interview: 26.01.17).

A survivor who is also a trader stated that there are very few refuse bins in the community and this is equally a reason why people throw waste products like rubbers and other refuse into gutters. In my observation I realized the same thing that there were few and sometimes no refuse bins around especially in Adabraka community to throw refuse materials like sachet bags and other snack packs away after eating. This accounted for why people threw solid waste materials into gutters which goes a long way to block the gutters and prevent the free flow of water. The result is the inability of the gutters to carry excess water away leading to flooding.

In Buipe and Nawuni communities in Ghana, a similar finding was made by Bempah (2011), where she found out that illegal disposal of solid waste such as throwing garbage into water bodies contributed to flooding.

#### **4.2.3 Attitude of people toward floods**

The Sub-Metro Co-ordinator of NADMO for Circle and Adabraka iterated that the attitude of residents here to floods is very appalling as they always ignore early warning signals and safety precautions from NADMO. One of the survivors of the disaster in Adabraka said; “it always flood here at the least rain but nothing damaging happens to us, so we only park our wares and go to our neighbours who live in high rise buildings and return after the flooding” (Personal interview:18.01.17).

Another survivor said they were used to the flooding situation there and they are aware that it would flood any time it rained. She said; “I only have to park some valuable goods into my neighbours’ rooms and climb up till the rain subside then come down to clean up” (Personal interview: 24.01.17). She said this was troubling in view of the fact that it affected her trading activities and rendered her homeless for a while but she had no other means than this. This is an

indication that they may have been adapting to the flood situation here because it does not come with major damaging effect to them and this explains their attitude. They became vulnerable because they may have been used to ignoring the warning signals in view of the fact that the floods that came previously had no major damaging effect on them so they may have taken things for granted. This attitude according to the findings was responsible for exposing them to the Twin-Disaster and the harm that came with it. This may be attributable to the lack of disaster awareness and preparation as discussed below.

#### **4.2.4 Lack of disaster awareness and preparation**

According to the Disaster Management Co-ordinator of the Ghana Red Cross Society, many people are not aware of the impacts of disasters and so do not plan for it. He stated that, “people take things for granted and do not even recognize the importance of a weather forecast to be able to plan with it” (Personal interview: 15.02.17). He further stated that many people were not educated on disaster preparation thus their inability to plan with weather forecast information which informs their inability to prepare for the disaster resulting in the high casualty rates. Stating his views on the subject, the Sub-Metro Co-ordinator of NADMO said, “residents ignored basic safety rules and regulations given out to them before the rains” (Personal interview: 26.01.17). He said there were early warning signals to them on radio that the rains were going to fall but they ignored all these warnings.

A 35 year old trader said, “most of the times when they give us this forecast that it will rain, it turns out that the rains do not even come and in view of this we do not take it with any seriousness” (Personal interview: 13.01.17). This situation may be one of the reasons why they ignored the early warning signals because once a particular warning fail, people might assume that the next warning may equally fail and their ability to trust these warnings may wane.

Another 24 year old trader stated that many of his friends who lost their lives had closed for the day but returned to save their wares from damage when they realized it was flooding. He said; “Instead of saving their lives they were rather hoping to prevent their wares from damage” (Personal interview: 20.01.17). If they had the basic safety education on disaster to the effect that one needs to save his/her life first in such situations, they might be alive. This was an indication

that many people may not have had education on disaster awareness and preparation in order to save their lives when disaster strikes.

On his part the Chief Disaster Control Officer of NADMO stated that “many people treat early warning messages with disdain and end up ignoring them which eventually lead to the high casualty rates” (Personal interview: 19.01.17). He attributed this to the fact that they as disaster managers do not do what he termed as “impact forecasting” which tells the possible impacts of the forecast been reported at any particular time on the people. He went on to say that “weather forecast only informs the public about the weather patterns without telling them the possible impacts it might have on them and their properties” (Personal interview: 19.01.17). These resulted in the lack of disaster awareness and preparation and became a factor that exposed people to harm during the Twin-Disaster. Another factor that exposed people was the putting up of buildings along water ways. This is presented next.

#### **4.2.5 Building along water ways**

A 52 year old trader who has been living in the Kwame Nkrumah Circle community for 30 years stated that the area used to be a marshy area where cows normally come to graze and many other farmlands located there but was later sold to people who came to build houses and settled there. According to the Chief Disaster Control Officer of NADMO, many communities in Accra including Circle and Adabraka were floodplains that were later built up. He stated that, “these built up communities have not followed any scientific planning and the result is that many of the structures including buildings have been put along water ways” (Personal interview: 19.01.17). This has prevented excess water from following its natural route of passage into streams and finally into the sea. He blamed the city authorities for not enforcing the code of standards for building. There are building codes that instruct people on how and where to put up structures in the Accra city. As to how this situation can be corrected, he had this to say; “My brother, for me all the structures that are cited on water ways should be demolished so that henceforth, authorities from AMA as a matter of urgency must up their game by regular monitoring because their current monitoring is very weak” (Personal interview: 19.01.17).

An official from AMA also said; “Previous governments failed to enforce building codes and this encouraged other illegal structures to develop in Kwame Nkrumah Circle and Adabraka communities and most of these illegal structures such as kiosks, containers, and buildings are sitting on water ways which blocks the passage of excess water into the drains” (Personal interview: 13.04.17). This situation is part of the factors that leads to flooding in these communities.

The Disaster Management Co-ordinator of the Ghana Red Cross Society on his part stated that, “the Kwame Nkrumah Circle and Adabraka communities are not properly planned and many people just build anywhere and anyhow without obtaining the right building permit. It has led to many people putting up structures on water ways and thereby preventing the free flow of water into the drains which results in flooding” (Personal interview: 15.02.17). The Sub-Metro Co-ordinator also stated that Adabraka and Circle are build up areas and consist of mostly squatters that are lying on water ways that prevents excess water from rainfall from free flowing. This situation results in flooding whenever it rains and leaves many properties lost. Many of these structures also come without building permits and have been left without any punitive measure which is why many other unauthorized structures keep springing by the day. These gives credence to the fact that local authorities who should enforce the building codes and rules fail on their part and thus the springing up of unauthorised structures on water ways. An official of AMA noted that most of these unauthorized structures were constructed at very odd times (usually deep in the night when everyone is asleep and during holidays when inspectors are not working), and this makes it impossible to stop them because at such times inspectors are unavailable. She was also of the view that most of these illegal structures are found in Circle than in Adabraka. According to the AMA official, this situation can be linked to the increase in population leading to the development of slums and squatters that are illegally cited (Personal interview: 13.04.17).).

Similar findings were made by Oteng-Ababio (2012, 2013) who found that many urban poor live in housing structures that has been constructed ignoring building standards and codes. Bempah (2011) also found that building along water ways contributed to flooding in Buipe and Nawuni communities. Such housing structures are cited on water ways that prevents the free flow of

excess water from rainfall thereby contributing to the constant flooding. The next section discusses the findings on population increase as a vulnerability factor.

#### **4.2.6 Increase in population**

The Executive Director of the Africa 2000 Network, Ghana was of the view that due to movement of people from rural areas into urban areas for greener pastures, the population of Accra has seen a surge and the result is that people decide to locate in dangerous areas that are less expensive to make ends meet. One trader in Circle said, “I came here from Kumasi to trade but as time went by I decided to live here since it is closer to my place of trade” (Personal interview: 25.01.17). According to the 2010 population and housing census, the population of Accra has reached 1,848,614 (Ghana Statistical Service, 2010).

According to A.M.A many people move from other communities in Accra to this community to trade but end up staying here with friends and family. He said “they begin to raise families as time goes on and their children become vulnerable to floods when they happen. Other people who come to stay with friends after some time put up illegal structures (containers and kiosks) to sell and as time goes on, they start using such structures as places of residence” (Personal interview: 13.04.17). From another official of AMA, many of such structures are put on water ways and end up obstructing the smooth flow of water which is a factor that causes floods in this area (Personal interview: 13.04.17). According to the findings, many people are unable to afford living in safer places in view of the fact that those places tend to be expensive for which many cannot pay. Their inability to locate in safer environments is connected to poverty which is the basis for the next section.

#### **4.2.7 Poverty**

A 45 year old trader stated that many people because of poverty could not afford the services of solid waste companies and that is why they dispose their solid waste illegally. According to one of the field officials of NADMO, it is very cheap to live in this community because of the low rents and high flood risk. “Because of the flood risk many others do not like to settle here but once the rent is low other poor people prefer to live here and ignore the risk factor”. He further stated that many landlords rent out their space very cheap for people to put containers and kiosks

on them which eventually become the sleeping place for them after work. He said, “our investigation also reveals that poverty is one of the reasons behind the illegal disposal of solid waste materials in gutters and other drains” (Personal interview: 27.01.17). Solid waste services are provided on a house-to-house basis and payment are made monthly by households. These services are stopped once a household fails to pay the service charge when it is due.

The Executive Director of the Africa 2000 Network, Ghana also indicated that “the poor background of the people living here (referring to the study area) leads them to seek shelter in poor locations without adequate facilities due to the low cost of these areas and this exposes them to harm during any disaster. These people live on subsistence with their low incomes from their jobs not enabling them relocate to other good and risk-free areas” (Personal interview: 08.02.17). According to Fordham (2003), poorer households tend to live in riskier areas in urban settlements, putting them at risk from flooding and other disasters. Their low income status makes it difficult to afford the means of living in risk-free areas which tend to be more expensive.

A trader who lives in Adabraka but trades in Circle stated that they were aware that the area is a flood prone area but had no means of relocating to other risk-free areas due to their high rent charges. “I have been planning to leave this place and rent in Lapaz (Lapaz is another community) but the rent is too high for me to afford so for now I am still here until I get some money before I can relocate. The trading is not giving me enough money and this affects my ability to relocate. I really want to relocate and I am saving money and at the right time I will move” (Personal interview: 21.01.17). This is consistent with the assertion expressed by Ahmed and Ahmed, (1999) that most low-income residents of developing countries do not have a realistic option of moving elsewhere during flooding and this is attributable to their low-income status. The next section presents the citing of a fuel filling station that made people vulnerable.

#### **4.2.8 Citing of GOIL filling station**

One of the major factors that led to the recording of the high fatality rates in this disaster was the fire that accompanied the floods. According to the Chief Disaster Control Officer of NADMO, the fire that started during the flood was the number one factor that made people more

vulnerable. He stated that, “no one expected the fire that started and so nobody prepared for it. We have never seen a thing like this before in our history. When there is flooding, people are able to swim and sometimes hang on till we come and rescue them but this time the fire changed the dynamics” (Personal interview: 19.01.17). He further explained that it was the result of the siting of the GOIL filling station that made people more vulnerable to the disaster. One of the residents who is a receptionist in one of the hotels that was devastated by the disaster said, “the siting of the GOIL filling station caused the fire that made many people die because we have been experiencing many floods in this area but we never record such huge number of deaths” (personal interview: 27.01.17). He stated that when floods come, they only have to relocate to the top floor of the hotel and after the rain stops they clean up and continue with normal business.

All the respondents were unanimous that the fire was as a result of the GOIL filling station that was cited at the Kwame Nkrumah Circle. According to the a 24 year old male trader, they started feeling the scent of fuel after the flood had engulfed the place they were selling their wares and perceived it to be coming from the GOIL filling station because that was the fuel filling station around them (Personal interview: 12.01.17). The Sub-Metro Co-ordinator of NADMO said, “there was a leakage from the underground storage tank of GOIL that contained fuel and when it came into contact with the flood waters it suspended on the water, spread to other parts of the community and was just waiting for a spark. As the fire started from the market side, it traced back the source of the fuel to the leaking tank at the GOIL filling station and burnt everything on its way (Personal interview:26.01.17).

Personnel from the Ghana National Fire Service in an interview stated that; “the fire was sparked by someone who was smoking cigarette and threw the live cigarette butt into the flood water after smoking, not knowing that fuel was suspending in the flood water. The underground tank that was containing the fuel was faulty and when the fuel came into contact with the water it suspended. On that day the temperature was conducive for combustion and so it was easy for the fire from the piece of cigarette to ignite flames. As the fire traced the source of the fuel to the underground tank at the GOIL filling station, it burnt everything on its way and in view of that majority of the people who died were those located in the Kwame Nkrumah Circle community around the GOIL filling station” (Personal interview: 10.02.17). He debunked assertions that the

fire was started by a thunder storm and the resulting lightening. Thus the citing of the GOIL filling station in a residential area exposed many people to harm as can be seen in the picture below (figure 4).

It was observed that the GOIL filling station is located near the Ghana Commercial Bank which is in the Circle community and as a result, the fire was only confined to the Circle community and that was why it was mainly that community that recorded many deaths and property losses.

**Figure 4: A picture of the burnt GOIL filling station with burnt vehicles**



Photo: Author (Adapted from News Ghana)

From the discussion above it is clear that the social vulnerability factors from the findings exposed many people to the floods and the citing of the filling station enabled the fire to start leading to the disaster that affected many people. From the ongoing discussion it can be pointed

out that these factors are connected and acted together in exposing people to harm. From the findings it was not only the flood that led to the high casualties but the combination of floods and fire resulted in the disaster and the subsequent harm to people. The same way, the social vulnerability factors from the findings also did not expose the people in isolation but the combination of these social vulnerability factors exposed residents of Kwame Nkrumah Circle and Adabraka to the Twin-Disaster.

In this Disaster came various effects on the people and their livelihoods which form the basis for discussion in the next section.

### **4.3 Social, Economic, and Psychological Effects of the Twin-Disaster on Livelihood of survivors**

The Twin-Disaster on June 3<sup>rd</sup> 2015 came with varied effects on residents and their livelihoods. The effects of the Twin-Disaster in this study were identified as social, economic, and psychological effects of the disaster on the livelihood of the people.

#### **4.3.1 Social Effects**

There were six (6) social effects as a result of the disaster that were identified in this study which are listed and discussed below.

- Loss of lives
- Displaced people
- Injuries to people
- Damages to infrastructure
- Relocation of the GOIL filling station
- Lessons for development

**Table 9: Report on the disaster by the Ghana Red Cross Society**

**Report by the Ghana Red Cross Society on the Disaster**

In June 3, 2015, the Greater Accra region of Ghana experienced flooding due to torrential rains which led to the widespread destruction to property and livelihoods, caused the displacement of people from their homes, and 200 deaths. According to rapid assessment figures (Ghana Red Cross Society (GRCS), up to 46,370 people were affected and 187 houses had been partially or totally destroyed as a result of the disaster.

Date: 30<sup>th</sup> June, 2016

Source: Author (Adapted from Ghana Red Cross Society, 2016)

**4.3.1.1 Loss of lives**

According to an 18 year old female student who was a survivor of the disaster, she was living with her parents and family when the disaster struck that faithful day and lost her relatives. She said, “I have lost my mum and sister to the disaster” (Personal interview: 23.01.17). She was living in a storey building close to the GOIL filling station in Circle. A 24 year old trader also stated that he lost six friends to the disaster. He stated that, “I was saved by God and I do not know how I got saved but I lost six of my friends. We used to work together selling carpets and sharing ideas and most of them were people who supported their families” (Personal interview: 30.01.17). They lived in Circle and that was the centre around where the fire engulfed. This certainly might have effects on the families of these dead people as their livelihoods are completely gone and their death may bring hardship to their families. These two interviewees were living in Circle where majority of the people died.

There are varied figures regarding the total death toll. According to a report by NADMO, there were a total of 152 lives that were lost to the disaster (see table 10 for NADMO report) but according to figures from the Ghana Red Cross Society who were also present on the ground to assist, the death toll was 200 (see table 9 for report). According to the Disaster Management Co-ordinator of the Ghana Red Cross Society, they took their time before coming out with their

report and as at the time NADMO was compiling its report many more bodies were still being discovered in different locations while others on admission also lost their lives which was not factored into the NADMO report but was part of their report. According to him, “there might be more than 200 as many more bodies would have been carried away by the flood water into different locations as well as into the sea”(Personal interview: 15.02.17).

As indicated earlier on in this discussion many of the people who died happen to be those who were located in the Circle community as that was the region of the fire and the area where the filling station was located.

**Table 10: Report by NADMO on the disaster on 3<sup>rd</sup> June, 2015**

**Report by NADMO on the investigation into June 3<sup>rd</sup> Water and Fire Disaster at the GOIL filling station at Kwame Nkrumah Circle**

On the 3<sup>rd</sup> June, 2015 around 9:45 pm, there occurred a devastating flooding and fire outbreak at the GOIL filling station which is next to the Ghana Commercial Bank at the Kwame Nkrumah Circle in Accra. The GOIL filling station and some buildings in the vicinity were completely burnt and several items worth millions of cedis were also burnt to ashes. About 152 people died and some sustained various degrees of burns with a total number of 197 patients recorded.

Date :2015

Source: Author (adapted from NADMO 2015)

**Figure 5 shows a picture of destroyed properties and burnt bodies**



Photo: Author (Adapted from Pulse Ghana)

#### **4.3.1.2 Displaced People**

According to the Sub-Metro Co-ordinator of NADMO many people have become homeless as a result of the disaster that demolished their buildings and the structures they were sleeping in. He stated that many others were displaced by the disaster. According to an 18 year old lady, their family lost their entire storey building (as can be seen in figure 6 below) to the disaster and are now living with friends now. Another female trader had this to say, “for now I have no permanent place to lay my head after this disaster; I move from friends to friends and I am planning to renovate my old place so I can move back in since that is the only place I have”

(Personal interview: 28.01.17). Another male trader said he was sleeping in the streets for almost one year having lost all his trading goods until a friend asked him to settle in with him for some time. He said this situation affected his livelihood as he struggled to get capital to get back into trading at the same time he was thinking of how to get a place of shelter (Personal interview: 28.01.17). The report from the Ghana Red Cross Society has it that 187 houses were affected by the disaster and 46,370 people were affected in various ways (refer to table 9 above for report). Many of the displaced people were found in the Kwame Nkrumah Circle community where most of the damage occurred.

#### **4.3.1.3 Injuries to people**

According to the Chief Disaster Control Officer of NADMO, many people sustained various degrees of injuries and were sent to the hospitals for treatment. According to the report by NADMO (see table 10 above) 197 people were sent to various hospitals for treatment. An 18 year old student who was a victim stated that, “I was on admission and was told I went into a coma for three weeks at the same time my mother and sister were also on admission in a different hospital” (Personal interview: 23.01.17). She stated that she had burns on her body due to how the fire caught her when she was trying to escape from it. Another caterer said, she had burns all over her body and nearly lost her life but for the timely intervention of NADMO who sent her to hospital, she would have lost her life. According to her, her health situation coupled with the loss of her goods and properties prevented her from participating in active work until she recovered fully and started depending on friends and family for assistance to get back into business. This health situation might have prevented many others from taking active part in economic activities including work and this might have impacted negatively on their livelihood.

#### **4.3.1.4 Damages to infrastructure**

A 41 year old driver said the road was rendered impassable as it was soaked in flood waters and prevented vehicular movement. He said, “even the gutters were destroyed by the disaster but were later re-constructed just this year” (Personal interview: 10.01.17). According to the A.M.A some schools were closed down because they were destroyed by the disaster and this affected the

educational calendar of some of the schools. Some of the students who could not wait for the reconstruction of the schools had to seek admission elsewhere. “the market at Odawna was very much affected and washed away with many of the structures destroyed” (Personal interview: 13.04.17). According to the Sub-Metro Co-ordinator of NADMO, the GOIL fuel filling station was burnt beyond recognition and has since not been reconstructed. He said, “the filling station is gone due to the fire. The streets and roads were washed away by the floods and prevented many traders from trading activities” (Personal interview: 26.01.17).

#### **4.3.1.5 Relocation of the GOIL filling station**

According to the Chief Disaster Control Officer of NADMO the citing of the GOIL filling station in an area like that left the residents here very vulnerable as many were calling for it to be relocated to a different place (Personal interview: 19.01.17). The Disaster Management Co-ordinator of the Ghana Red Cross Society also shared the same view that the fuel filling station was a high risk factor and wondered why it was cited there in the first place. One survivor of the disaster had this to say; “this GOIL filling station was the cost of the many deaths in this disaster and this is why we had been calling on the authorities to relocate this filling station from here but our attempt had fallen on death ears but now we are very happy it has been burnt beyond recognition and we learnt the authorities have decided to relocate it somewhere else” (Personal interview: 03.02.17). To him and others, this was a positive development to them and one that takes future risk of fire away. According to Skidmore and Toya (2002) disasters can have a positive impact on development and in this relocation of the GOIL filling station; we see that planners of the city of Accra having realized the mistake of citing development projects like the filling station in a wrong place have decided to relocate it elsewhere. This according to the disaster survivors is a positive development for them. This finding goes a long way to reaffirm Skidmore and Toya (2002) stand that disasters do not only come with negative consequences but can also have a positive effect on development.

#### **4.3.1.6 Lessons for development**

One other positive impact of the Twin-Disaster is the fact that it has become a ‘wakeup’ call for policy-makers and residents to become aware of the need to plan for disaster of any kind. A receptionist at a hotel that was affected by the disaster said management now take weather forecast into consideration when planning. According to the Chief Disaster Control Officer of NADMO, they as an organization have taken a lot of lessons from the disaster which will be useful for any possible future occurrence. He said, ‘‘hitherto when I am planning for a disaster such as flooding, I do not plan it with other disasters in mind but since this twin-disaster, I have learnt to plan disasters with a wide range of options now. I now have a different perspective to disaster management as a result of the lessons learnt from the twin-disaster’’ (Personal interview: 19.01.17). On the early warning signals, he said he has identified the need to do ‘‘impact forecasting’’ that will enable people understand the potential impact of a weather forecast so as to prepare in time for any eventuality.

According to him (Chief Disaster Control Officer of NADMO) they have put in place a special taskforce in every community identified as a flashpoint for flood. The role of the taskforce is to monitor flood situations in these flashpoints during rainy seasons and give feedback. These feedbacks provide the basis for action. He said, ‘‘we will no longer wait for disaster to happen before we go to give reliefs but we are now in the communities with taskforce teams monitoring the situation’’ (Personal interview:19.01.17). These lessons learnt from this disaster may go a long way to help develop a positive attitude towards disaster awareness and preparation as past attitudes towards floods has been very lackadaisical.

#### **4.3.2 Economic Effects**

The Twin-Disaster came with economic effects and according to the findings the following were the economic impacts the disaster brought;

- Effect on economic activities
- Loss of properties
- Loan repayment

#### **4.3.2.1 Effects on economic activities**

According to a trader who sells on the streets, economic activities were brought to a halt for many weeks after the disaster. According to the Sub-Metro Co-ordinator of NADMO, Kwame Nkrumah Circle is a commercial area where people from different communities either come to work there or come to trade. There are also lorry terminals there so workers who close from work access the place and this makes the place an active commercial centre. He stated that, “commercial activities were discontinued as a result of the disaster and this had effect on the livelihood of many traders and commercial vehicles who could not trade or pick passengers respectively because the place was cordoned off and nobody was allowed to come near” (Personal interview: 26.01.17).

A 25 year old female trader said that she was not able to send money to her mother and siblings in Kumasi for about three months after the disaster because she could not find a place that was commercially busy to trade as compared to the Kwame Nkrumah Circle. She said, “after the disaster I lost so many goods I was trading with and as I came back to start again, I could not get a good place to trade”. “All the places I went to initially were not busy as compared to Circle and my profits started declining which affected me as I was unable to remit my family back in Kumasi and so I am now back here again because it is busy and profitable here” (Personal interview: 09.02.17). According to Cannon (2008), some people are affected by disasters not because they have been exposed by exploitative processes but they are put at risk because they themselves decide to live in dangerous locations in view of the benefits they gain for their livelihood activities. Clearly from this 25 year old trader’s position, she is still back to the same vulnerable area to trade because it is a busy and profitable area. So even though she now knows how dangerous this place is in terms of flooding, she still wants to be there to make a living. According to her all the locations she went to after the disaster were not busy places thus her decision to come back to this same dangerous location. In her case, any flooding disaster that will hit that place may be described by what Cannon (2008), calls “innocent” disasters in reference to the fact that no exploitative means would have made her vulnerable but she herself would have exposed herself to harm since it was her decision to live in a dangerous location because of what she gets from there (her livelihood) now that she now knows.

Another trader who trades in carpet said, “I lost all the carpets I was selling and was in a serious debt situation with no money to even pay the school fees of my daughter as I was unemployed for a long time before my friends came to my aid” (Personal interview: 09.02.17). This is an indication that many livelihoods were affected negatively by the Twin-Disaster.

#### **4.3.2.2 Loss of properties**

The Chief Disaster Control Officer of NADMO mentioned that the disaster led to the loss of properties and goods worth millions of Ghana cedis that were burnt to ashes. Also the Ghana Red Cross Society estimates that a total of 187 houses were destroyed. A 32 year old trader said, “I lost all my wares running into thousands of Ghana cedis and I did not know where to start from” (Personal interview: 10.02.17). Another 52 year old business woman also said she lost all her ovens, fridges, 4 cartoons of margarine, 5 bags of flour, 3 Televisions, and many cylinders. She also said, “my entire house got burnt to ashes and I currently reside with a friend while I come to work here” (Personal interview: 17.01.17). They were both residents in Circle where the damage was more.

Another lady who lived with two other friends in a kiosk who were all traders said, “I lived in a kiosk with two friends and we lost all our wares including the kiosk we were living in and unfortunately too, one of our friends died during the disaster adding more burden to us” (Personal interview: 04.02.17). The burden she was referring to was the fact that apart from trying to start all over again (regarding her trade), they had to also try and help their deceased friend’s family with money every month. This brought an additional burden to her and her livelihood.

A 29 year old driver on his part lamented how he lost his taxi to the disaster after parking it at the premises of the GOIL filling station. Narrating his loss, he said, “I had come to the filling station to buy fuel when it was still raining but after buying it my car failed to start so I had to leave it there to go look for a mechanic to come and fix it for me only for the flood to prevent me from going back to work on it” (Personal interview: 04.02.17). According to him the result was the fire that came and the entire vehicle was burnt beyond repairs. Figure 4 shows some of the burnt

vehicles at the filling station on the day of the disaster. He stated that his only source of livelihood was gone.

**Figure 6: shows two storey buildings devastated by the Twin-Disaster**



Photo: Author (Fieldwork, February 2017)

#### **4.3.2.3 Loan repayment**

A 25 year old trader who was yet to finish paying off a loan from his bankers had an additional burden as a result of the disaster. He said this;

“I had taken a loan from the bank to start this business since it was booming but I had the shock of my life when the disaster came and swept everything I had laboured for. “As we speak now I have not finished paying the first loan but when my bankers heard what happened to us here, they advised me to come for another loan top-up which I did and that is the reason why you see me here again”(Personal interview: 06.02.17). This adds to his debt burden he has to go through.

### **4.3.3 Psychological Effect**

According to the findings, there were psychological effect resulting from the Twin-Disaster and the factor that was identified as a result of the disaster is;

- Trauma of victims

#### **4.3.3.1 Trauma of victims**

An 18 year old victim still cannot come to terms with the sad event that happened as she said she always feel depressed any time she remembers that episode. “I feel so traumatized any time it comes to mind and I am always depressed because I try to take the memory away but up till now it will simply not go away” (Personal interview: 23.01.17). From my observation I saw how difficult it was for her as she sobbed in tears while making her views known to me. According to a 27 year old survivor of the disaster who lost five of his friends, he feels depressed any time he remembers that day. He said, “I feel very bad any time I remember that incident as though I did not do enough to save my friends. I tried to save some of them but the power of the water was driving me along with my friends so I had to let go of their hands to survive” (Personal interview: 21.01.17). As he let go of their hands, he was able to swim to safety as he was the only one who could swim. These thoughts make him feel very bad about himself any time the tragedy comes to his mind.

Another victim, a 34 year old taxi driver who had burns all over his face said he was living with the stigma which is affecting his personal life and that makes him feel very bad all the time. He said, “because of this burns on my face many people who see me driving this taxi are not willing to use my taxi and do not even want to come close to me. Even my friends are refusing to draw close to me and this gives me a lot of depression” (Personal interview: 06.02.17). He said this stigmatization is having effect on his life and his job just because of the burns on his face. With two children to take care of, his situation according to him has affected his job as many passengers in view of his current situation are refusing to use his taxi and he is unable to raise enough money to pay the fees of his children. His livelihood, according to him, is under threats.

#### **4.4 Response of the survivors during and after the Twin-Disaster**

According to Few (2003), people facing flood or disaster risk may take action to prevent or reduce any negative effects through various actions. They respond in order to survive the negative consequences of such disasters and to recover from such events. When the twin disaster struck, the people in the communities were first to respond before any outside help came. There were responses by members of the communities during the disaster and after the event. During the disaster the responses of survivors to the event includes;

- Evacuation of goods and properties
- Taking shelter in high rise buildings and under canopies
- Distress calls for assistance
- Working with NADMO and other agencies to save lives

##### **4.4.1 Evacuation of goods and properties**

A study by Shitangsu and Routray (2010) found that people try to rescue their properties when flood waters rises and these properties are moved to safer places. A similar finding was made in this study where many of the residents reacted to the disaster by evacuating their goods and properties. According to a 26 year old female trader resident at Adabraka, when the rain started falling she did not expect any massive flood but when she realized it was flooding she had to start packing her wares to her container. She said; “we all started packing our goods to our normal places we keep them thinking they might be safe” (Personal interview: 09.02.17). According to a 45 year old vendor, he and his workers started packing the fridges and raw materials they have been using for their yoghurt business as they saw the water level rising. “We packed our goods and raw materials in a safe place but the rising water level kept us busy as we had to ask our neighbours for help to send some of our goods to their dwelling places in the storey building for safe keeping” (Personal interview: 11.02.17). According to him they have a good relationship with their neighbours and so it was not difficult getting a place to keep their goods. In both communities, the residents resorted to evacuating their goods and properties and moved them to safe places. The findings reveal that in both Circle and Adabraka, residents resorted to the evacuation of their goods and properties to safer places when it started flooding.

#### **4.4.2 Taking shelter**

Other community members also responded to the disaster by taking shelter on high rise building. A 32 year old woman in Circle iterated that she was used to the flooding situation in this community and always take shelter in high rise building with few other friends. She said “I climbed a storey building to take shelter there while the flood waters recede because that is what I always do anytime it is raining here. Many others also tried to take shelter on other high rise building because of the level of flood water” (Personal interview: 10.01.17). As the case study below indicates many others took shelter in storey buildings as a way of adapting to the flood situation. This clearly is an indication that they had good relationship with members of the community that enabled them to take shelter.

According to the receptionist in the hotel located in the Circle community, many people came there to take shelter but the numbers were becoming too much so they had to let go of other people who came around for the same purpose. Another 25 year old ice cream seller said, “we all tried to take shelter at the canopy near the GOIL filling station while others also went to the pharmacy in front of the storey building” (Personal interview: 18.01.17). According to the account of an 18 year old student, many people who had closed from work and were going home (they were not residents in this community) took refuge at the canopy in front of the GOIL filling station and in front of their drug store. They were all waiting for the rain to subside before going home (Personal interview: 23.01.17).

From the findings, it was a constant practice in the two communities that they took shelter in high rise buildings during flooding times and it was not surprising they were used to this response to the situation.

## Case study 1

My name is Kwame and I am 27 years old and live in Kwame Nkrumah Circle. I am educated and left school after completing Junior High School. I am a trader with no wife and never been married before. In this community, whenever it rains there is always flooding. This is because most of the gutters here are chocked and excess water from the rain which is supposed to flow freely through the gutters are unable to move and flood the entire community. These gutters are chocked because some people in this community throw refuse into the gutters at odd times when no one is watching. Especially when it is raining most people from various households even some from my house leave their solid waste materials in the flowing water. It seems they do not know it goes to block the water from flowing freely but I know it does. I think this situation should be blamed on the providers of solid waste services. They fail to come on time and sometimes up to two weeks they do not show up to collect the waste and this makes the waste materials smell very badly which can lead to illness. So because of the bad stench from the waste materials, you have to find somewhere to dump it to prevent the bad smell. So people throw them into gutters to prevent illness. So for me I think that in view of the fact that the water from rainfall fail to flow freely because the gutters are chocked is the reason why it floods constantly here. And for the Twin-Disaster, it was a combination of the flood and Fire that led to the harm the community suffered. The fire was a result of the GOIL filling station that had a faulty underground storage tank which leaked the fuel. When I saw the level of the water, my friends and I decided to safeguard our goods and properties so we started parking them into a neighbour's house which was a story building and we later decided to take shelter there until the rain stopped and then we wait for the water to subside. We could not pick everything because some were heavy and we could only repair them after the floods. Later when the fire came, it swept all the goods we left behind. Even the container I use in trading was destroyed. I later discovered that I had lost some of my friends. I am still putting the container in shape so I can start trading in it but for now I am doing my trade on the streets for a while to get some money to fix it.

#### **4.4.3 Distress call for assistance**

The receptionist at the hotel stated that they started making distress calls to the Ghana Fire Service after discovering the fire that was burning the other houses. “We heard ‘fire’ ‘fire’ and so we called the fire service people for help after seeing the wild fire coming towards the hotel” (Personal interview: 27.01.17). Another victim who lived in a kiosk with her friends said she called a local radio station for assistance and narrated all that was happening and they promised to get in touch with NADMO and the police for assistance” (Personal interview: 09.02.17). A 26 year old male who traded on the streets said he called the radio station for assistance because he had no one to call for assistance. An observation made by the researcher in Ghana is that people seems to have confidence and trust in radio stations in times of the need for assistance and so it is no surprising that many of the respondents preferred calling a radio station to report the disaster to them for assistance.

#### **4.4.4 Working with NADMO to save lives**

A 23 year old drink seller said during the disaster he was able to assist NADMO in saving the lives of other people who were trapped in the flood water. He said because he was able to swim he got a rope from NADMO and the Fire Service personnel to other people and once they got hold of the rope they were able to follow him to safety. He said; “I was swimming with the rope to the other side of the road where some people were shouting for help and once I heard their voice I went to their direction with the rope and they got hold of it” (Personal interview: 15.02.17). According to him the rope was helpful as people held on to it and were saved. Another 25 year old shoe-maker said he provided information about the direction the flood took his friends in order that the team could assist them. He said, “I was with my friends when the rushing water carried us and we started shouting but I was fortunate enough to hold on to a tree and I saw my friends being carried away so I was shouting when I saw the NADMO team and they came to my rescue and I showed them the direction the water carried my friends” (Personal interview: 11.02.17). Thankfully, according to him they were rescued by the team.

#### **4.4.5 Responses of survivors after the disaster**

After the disaster the community members had some responses in place that enabled them cope with the disaster as a way of recovering from what had happened. The respondents had the following responses after the disaster;

- Relocation
- Rebuilding damaged buildings and structures
- Rebuilding livelihoods

#### **4.4.6 Relocation**

One of the responses of the community members after the disaster was to relocate to other communities within Accra due to the disaster. The Disaster Management Co-ordinator of the Ghana Red Cross Society said according to their research some people relocated from the community to other areas which to him was the best decision to make. He said, “some people relocated from the area to other communities for fear of future disasters since this area is still flood prone” (Personal interview: 15.02.17). A 28 year old trader who used to live in Circle said, she does not live in this community anymore since the disaster struck in 2015. “I have gone to rent a single room in Madina and that is where I live now but I still come here to trade since it continues to be a very busy and lucrative place to do business. Even though the renting of the room has put some financial burden on me, it is worth it because I value my life” (Personal interview: 14.02.17). This is interesting that she still comes back to the same flood prone area to trade in view of the risk the area still pose. The trader was also of the view that people might have relocated from Circle than Adabraka because the damage was more at Circle than Adabraka. Even though these two communities suffer from floods, the Twin-Disaster in view of the fire led to the destruction of many buildings and properties and is the reason why people will relocate from Circle.

#### **4.4.7 Rebuilding damaged structures and buildings**

The receptionist who works in the hotel that was also affected by the disaster said after the disaster the management embarked on a re-building exercise with the direction of the Ghana National Fire Service and the Accra Metropolitan Assembly who gave them the specifications. He said they have been able to put the building in shape and business has already started with clients patronizing the hotel. He said, “we had to demolish some aspect of the building that the fire destroyed and rebuild and we also made some new fittings in one or two places and we had it inspected before commencing normal business” (Personal interview: 27.01.17).

A 35 year old lady said she is gradually renovating her building but will move in later when it is completed. She said, “as you can see I am trying to bring it back to life but the fire has weakened it (referring to her building) so I had to demolish it entirely for fresh work to start on it but because I do not have the means I am working on it gradually until such time that I complete it” (Personal interview: 07.02.17). She pays workers to do the renovation on her building. The 24 year old trader also said he had just finished reconstructing his container that he uses to sell his wares and has just moved back into it for his normal work life to start. Some of the respondents sleep in the same container they use in selling their wares. Instructively, most of the damaged structures were located in the Kwame Nkrumah Circle community with few ones at Adabraka. Again this is because the fire was centred in Circle community leading to damages there.

These cases of rebuilding damaged structures and buildings are paid for by the people who own them and the builders gain financially from rebuilding these damaged structures. This is consistent with the assertion by Pelling (1999) that there are some people who make financial gains from damaging flood situations like the Twin-Disaster and since disasters does not only come with negative impacts, certainly those who have been engaged such as carpenters, masons, and painters will make some financial gains as a result of the disaster.

#### **4.4.8 Rebuilding livelihoods**

According to the 52 year old woman all her business activities came to a halt as a result of the disaster as she lost all her ovens, fridges, gas cylinders and other ingredients for her business. Because of this lost and the loss of the place of business, there was nowhere to start business but she got help from her friends to start her business again. She said, “I had assistance from my old school friends who bought new ovens and gas cylinders for me and that is what has helped me to start this business again” (Personal interview: 17.01.17). According to her, the business is gradually taking shape and will use her profit in rebuilding her destroyed building.

According the Sub-Metro Co-ordinator of NADMO, some relief agencies were in the community to offer financial support to some of the victims so they can get back into their trading business since they lost every item they were trading in. He stated that, “the financial assistance was not done scientifically as they did not contact us to help them with the targeting in order to identify the right traders who lost all their goods for assistance” (Personal interview: 26.01.17). He was of the view that, it was a good gesture though that helped rebuild the livelihood of some of the victims.

According to a 28 year old trader who sells shoes by the streets, she was assisted by a micro-finance company who granted her a loan to restart her business and since then she has been repaying the loan gradually and life has return to normal as she is able to cater for her family. The granting of financial assistance by some relief agencies and micro-finance companies has been instrumental in ensuring that some of the victims were able to recover from the disaster and rebuild their livelihoods.

#### **4.5 Mitigation and Disaster Risk Reduction Initiative by NADMO in the Twin-Disaster**

Mitigation and Disaster risk reduction measures are geared towards lessening risks or reducing the negative impact of disasters (Adam, 2004, Cutter et al, 2003). This means addressing social and economic factors that makes people vulnerable and unable to cope with shocks and stress of disasters. Reducing the risk of a disaster also means putting in place adequate measures that ensure that factors that make people vulnerable or that which exposes people to harm are addressed. In Ghana, the organization that is legally sanctioned to be responsible for all types of

disasters is the National Disaster Management Organization (NADMO). It was established by Act 517 of 1996 to manage disasters and emergencies in the country as a whole. They play a coordinating role by coordinating resources of government institutions and non-governmental agencies in a bid to manage disasters. According to the findings, in the Twin-Disaster the mitigation and disaster risk reduction initiative that was deployed by NADMO is as follows;

- Early warning information
- Public education

#### **4.5.1 Early warning information**

One of the most important resilient strategies in disaster risk reduction to people and property is the provision of early warning information and advice to people. This information tells people how to prepare and respond to an impending disaster. Preparedness involves measures that are taken in anticipation of a disaster to ensure that appropriate and effective actions are put in place during a disaster. It also includes constructing effective risk messages on what to do before, during, and after a disaster.

The Chief Disaster Control Officer of NADMO said before the rain started falling, they picked up signals from the Meteorological Services Department of Ghana that there was going to be rainfall in the Accra Metropolis. The Meteorological Services Department of Ghana is responsible for keeping climatic and rainfall data in Ghana. He said, “we circulated this vital information to the various media houses including radio stations for announcements to be made. This information was intended to alert people of the possibility of flooding since it was a perennial problem in Accra so they can plan very well” (Personal interview: 19.01.17). By adequately planning with this information, risk will be reduced and casualty rate might also be drastically reduced.

According to a 24 year old trader he did not hear any announcement on radio to inform his action. An 18 year old student said they heard the announcement that it might rain but they took it lightly. She said, “normally we hear these forecast but a lot of the times their predictions do

not come to pass so this time too we did not take it with any seriousness” (Personal interview: 23.01.17).

There are numerous radio stations in the Accra Metropolis alone numbering about 44 radio stations in the Greater Accra Region alone. This means there is a possibility that some people might not have heard about any early warning information as the various radio stations might communicate this information at different times and at a time that many residents might be trading. Also the fact that some of the previous warnings from NADMO about impending rain failed to happen were reason why many people did not heed the warnings.

The Chief Disaster Control Officer of NADMO said that these warning signs are normally not heeded and that is what always accounts for the high casualty rates during disasters. He maintained that they do not do impact forecasting which tell the people what the likely impact will be with a particular weather forecast which would have enabled people plan adequately. On his part, the Sub-Metro Co-ordinator of NADMO said he issued these warning messages to all volunteers in the various communities to inform people but these were ignored. According to Paton and Johnston (2001), providing early warning signals is not enough and should not be assumed that once such information is given people will heed to it and take caution but that people assume that authorities will still take responsibility for managing both the hazard and their safety.

#### **4.5.2 Public education**

Chief Disaster Control Officer of NADMO stated that as a way of reducing risk to disaster, they also do public education on disaster mitigation and risk reduction. He said, “we sent our volunteers to educate the public on the dangers associated with their places of residence as it was declared a flood prone area and very vulnerable to disaster” (Personal interview: 19.01.17). According to him, anytime they met the residents NADMO educate them on the need to relocate to other areas to be safe. He said public education is also done through the media especially on radio and sometimes on the television. A 27 year old ‘kenkey’ seller said, “they always tell us to relocate to different places because this place is a flood prone area but they fail to tell us where to go” (Personal interview: 10.01.17). According to her they have no money to relocate to any

other community but if the government will assist them in moving by providing the necessary accommodation, they will gladly relocate.

On the day of the disaster, the response by NADMO according to the Chief Control Officer were two fold and included the following;

- Search and rescue
- Provision of relief items

#### **4.5.3 Search and rescue**

The Chief Disaster Control Officer of NADMO said they rely on search and rescue operations when disaster strikes so as to be able to rescue affected victims and save lives. According to him, in this disaster, they relied on information provided by many residents and were able to rescue some people and many lives were saved due to this. “When we got the information from the radio station, we quickly informed all our personnel and the volunteers on the ground as well as our collaborating agencies like the Ghana National Fire Service, the Ambulance Service, the Police Service, the Military as well as the Red Cross Society of Ghana” (Personal interview: 19.01.17). He said they worked together to search for victims in the flood waters in order to rescue them. This is part of the efforts at addressing disaster management as they are able to save many lives.

#### **4.5.4 Provision of relief items**

According to the Chief Disaster Control Officer of NADMO, they provided relief items to survivors. He said normally they do an assessment of the situation on a ‘need basis’ to be able to identify what the critical need of the victim at that time will be so that they provide assistance. He said, “for some victims what their pressing need was at the time was where to sleep, and so they try to arrange a temporal shelter for such people and for others it was food and water, so they made provisions for them. A 24 year old trader who was a survivor said, NADMO wrote their names that they were going to assist them but never heard of them again”. He said some other residents said they got some assistance from NADMO but he did not get any assistance

from them. The Sub-Metro Co-ordinator on his part said their initial assessment indicated that there were some survivors whose needs were more pressing than others and so the need to attend to those ones first before others. The findings revealed that NADMO does an initial assessment of damage to individuals on a need basis and depending on the results of assessment they provide relief items to those whose needs are very critical.

#### **4.5.5 Inadequate risk reduction initiatives caused by challenges to NADMO**

According to the Disaster Management Co-ordinator of the Ghana Red Cross Society, risk reduction initiatives by NADMO are very low and are reduced to only the provision of public education and sometimes early warning signs. He asserted that sometimes the warnings are not issued well on time for people to prepare and at times too because weather forecast are not predicted accurately, subsequent forecasts are treated with no seriousness (Personal interview: 15.02.17) This assertion was corroborated by some respondents who were of the view that sometimes they are informed that a rain storm will be coming with rains so they should prepare. They stated that they sometimes prepare by not going to trade or relocating to other places only for them to realize that the rain did not fall at all. This creates a situation where residents fail to take subsequent early warnings serious.

#### **Table 11: shows aspect of the report by Advisory Committee of NADMO**

##### **The Relief and Reconstruction Technical Advisory Committee of NADMO**

There are initiatives aimed at reducing social and economic vulnerability and investing in long term mitigation activities. Unfortunately such initiatives aimed at prevention and mitigation are few, poorly funded and insignificant in comparison with money spent by donors and development partners on humanitarian assistance and relief as well as on post disaster reconstruction.

Date: 2013

Source: Author (Adapted from NADMO 2013)

A summary report by the Relief and Reconstruction Technical Advisory Committee of NADMO in 2013 (table 11 above) reiterated the fact that disaster mitigation and risk reduction was very critical to disaster management and stated that there were initiatives by NADMO at reducing social and economic vulnerability and investing in long term mitigation activities. These initiatives according to the report are few and poorly funded. Incidentally Yodmani (2001) also asserted that initiatives aimed at reducing social and economic vulnerability are few and poorly funded and insignificant in comparison with money spent by donors and development agencies on humanitarian assistance and relief work.

According to the Chief Disaster Control Officer of NADMO, the Organization (NADMO) is plagued by several challenges that make their objective of disaster mitigation and risk reduction difficult to achieve. He stated that these challenges does not help them address the major factors that expose people to harm from any disaster even though they have developed good plans to tackle vulnerability issues. Some of the challenges militating against their operations according to him are;

- Inadequate resources
- Legislative challenge
- Public perception about NADMO
- Human resource challenge during change of government
- Political interference in decisions of NADMO

#### **4.5.5.1 Inadequate resources**

According to the Chief Disaster Control Officer of NADMO budgetary constraints is one of the biggest challenges that is hampering the smooth operation of NADMO and its programmes. He stated that NADMO is not autonomous and continue to depend on the ministry of interior to survive. He said their main source of funds comes from the Ministry of Interior and this position is consistent with similar findings by Oteng-Ababio (2013) where he found that government's subvention was the main source of funding for NADMO operations which was inadequate. According to the Chief Disaster Control Officer of NADMO the funds allocated to them is inadequate and sometimes fail to come in full or does not come on time. Because the funds

allocated to NADMO is not sufficient they depend on their bilateral and multilateral donors in funding some of their programmes. This challenge according to the Chief Disaster Control Officer of NADMO is the main reason why NADMO is unable to carry out most of its disaster risk reduction and mitigation initiatives.

#### **4.5.5.2 Legislative challenge**

According to the Chief Disaster Control Officer of NADMO, they do not have the legislative instrument that will empower them to arrest and prosecute people who fail to heed their warnings for disaster risk reduction. He asserted that it is the Metropolitan Assembly that is mandated to issue permits for building and ensure that people do not live in dangerous and unauthorised places. According to him, in some instances they have issued warnings for people to relocate due to the risk of flooding and its negative effect on life and properties but these warnings are not followed. Referring to the twin disaster, he stated that the residents were warned to relocate because the area was a flood prone area and it posed danger for lives and properties. This warning was never heeded by many residents. The failure of many residents to relocate from this area may be partly because of poverty and the fact that some of them could not afford it as can be deduced from the responses discussed earlier.

#### **4.5.5.3 Public perception about NADMO**

According to the Chief Disaster Control Officer of NADMO another challenge that confronts their operation is the public perception of NADMO as a political organization. The public perception is that NADMO helps people and according to him (The Chief Disaster Control Officer of NADMO), any personal damage to anyone as a result of his/her own mistake is brought to NADMO for assistance. He stated that some of the individuals come to NADMO offices to make demands for assistance for shelter, food, livelihoods, and clothing. Some of these individuals because they know some of the 'big men' in power, they go to them and these 'big men' push them to come to NADMO for assistance. According to him, these people think NADMO belongs to their party and since they are in power the party must help them and so NADMO is the entity that should take up such responsibility. He said, these 'big men' call the

offices of NADMO to put pressure on them to give such assistance to these individuals. He said, ‘because we also want to keep our jobs when such calls come from these ‘big men’, we comply and provide such assistance to the individuals’. He said the provision of such assistance takes away much of the resources needed for disaster work and this is one of the reasons why they are not able to deliver their mandate well.

#### **4.5.5.4 Human resource challenge during change of government**

Another challenge confronting NADMO according to the Chief Disaster Control Officer of NADMO is that of human resource. According to him any time there is a change of government, many personnel at NADMO loses their job due to the perception that most of the personnel belong to previous government. This problem according to him presents a great challenge to human resource development at NADMO. This is because NADMO continue to lose many of their skilled personnel and the people brought by new governments are mostly party people who lack the necessary expertise in disaster management which affects the operations of NADMO. He said, ‘as I speak to you now I do not know my stand in view of this new government that has just assumed power’ (Personal interview: 19.01.17). The New Patriotic Party has just assumed power in Ghana and according to him most of the staffs in NADMO are not sure if the current administration will terminate their appointment or not.

The Sub-Metro Co-ordinator of NADMO also made the same assertion and according to him some party members of the new government came to their offices and demanded that all staffs should leave the organisation because their party had assumed power. He stressed that, ‘we do not know what will happen to us and this is why we still lack the right personnel for disaster work’ (Personal interview: 26.01.17). This is consistent with the findings of Bempah (2011:92) where respondents were of the view that NADMO is a political organisation due to the political interference the organisation is faced with, where experienced personnel are replaced with less experienced ones.

According to him if these challenges are addressed by the central government and the general Ghanaian public, NADMO can become very effective in disaster management and especially in mitigation and disaster risk reduction initiatives.

#### **4.5.5.5 Political interference in decisions of NADMO**

The Chief Disaster Control Officer of NADMO was also of the view that unnecessary interference in decisions of NADMO by politicians is equally adding to their challenges. He said; “we get our subventions from the central government for our activities and because we are experts here we must be allowed to carry out our plans and take decisions that are relevant to disaster management. We normally receive instructions from central government to carry out certain decisions that are not in the interest of disaster management but are just relevant to the government for the sake of political expedience” (Personal interview: 19.01.17). Referring to the Twin-Disaster, he said before NADMO gives out relief items they normally do a ‘need based’ analysis to identify what the needs of the victims are before embarking on relief item distribution. This is because the pressing needs of individuals may differ due the different damages people might suffer. In view of this it takes time to finish the analysis and commence distribution of relief items.

According to him, during their analysis stage, an opposition political party took advantage of the situation to organise an event in the disaster-hit area and distributed various relief items to people around. The claim of the opposition party at this event according to Chief Disaster Control Officer of NADMO was that, they cared for the people more than the sitting government. He said because it was a year to the general election, the government panicked because of the event organised by the opposition and started issuing orders to NADMO to start distributing relief items to people without any registration and need analysis. They had no option than to comply and in view of that many genuine victims who should have benefited from relief items could not benefit. He said; “these are the same people who will turn round and blame NADMO for incompetence when things go wrong” (Personal interview: 19.01.17).

According to the Disaster Management Co-ordinator of the Ghana Red Cross Society, for political reasons the government failed to declare a state of emergency on time to enable humanitarian organisations to come on board. He said, “humanitarian organisations will come on board when a state of emergency is declared but usually governments think by declaring a state of emergency, it will be a dent on their reputation and in this disaster a similar trend occurred” (Personal interview: 15.02.17).

These challenges above according to the findings represent the factors that limit the efforts of NADMO in disaster mitigation and risk reduction initiatives. As can be deduced from the findings many of the vulnerability factors that exposed people were not addressed. According to Alvarez (2006) the participation of local people is important in designing and planning effective disaster management plans. In view of this, any mitigation and disaster risk reduction initiative must involve the participation of the local people and this calls for community based efforts in risk reduction. The next section discusses findings on disaster management and community based efforts in disaster risk reduction.

#### **4.6 Disaster management and community based efforts in disaster risk reduction**

Disaster management is very essential in saving lives and properties as well as preparing plans to build resilient communities. An aspect of this is how to reduce the risk of disaster that people face in their communities. Community Based Disaster Management is one of the approaches to disaster management which helps in building the capability of local communities to cope with disasters by developing a locally appropriate and locally owned strategy for disaster management. This section discusses the extent to which current disaster management strategy by NADMO incorporate community based efforts in disaster risk reduction in Accra. According to the findings two approaches have been developed by NADMO to incorporate community participation. These are;

- Decentralized system of operation
- Volunteer group formation in the various local areas

##### **4.6.1 Decentralized system of operation**

Disaster management is a very critical tool for reducing the negative impacts a disaster can have on communities and safeguard the interest of the communities and the State as a whole by saving lives and properties. According to the Chief Disaster Control Officer of NADMO their current strategy for disaster management is to decentralise their operations to the lowest unit of local level. He said by doing that it becomes easier to organise their activities. He said they have offices at the national, district, and zonal level such that their operations are localised so as to

incorporate local dynamics into disaster management. He stated that disasters strike in local communities and by decentralising their operations, officers in these local level units will no longer have to wait for action from the national level before taking action. According to him they coordinate well with all the local officials and share information on disaster management with constant training programmes for their staffs. He stated that most of the staffs in the local unit offices are from the communities. This is to tap from their knowledge of the local area dynamics to be able to design appropriate disaster management strategy.

#### **4.6.2 Volunteer group formation in the various local areas**

According to the Chief Disaster Control Officer of NADMO they have formed volunteer groups in most of the local units in view of the fact that they want to involve the locals in disaster management and since these communities are the ones affected by disasters, it is necessary that they are part of the solution. He said when such volunteers are brought on board they are equipped with the necessary training to be able to be effective on the job. By so doing their local knowledge about disaster management is tapped and developed. According to the Sub-Metro Co-ordinator of NADMO the concept of volunteers is a good initiative that should be encouraged throughout the entire country.

The Chief Disaster Control Officer of NADMO however bemoaned the challenges this concept is creating for the organisation. According to him, even though they keep explaining to the communities what volunteering means, it is misconstrued and the understanding is that it is full time employment. In view of this understanding, when people volunteer and after one year they do not receive regular salaries they quit. He maintained that this situation is gradually ‘killing’ this noble idea of using local human resources for disaster management because most of the volunteers they train and equip with skills end up quitting and putting more burden on NADMO. According to him, in view of budgetary constraints they are not able to absorb them to become full time employees and the idea of volunteering was not conceived to be one that pays salaries but to use local knowledge in disaster management in a way that tailor solutions to the needs of these communities. He thinks there should rather be a disaster volunteer group that should be spearheaded by the communities so that NADMO would rather collaborate with them.

According to him, if such initiative is taken and started by the communities themselves, people will not make monetary demands from NADMO.

#### **4.7 Issues emerging out of findings**

The study revealed some interesting issues that emerged from the findings and these are discussed below.

##### **4.7.1 Politicizing Disaster**

Disaster management is a critical arena that requires experts in the field to take the best and timely decisions to save lives and properties. One of the most interesting issues that emerged in the study was the politicization of disaster in Ghana. Politicians in Ghana always want to make political capital in almost every situation that come up. According to the findings an opposition political party took advantage of the disaster to sell a campaign message to the affected community and the message was that, they cared for the people more than the sitting government. This was equally met by a reaction from the sitting government to the effect that they had to disorganise the professional work of disaster workers to suit the whims of power. Boin et al (2009) assert that politicians will turn disasters from threat to opportunities as it will become the context of framing and blaming. This was exactly what happened as the opposition party saw the disaster as an opportunity to give relief items in order to win the hearts and minds of electorate so they can vote for them at the polls and blame the sitting government for doing little to help. Similarly in the case of Malaysia, politicians are quick to politicize disasters to their advantage (Chan, 2015).

The government's reaction and the unnecessary interference in the operations of NADMO is a recipe for chaos and very dangerous for disaster management in the country. Disaster management should be de-politicized and the body responsible for disaster management which is NADMO should be autonomous and not be subject to the control of politicians for effectiveness. Politicizing disaster is akin to endangering the lives of citizens and rendering the work of NADMO ineffective.

The findings also revealed a rather sad situation where when there is a change in government, some skilled personnel are replaced with new ones from the incoming government who might not be skilled for disaster management. It is equally a bad trend that needs remedy since disaster management work require people with expert skills on the field to come up with plans that will prevent harm to lives and damages to properties.

#### **4.7.2 Social capital as a form of resilience**

The responses presented above was how the communities reacted to the disaster when it struck them and it is imperative to state that the relationships that were built by some of the respondents helped them survive the disaster. These relationships as can be deduced from the findings enabled people to take shelter in high rise buildings in order to save their lives. It was equally helpful in getting many goods to safety. This network of relationships that enabled individuals to gain access to friends and neighbours' buildings is termed social capital that has been built among the residents. According to Armah et al, (2010), social capital refers to connections within and between social networks as well as connections among individuals. Tompkins (2005) asserts that social capital is an integral part of resilience while Murphy (2007) is of the view that resilient communities have the capacity to fall on their internal strengths and resources to deal with disasters. In this study, from the responses it can be deduced that one of the strengths and resources at the disposal of some of the respondents was the social capital they used to their advantage. It was equally due to the relationships that the survivors had with some members of the community that helped in providing useful information leading to the rescuing of people and the saving of lives.

According to Cutter et al (2003), one of the major factors that influences social vulnerability is social capital including social networks and connections. This is an indication that even though the Twin-Disaster was devastating resulting in the loss of lives and properties, many others who were equally affected by it were able to recover from it. So even though people might have multiple vulnerability factors, social capital remains a very critical resource that makes individuals resilient to catastrophic disasters and help in reducing harm.

## **CHAPTER FIVE: Discussion of Findings**

### **5.0 Introduction**

This chapter presents a discussion of the findings of the study. The discussion is presented in relation to the research questions and objective of the study and in line with existing literature as well as the theoretical framework guiding the study. It raises interesting questions regarding the Twin-Disaster and disaster management in Ghana and is not in a chronological order. It is rather presented in a way that makes it easier for readers to better understand the implication of the findings to disaster management in Ghana.

### **5.1 Natural Hazard, Disaster and the Concept of Vulnerability**

Natural hazard has mostly been used to refer to the occurrences of severe natural phenomenon and the interpretation given to such happenings favoured the belief that there was nothing to be done when faced with such disasters because they were natural and unavoidable occurrences (Cardona, 2004). However, Cannon (1994) stressed that hazards are natural but disasters are not and that disasters should not be perceived as an inevitable outcome of the impact of a hazard but the condition of people at the time of impact makes a hazard to become a disaster. This is to say that the extent of vulnerability of people will determine whether a hazard will become a disaster or not. In view of this, for a hazard to become a disaster it must hit people who are vulnerable and one of the tenets in vulnerability research is the identification of conditions that make people vulnerable to extreme natural events. Vulnerability has become an important concept for understanding what it is about the living condition of people that enables a hazard to become a disaster (Tapsell et al, 2010). Vulnerability is about how a system is exposed to injury or damage.

There are various aspects of vulnerability but this study focused on social vulnerability factors. Social vulnerability includes a combination of factors that determine the degree to which people's lives, livelihoods, properties, and other assets are put at risk by a discrete and identifiable event in nature and society (Wisner et al, 2004). The natural disaster approach which perceives disasters as caused by natural forces and that such occurrence are unavoidable failed to

recognise the role of vulnerability factors that rather exposed people to harm as a result of disasters. The findings proved Cannon (1994) right, that a hazard becomes a disaster when it hit vulnerable people who are not prepared.

The social vulnerability factors that exposed people in Kwame Nkrumah Circle and Adabraka to harm were; poor drainage system, poor solid waste disposal, attitude of people toward flood, lack of disaster awareness and preparation, building along water ways, increase in population, poverty, and the citing of GOIL filling station. The Twin-Disaster started with continuous rainfall that led to flooding and the subsequent fire that started leading to various effects as presented earlier. The rainfall was heavy and continuous for two days and the gutters as well as the various drains were chocked. The Odaw River channel was equally chocked with debris, filth and silt leading to the blocking of the water from freely flowing. The result was the flooding that ensued. According to a study by Karley, (2009), whenever it rains heavily in Accra, the main tunnel that carries water and finally empties it into the Odaw River is heavily chocked with garbage, mainly plastic waste. This prevents the smooth flow of water when it rains and the result is that it inundates the area leading to flooding.

The inability of city authorities to desilt the drains as well as the inadequate gutters and their small sizes coupled with the illegal disposal of solid waste affected the drainage system and led to flooding. Systemic negligence on the part of refuse collectors who failed to collect solid waste on time and the failure of city officials to monitor solid waste collectors led to irregular solid waste collection. The irregularity of solid waste collection resulted in people disposing their waste in the drains that chocked the drains leading to flooding. The failure on the part of the City authorities to enforce building codes and permits led to the development of unauthorised structures that were put on water ways that ended up blocking the passage of water into the drains and led to flooding. These were the conditions under which the people were living which made them vulnerable to flooding. The citing of the GOIL filling station was a major factor that exposed the people to harm. It brings to question the citing of developmental projects in residential areas without thinking about the repercussions to residents living around it.

These vulnerability factors became the conditions that exposed people to the impact of the hazard and the result was the subsequent Twin-Disaster. And because these people were vulnerable due to their condition at the time, the hazard (Rainfall leading to flood) became a

disaster. It is therefore the interaction of the hazard (heavy rainfall) with these social vulnerability factors that resulted in the Twin-Disaster with the varying effects. These social vulnerability factors exposed many of the people to injury and damage in the disaster. This therefore lends credence to the fact that the concept of vulnerability is critical for understanding the conditions of people that expose them to natural events leading to disasters. This therefore defeats the argument that natural forces are solely responsible for disasters which makes them unavoidable. The findings in this study prove that disasters are avoidable contrary to the views that they are unavoidable because disaster is the result of the interaction of a hazard with vulnerability factors. The next section delves into some of the effects of the Twin-Disaster on the livelihood of survivors.

## **5.2 Twin-Disaster and Effects: What impacts, negative or positive?**

Disasters have varying impacts on people and constantly they are associated with negative effects. But Pelling (1999) for instance notes that there are some positive impacts of disasters on development. The findings revealed that there were a number of impacts on the livelihood of the survivors. Yodmani (2001) demonstrated that families who lose their means of livelihood during a disaster find their recovery from adverse effect become more unlikely and their vulnerability to future disasters is likely to increase. As earlier discussed in the theoretical framework, the effects of the disaster can have impacts on the vulnerability level of the people for subsequent natural hazards and a negative effect on their livelihood may increase their vulnerability factors that will enable a hazard to become a disaster.

The Twin-Disaster had various effects on the livelihood of people. From the findings, there were social, economic, and psychological effects of the disaster on people. The Disaster affected the means of earning of many people while others lost resources that would have aided them in making a living. In this study human resources were lost in the 200 lives that perished in the disaster. Some of the dead were people who supported their families and this support function might now be gone with their death as a major human resource that supported the family is gone. Others too were either injured and/or displaced by the disaster. Certainly an injured person may not have the strength to work and with this situation, their livelihood is affected as they are

unable to earn any money to support themselves or even their families. For those who were displaced, it would be challenging to think of where to get shelter and how to start working again. The psychological effect alone can affect their livelihood as noted by one of the respondents (the taxi driver). His injuries and the scars on his face are having a damaging effect on his livelihood as passengers are not willing to patronize his services. He is being stigmatized for the injuries on his face which has changed the complexion of his appearance. His inability to get passengers on a daily basis to be able to get his daily sales is affecting his family and he is not able to raise enough money to take care of his family. This may even lead to stress and the trauma can be damaging to his self-esteem. These are potential health impacts of flooding that result from stress (Durkin et al., 1993; McMichael et al., 2001).

Basic resources that are important for livelihood like their stores or kiosks and containers where they traded and sometimes lived were destroyed. Most of the damages occurred at the Kwame Nkrumah Circle where the fire was mostly centred.

There were some positive impacts such as the relocation of the filling station that reduced the vulnerability of future fire outbreak as well as the good lessons learnt for development. Others also made financial gains by reconstructing damaged building and structures. This is consistent with the notion by Pelling (1999) that there are some people who make financial gains from damaging floods. This is an indication that disasters should not be associated with negative impacts only but then some effects can be positive as this findings revealed.

Overall the net effect of the Twin-Disaster was negative and this has the cruel tendency of affecting the survivors in subsequent disasters as they become more vulnerable. This link means that people who lose their means of livelihood during a disaster may find their recovery from adverse effect become more unlikely and their vulnerability to future disasters is likely to increase. Due to the negative impact of the Twin-Disaster on the livelihood of the victims, they may become more vulnerable and any natural hazard that strikes may be hitting a group that is still not prepared and vulnerable which may lead to a disaster again. In view of this, any disaster mitigation and risk reduction initiative must target all the social vulnerability factors identified from the findings in this study. The next section discusses mitigation and risk reduction initiatives as part of disaster management.

### **5.3 Disaster Management: Mitigation and Risk Reduction**

Disaster management is an important planning tool for reducing injuries and damages resulting from disasters. Mitigation measures as part of disaster management are geared towards lessening risks or reducing the negative impacts of disasters (Adam, 2004; Cutter et al, 2003). Reducing negative consequences of disasters mean addressing the key issues and factors that make people vulnerable. Disaster risk reduction is defined as the concept and practice of reducing disaster risks through efforts at analysing and managing the causal factors of disasters including reduced exposure to hazards (UNISDR, 2009). This requires the identification of risk factors that expose individuals and groups to natural hazards. The identification of these vulnerability factors is an important step towards disaster management. Addressing these risk factors that expose people to hazards helps in risk reduction and the reduction of negative consequences of disasters. The findings revealed clearly that there was no link between mitigation and risk reduction initiatives and vulnerability factors that expose people to harm. That is to say that the measures employed by NADMO to reduce risk failed to incorporate the social vulnerabilities of people.

One of the measures of reducing risk is through the issuance of early warning signals and public education on disaster management. The findings revealed that NADMO relied on these two measures to help mitigate the negative effects of the disaster. A similar finding was made by Bempah (2011), where it was found that the key mitigation and risk reduction initiatives for frequent flood situations in the central Gonja District of Ghana was through public education. Other responses by NADMO on the day of the disaster includes search and rescue operation which was geared towards rescuing and saving people affected by the disaster as well as providing survivors with relief items.

The early warning signals were sent to enable people prepare in anticipation of the flood but it unfortunately failed in telling people what to do in the flood situation. In view of inaccurate predictions of rains in previous early warnings, many residents in Circle and Adabraka failed to pay attention to the early warnings of NADMO in the Twin-Disaster. It was also possible according to the findings that not everyone heard the warnings and so could not prepare adequately for the disaster. From the findings, it was also clear that the content of the public education by NADMO may have been misplaced. This is because educating people on the need to relocate because the communities were flood prone was not going to help reduce

vulnerabilities in a community where many are unable to afford high rent in safe places. One would have expected the education to also inform the people on what to do when the flood comes and what to do to prevent flooding situation. It was a flood prone area but there were conditions that made the area flood prone, some of these conditions had to do with the vulnerability factors identified earlier.

In Disaster Management people's vulnerabilities to disasters present the key factor in determining the impact of disasters on them (Yodmani, 2001). In view of this any mitigation and disaster risk reduction strategy should focus on the vulnerability of people. Mitigation measures as well as disaster risk reduction initiatives are geared towards reducing risk and preventing negative consequences of disasters on people which means addressing social factors that make people vulnerable and expose them to flooding. This means putting in place measures that will ensure that factors that make people vulnerable to disasters are addressed. The identification of vulnerability factors is a starting point for risk reduction initiatives and helping address such issues helps in building resilient communities prepared for disasters. As stated earlier in section 5.1 disasters are avoidable contrary to the views that they are not because disaster is the result of the interaction of a hazard with vulnerability factors. This means if the conditions of people that make them vulnerable to hazards are addressed fully; the result will not be a disaster and the negative effects of disasters reduced to the lowest level.

Kullig (2000) asserts that disaster risk reduction should focus on building resilient communities rather than merely responding to disasters. From the study it was evident that the approach of NADMO to disaster management is one that can best be described as more geared towards responding to disasters than one that is focused on building resilient communities. Their efforts at managing disaster is not one that is focused on building resilient communities by responding to the needs of the community and dealing with the factors that makes people vulnerable to disaster. According to Cannon et al, (2003), the focus of disaster management continues to support victims of disaster rather than build up preparedness, resistance and resilience through reductions in vulnerability. So clearly from the ongoing, NADMO's disaster mitigation and risk reduction initiatives did not help in reducing the risk people faced in Circle and Adabraka. The findings revealed that there was no connection between mitigation and risk reduction measures and the factors identified as social vulnerability factors that exposed people to the Twin-Disaster.

#### **5.4 Disaster Management: Community Based Disaster Management and NADMO**

Disaster management has moved from top-down to bottom-up approaches to what is now referred to as community based disaster management in view of the shortfalls inherent in top-down initiatives. The top-down approach failed to address local needs, ignored the potential of indigenous resources and capacities and may have increased the vulnerabilities of people (Victoria, 2002, Shaw, 2012). The people who are affected by disasters need to have a say in measures that will address their problems but many times vulnerable people and places are left out from decision-making when it comes to disaster management. Communities are the best judges of their own situations and are best placed to make good decisions regarding their well-being (Yodmani, 2001). Communities play vital roles in disaster management because they are the first to respond when disaster strikes before outside assistance come and in view of that involving them in disaster planning is the right way to identify their needs for redress. It is therefore the bottom-up approaches that provide the basis for implementing mitigation strategies and a successful disaster management process (Pearce, 2002). Decentralization is one of such bottom-up approaches where responsibility to provide basic disaster management services are organized from the local unit level.

According to the findings, in a bid to incorporate community based efforts into their disaster risk reduction initiatives, NADMO has decentralised its operations from the national level to the local unit by locating offices in various local areas so as to be able to tap into available local knowledge. As part of the plans for disaster management, there is a concept of volunteer groups at the local level that is made up of local indigenes. This is to make use of indigenous knowledge on disaster management. The volunteer group formation is one idea that would have helped in involving the communities in rolling out mitigation and disaster risk reduction initiatives for communities that are vulnerable to disaster. The findings revealed a number of social vulnerability factors that can be addressed using the community based efforts such as the volunteer group but unfortunately they were not active during this research. The reason for their inactivity can be linked to what the Chief Disaster Control Officer of NADMO stated earlier about the fact that individuals demand financial compensations for volunteering which they are not able to afford.

According to Pearce (2002), it is local level bottom-up policies that provide the impetus for the implementation of mitigation strategies and a successful disaster management process. This means that any solution to disaster especially floods should incorporate the needs of the community in order to reduce vulnerabilities people face. There is the need for constant engagement of NADMO officials and the communities to fashion out modalities to help reduce vulnerabilities in the communities. Attitude of people toward flooding was one of the social vulnerability factors as well as their lack of disaster awareness and preparation. This can be changed by regular engagement and education led by the NADMO officials facilitated by the volunteers. Public educations can be more effective if organized in the local communities than on radios and Televisions since not everyone can listen or watch at the times selected to air disaster awareness education programmes. This enable community participation in disaster management plans which leads to community ownership as disaster mitigation plans are incorporated and integrated into local governance structures.

Clearly, from the findings there are community based initiatives to disaster management in the work of the volunteers and the decentralisation of NADMO's operations and in answering the research question, to a large extent NADMO's current disaster management strategies incorporates community based efforts in disaster risk reduction but in view of the challenges facing the volunteer groups, it seems not to be active. It is therefore important to accept the suggestion by the Chief Disaster Control Officer of NADMO that volunteer groups should be formed and initiated by the communities and such groups will then work in close collaboration with NADMO. This might be very involving as much of disaster mitigation and risk reduction initiatives will be patronised by the communities. A community based approach to disaster management can transform vulnerable communities into resilient ones that are well able to withstand as well as recover from stress and shocks emanating from disasters.

### **5.5 Disaster Management: Resilience and Social Capital as Resources for Mitigation**

According to Shitangsu and Routray (2010), people in a flood prone area adopt different measures to minimise the ramifications. From the findings many people in both Circle and Adabraka adopted various measures to reduce the negative effects of the disaster. It also

demonstrates people's ability to rise up to disaster situation and recover from it. Approaches by NADMO to resolve flooding has failed to tackle the various social vulnerability factors that expose people to harm and disaster planning has not also delivered the right risk reduction and mitigation needs of people. Despite the devastating effect of the disaster, many people were able to employ different approaches to cope with the situation. The study revealed that despite the harm that the disaster brought to the community, some people were resilient and applied various means in surviving and recovering from the disaster.

Resilience refers to human capacity to minimize the impacts of a disaster through some form of adaptation (Few, 2003). It is the ability of a system or a community or an individual to scale through negative impacts of a disaster and be able to bounce back in the face of adversity. From the findings various adaptation measures were used by survivors of the disaster. Some of the survivors relocated to other communities and the majority of those who relocated were from the Kwame Nkrumah Circle community which was the area where the fire affected. Others also responded to the disaster by having to rebuild their damaged structures while some too engaged in rebuilding their livelihoods as a way of moving on. These were responses by the community after the disaster had occurred. But during the disaster, the responses included evacuation of goods and properties, taking of shelter in high rise buildings, making distress calls for assistance as well as working to help NADMO in saving lives. These responses were relied on by the residents before outside assistance came. These are ample evidence that the community had some capacity to respond well to the disaster which needs to be properly developed and tapped into for disaster management. Disaster mitigation and risk reduction strategies as part of disaster management should be geared towards building resilient communities. This also proves that in disaster situations people are not passive actors when disaster strikes but then they always will have certain capacities and resources that they will fall on to bounce back. Such capacities and resources should be recognised by policy makers, developed and used for disaster management planning.

The findings also revealed that many people were able to take shelter in their friends' buildings and the fact that they had some form of relationship that enabled them to take shelter and park properties into the homes of neighbours for safety. These relationships and connections are known as social capital. According to Armah et al, (2010), social capital refers to connections

within and between social networks as well as connections among individuals. In the finding social capital played a crucial role in ensuring that people were able to survive and recover from the Twin-Disaster. Social capital thus becomes one of the resources of the community that can be used by NADMO for mitigation and risk reduction initiatives by educating residents on the need to stop throwing solid waste in gutters and creating awareness about the dangers of flooding as well as what needs to be done in a flood situation. Such networks can also provide the basis for the spread of early warning messages and the undertaking of disaster preparation plans. Thus social capital provides an enormous tool that can be taken advantage of by NADMO.

Mitigation measures are part of disaster management and geared towards the reduction of the risks people face as well as the negative impacts of a disaster. In view of this building resilient communities should incorporate preparedness plans into disaster mitigation. Such plans should rely heavily on the resources and capacities of the communities to build a resilient community. These adaptation strategies from the ongoing discussion provide the impetus for disaster mitigation and risk reduction.

Social capital and the resilience of the people are valuable resources at the disposal of NADMO and can play a pivotal role in disaster management if fully recognized and developed. These finding therefore provides a rich resource to NADMO for its risk reduction and flood mitigation measures for the future.

## **CHAPTER SIX: Conclusion**

### **6.0 Introduction**

This chapter presents the concluding remarks of the study by arguing for a shift in focus by NADMO in favour of risk reduction initiatives that will be based on reducing people's vulnerabilities to disaster using the Community Based Disaster Management approach. It also addresses some of the pertinent issues raised in the problem statement earlier.

### **6.1 Disaster Management: Moving beyond relief**

One of the issues in the problem statement was why NADMO was unable to deal with the flooding situation in Accra. The findings of this study revealed that NADMO appreciates the fact that disaster mitigation and risk reduction was very critical to disaster management, however most of the efforts of the organization were geared towards post disaster operations and mostly based on the provision of relief to victims and survivors of disasters. Cannon (1994) asserted that the focus of disaster management continues to support victims of disaster rather than build up preparedness, resistance, and resilient communities through the reduction in vulnerabilities of people. The identification of a problem is a major step in resolving it and this is why it is very essential that the factors that make people vulnerable thereby exposing them to harm be addressed. Rather waiting until disaster strike before putting up strategies to respond is as equal as endangering the lives of citizens and best described as reactionary.

There is the need for a rethinking of disaster management strategies to echo the importance of disaster risk reduction initiatives. Disaster management is about development and requires that disaster management plans are integrated into development plans at the national, regional, and local level. According to Singh (2010), how to respond and prepare for a disaster is most effective if such plans are built and incorporated into the development process. It is crucial to build resilient communities to be able to withstand disasters. The current development strategies of citing developmental projects anywhere without recourse to disaster plans is part of a larger problem of making people and communities more vulnerable to disasters. The findings revealed an example of how a fuel filling station was cited very close to a residential area which ended up

making more people vulnerable to the Twin-Disaster. It is a typical case of the inability of officialdom to incorporate disaster plans into the development process and as it has always been the case in Ghana; officials waited until the disaster struck then NADMO came in to provide relief and helped in search and rescue. This reaffirms the assertion by El-Masari and Tipple (2002) that disaster is a development problem that emanate from poor decision-making on the part of policy makers.

Building resilient communities as part of Disaster management planning is a means of developing the capacities of local people to respond to emergency situations when they happen. This is because the communities are always the first to respond to disaster situations before outside help comes. This is what makes Community Based Disaster Management one of the means of building capacity of local people since the top-down approach to disaster management failed to address local needs and failed to make good use of indigenous resources and capacities. Communities have certain resources that can be useful in disaster management and CBDM presents an opportunity for such resources to be deplored. This research revealed that social capital and the resilience of the people are such resources that can be utilized in disaster management. Such resources were part of reasons why residents continued to live in Circle and Adabraka despite the fact that these areas were flood prone.

The volunteer group formation from local communities presents a perfect starting point for building the capacities of communities by tapping local knowledge and engaging locals to participate in disaster management strategies. Engaging community members helps in identifying social vulnerability factors that exposes them to disasters. This study revealed a number of vulnerability factors that exposed people to harm and by involving the community in diagnosing the problem, they will also be better placed to proffer solutions. In view of this, mitigation strategies must stress social rather than physical approaches while such approaches must place emphasis on proactive rather than reactive actions. Such proactive actions must take a CBDM approach to disaster management with emphasis placed on reducing the vulnerabilities communities face and work towards risk reduction. Vulnerability reduction must be integrated as part of an ongoing policies and programs that require consistent and constant review and modification. By so doing, when a natural hazard (heavy rainfall) strikes, it will hit a population

that is not exposed by various vulnerability factors but rather a population that is better prepared. This can reduce the negative consequences of flooding in the Accra Metropolis.

The rainy season is here with us again in Ghana and the revelation in this study by way of the findings present a good starting point for addressing various social vulnerability factors that expose communities to natural hazards culminating in an eventual disaster.

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## Appendix 1: Informed consent form



UNIVERSITY OF AGDER

### Ethical consideration

**Informed Consent Form For** .....

#### **Introduction**

My name is Raymond Acquah, a student of University of Agder, Norway and pursuing a program in Development Management. I am the researcher for the study, 'The 2015 June 3<sup>rd</sup> Twin-Disaster in Accra: A Situational Analysis of Ghana's Disaster Preparedness'. I hereby invite you voluntarily to participate in this study. Kindly draw my attention to any word or concept on this form that you need further clarity.

#### **Purpose of Research**

This study seeks to investigate the causes of the 2015 June 3 Twin Disaster and to assess NADMO's role in the disaster.

#### **Research intervention**

The main tool for this conversation is an interview guide which is made up of a series of questions that cover the main issues to be discussed.

**Criteria for selection**

You were invited to take part in this study in view of your experience as an individual/agency in flood situation that you have which will be valuable to this study.

**Voluntary Participation**

Participation in this study is strictly voluntary and may not in any way affect you. You may change your decision to participate in this study at any time and such action may not affect you in any way.

**Procedure**

Personal interviews will be used and English language as well as the local language will be the medium of interaction. Interviews shall be recorded on a tape recorder for later transcription and data analysis. The use of a recorder may also be rejected by respondent if he/she is not comfortable. Note that all interviews are given codes and not personal names.

**Duration**

Each interview session is expected to last between 45-60 minutes.

**Risks**

This study has little or no effect on your health and psychological well-being as no chemicals will be administered as experiments. Rather some questions asked may be sensitive, personal and might elicit emotional response. Whilst this is not intentional, when such situations arise the participant is under no obligation to continue with the discussion. Appropriate counselling, if it is necessary will also be provided by the researcher.

**Benefits**

This study is strictly voluntary and for academic purposes only. It does not promise payment or gifts in return for participating in this study. Your decision to participate in this study will potentially help in designing appropriate disaster mitigation strategies that will be beneficial in flood management in this community.

**Confidentiality**

Your confidentiality with the information provided will strictly be maintained. Personal details will not be disclosed.

**Right to withdraw**

This study as stated earlier is voluntary and participants have the right to withdraw at any time without any repercussion.

**Contact**

Should you have any questions or concerns, you may contact me via the following address;

[racquahl@gmail.com](mailto:racquahl@gmail.com) or [arne.o.oyhus@uia.no](mailto:arne.o.oyhus@uia.no)

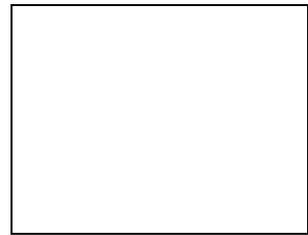
**Certificate of Consent**

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

**Name of Participant**.....

**Signature** .....

**Date** .....



**Thumbprint**

## Appendix II: Semi-structured interview guide for Survivors

Target: Survivors of the Twin-Disaster

Interview code.....

Name of community.....

Date .....

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### Demographic characteristics

1. Sex

- Female
- Male

2. Age

- 18-24
- 25-31
- 32-38
- 39-45
- 46-52

3. Education

- No education
- Junior High School
- Senior High School
- Tertiary
- Vocational
- Others

4. Occupation

.....

5. Marital status

- Single
- Married
- Divorced

- Widow

Objective 1: social vulnerability factors

1. On the day of the disaster where were you? Can you describe what you saw and how the disaster happened?
2. What do you think caused the twin disaster?
3. Did you lose any relative or friend? What factors accounted for the many lives that were lost?
4. How exposed were you to this disaster? What made you so exposed to this disaster?
5. How prepared were you before this disaster?
6. How did you survive the disaster? What do you think made it impossible for others to survive?
7. Did your economic situation put you at risk? Can you explain how?
8. Are you aware this area is a flood prone area and not safe for habitation? What do you think causes this area to flood every year? What factors did you consider before deciding to live here?
9. Have you considered relocating from this community? Why are you still staying here?
10. What social structure existed before the disaster? How did this structure affect you during the disaster?

Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors

1. Did you lose any property and can you quantify them? How did this affect your livelihood? Generally how did the disaster affect you?
2. Did you insure any property and can you explain why?
3. How did the disaster affect your job/occupation?
4. What effect did it have on your family and household? Can you describe how you felt after the disaster and how you feel now when you remember that episode? Can you also describe the feeling of your family after the disaster and now?

Objective 3: immediate response of the community during and after the June disaster

1. What did you do when the area started flooding? Are you used to annual flooding in this community? If yes explain how you cope during such a time?
2. During the disaster what role did you play in response to the situation? How did you survive the disaster?

3. Were you assisted by other friends and relatives within the community that made it possible for you to survive and recover from this disaster? Can you explain how you were assisted?
4. Were you able to offer assistance to others in the wake of the disaster? How did you assist?
5. How are you coping now? Can you explain how other community members are coping after the disaster?
6. What role do you think the community can play to forestall future events?

Objective 4: mitigating and disaster risk reduction initiatives that has been developed by the NADMO

1. Do you know NADMO and what they do? Can you explain the role they played during and after the disaster?
2. Are you aware of any disaster risk reduction initiative in place at the community level by NADMO?
3. Before the disaster did you read any early warning sign about the disaster? Did you hear any announcement from the media or a friend about an impending flooding in the community prior to the disaster? If yes what did you do about it?
4. What do you think should be done to avert future occurrence?

Objective 5: extent to which current disaster management strategy incorporate community based efforts in disaster risk reduction

1. What measures have you put in place to cope with the situation?
2. What measures are you putting in place to ensure you are not affected in the future by these emergencies?
3. Currently are you aware of any disaster management team in this community? What role do they play? Were they effective during the disaster? Can you explain their roles during the disaster?
4. With regards to assistance from residents who helped in saving lives during the disaster, how did they work with NADMO? Were they working together with their friends in the community or they were working hand in hand with NADMO? Please explain.
5. What measures do you have in place to avert future crises like this?
6. What role do you play in disaster management in this community? What roles does this community play in disaster management?

### Appendix III: Semi-structured interview guide for NADMO

Target: NADMO

Interview code.....

Managerial level/Position .....

Date .....

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#### Objective 1: social vulnerability factors

1. What do you think were the factors responsible for causing the twin disaster? What led to the flooding? Is this area a flood prone area? If so were the residents aware and why were they occupying these areas?
2. What social factors exposed people to the disaster? What other factors contributed to the disaster?
3. In terms of development projects like physical infrastructure (roads, gutters and drainage system, electricity, etc), did the community lack certain infrastructure that made people vulnerable to the disaster?
4. What factors account for why some people survived while others died?

#### Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors

1. What was the impact of the disaster on the people? How many lives were lost and what was the quantum of properties lost?
2. How did the disaster affect the livelihood of the residents in this community?

#### Objective 3: immediate response of the community during and after the June disaster

1. What was the reaction of residents during the disaster?
2. Was there assistance from members of the community during and after the disaster? How did they offer assistance?
3. What was the community's reaction after the disaster?
4. Can you describe their reaction (during and after the disaster) as a community that was prepared for such a disaster?

Objective 4: mitigating and disaster risk reduction initiatives that has been developed by NADMO

1. How did NADMO ensure that the community and its inhabitants had access to important information about disaster management?
2. Were there early warning signals available to community members? How was these communicated to them? How did they react to these signs?
3. With specific reference to the twin disaster, what strategy was put in place to offer assistance to the affected residents? What challenges did you face with this strategy?
4. Generally, what is NADMO's strategy for combating disaster? Has this strategy been successful in your assessment of other disasters?
5. What are NADMO's plans for disaster mitigation and risk reduction? What factors affect these plans?
6. What are the major challenges NADMO is facing in its operation?

Objective 5: extent to which current disaster management strategy incorporate community based efforts in disaster risk reduction

1. Are you aware of any community-based efforts in disaster risk reduction in Accra? If yes how is it organized?
2. Does NADMO officially recognise these community-based efforts? Do you incorporate such efforts into your strategies of disaster mitigation and risk reduction? Explain how.
3. To what extent are local community members involved in disaster risk reduction and mitigation initiatives by NADMO?
4. How does NADMO ensure community participation in disaster management?
5. What is the current disaster management strategy of NADMO? How does this strategy make provision for long term preventive measures?
6. Are there other organizations that assist in disaster risk reduction and mitigation? What are their contributions and how do they affect your operations?

## Appendix IV: Semi-structured interview guide for AMA

Target: Accra Metropolitan Assembly

Interview code.....

Managerial level/ Position.....

Date .....

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### Objective 1: social vulnerability factors

1. What do you think were the factors responsible for causing the twin disaster?
2. What led to the flooding? What is the flooding history for this area? How did the inhabitants of this area come to settle here?
3. Were the residents aware of the flood situation in this area and why were they occupying these area?
4. What social factors exposed people to the disaster? What other factors contributed to the disaster?
5. In terms of development projects like physical infrastructure (roads, gutters and drainage system, electricity, etc), what infrastructure did the community lack that made people vulnerable to the disaster?

### Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors

1. What was the impact of the disaster on the people? How many lives were lost and what was the quantum of properties lost?
2. What factors account for why some people survived while others died?
3. How did the disaster affect the livelihood of the residents in this community?

### Objective 4: mitigating and disaster risk reduction initiatives

1. How did AMA ensure that the community and its inhabitants had access to important information about disaster management?
2. Were there early warning signals available to community members? How was these communicated to them? How did they react to these signs?

3. How do you ensure that planning in this area incorporates disaster mitigation and risk reduction?
4. How do you ensure that planning in this area incorporates disaster mitigation and risk reduction?

## Appendix V: Semi-structured interview guide for Ghana Red Cross Society

Target: Ghana Red Cross Society

Interview code.....

Managerial level/Position.....

Date .....

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### Objective 1: Social vulnerability factors

1. Generally, what is your perception about the causes of disasters in Accra specifically with regards to floods and in reference to Kwame Nkrumah Circle and Adabraka communities?
2. Can you please identify some of the vulnerability factors responsible for flooding in Accra with special reference to social vulnerability factors?
3. Recounting the June 3<sup>rd</sup> twin disaster, what in your view were the causes of the disaster?
4. In your own view what was the social and economic vulnerability factors that led to the disaster? In other words what social factors exposed people to this disaster?

Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors.

1. What was the impact of the disaster on the people?
2. How did the disaster affect the livelihood of the residents in this community?

Objective 3: Response of the community during and after the June disaster

1. What was the immediate response of the community after the disaster?
2. What role did the Red Cross play after the disaster?
3. Did the Red Cross work with assistance from individuals in the community? How was this collaboration done?

Objective 4: Mitigating and disaster risk reduction initiatives

1. What is your view on disaster mitigation and risk reduction in disaster situations in Ghana?

2. What is your view on how this disaster was managed by NADMO?
3. What is your view on community involvement in disaster management in Ghana?

Objective 5: extent to which current disaster management strategy incorporate community based efforts in disaster risk reduction

1. Are you aware of any community-based efforts in disaster risk reduction in Accra? If yes how is it organized?
2. Does your organization assist NADMO in disaster risk reduction and mitigation? Do you have any working relations with the communities with regards to disaster management?

## Appendix VI: Semi-structured interview guide for Africa 2000 Network, Ghana

Target: Africa 2000 Network, Ghana.

Interview code.....

Managerial level/Position.....

Date .....

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### Objective 1: Social vulnerability factors

1. Generally, what is your perception about the causes of disasters in Accra specifically with regards to floods and in reference to Kwame Nkrumah Circle and Adabraka communities?
2. Can you please identify some of the vulnerability factors responsible for flooding in Accra with special reference to social vulnerability factors?
3. Recounting the June 3<sup>rd</sup> twin disaster, what in your view were the causes of the disaster?
4. In your own view what was the social and economic vulnerability factors that led to the disaster? In other words what social factors exposed people to this disaster?

Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors.

1. What was the impact of the disaster on the people?
2. How did the disaster affect the livelihood of the residents in this community?

### Objective 3: Response of the community during and after the June disaster

1. What was the immediate response of the community after the disaster?
2. What role did your organisation play after the disaster?

### Objective 4: Mitigating and disaster risk reduction initiatives

1. What is your view on disaster mitigation and risk reduction in disaster situations in Ghana?

2. What is your view on how this disaster was managed by NADMO?
3. What is your view on community involvement in disaster management in Ghana?

Objective 5: extent to which current disaster management strategy incorporate community based efforts in disaster risk reduction

1. Are you aware of any community-based efforts in disaster risk reduction in Accra? If yes how is it organized?
2. Does your organization assist NADMO in disaster risk reduction and mitigation? Do you have any working relations with the communities with regards to disaster management?

## Appendix VII: Semi-structured interview guide for Ghana National Fire Service

Target: Ghana National Fire Service.

Interview code.....

Managerial level/Position.....

Date .....

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### Objective 1: Social vulnerability factors

3. Generally, what is your perception about the causes of disasters in Accra specifically with regards to floods and in reference to Kwame Nkrumah Circle and Adabraka communities?
4. Can you please identify some of the vulnerability factors responsible for flooding in Accra with special reference to social vulnerability factors?
5. Recounting the June 3<sup>rd</sup> twin disaster, what in your view were the causes of the disaster?
6. In your own view what was the social and economic vulnerability factors that led to the disaster? In other words what social factors exposed people to this disaster?

Objective 2: social, economic, and psychological effect of the disaster on the livelihood of survivors.

1. What was the impact of the disaster on the people?
2. How did the disaster affect the livelihood of the residents in this community?

### Objective 3: Response of the community during and after the June disaster

1. What was the immediate response of the community after the disaster?
2. What role did the Red Cross play after the disaster?
3. Did the Red Cross work with assistance from individuals in the community? How was this collaboration done?

### Objective 4: Mitigating and disaster risk reduction initiatives

1. What is your view on disaster mitigation and risk reduction in disaster situations in Ghana?
2. What is your view on how this disaster was managed by NADMO?
3. What is your view on community involvement in disaster management in Ghana?

Objective 5: extent to which current disaster management strategy incorporate community based efforts in disaster risk reduction

3. Are you aware of any community-based efforts in disaster risk reduction in Accra? If yes how is it organized?
4. Does your organization assist NADMO in disaster risk reduction and mitigation? Do you have any working relations with the communities with regards to disaster management?