



FLOOD MITIGATION AND ADAPTATION MEASURES: THE ADAMAWA STATE

EXPERIENCE

**KADALA S. BANDI, MOSES Z. WANDA AND FATIMA
S. MEDUGU**

*Department of Urban and Regional Planning, Federal
Polytechnic, Mubi – Nigeria.*

Abstract

In 2012 and some subsequent years, there were cases of flooding along the coastal areas of major rivers in Nigeria, namely the river Niger and the Benue valley. Recently Adamawa State government reported that about 302,200 people were affected in a flooding which occurred between 30th August and 25th September 2015. This research investigated the causes of the flood and how the Adamawa state government contained it and adapted to it, to prevent future occurrence. The methods employed in this study are interviews and site visitation of three settlements mostly affected by floods annually. The research finds that the three stages of prevention preparedness and mitigation were observed in the control of floods in Adamawa State by the National Emergency management Agency (NEMA) and Community Base Organizations (CBO's) which are mostly homogeneous in nature. Information dissemination and evacuation of displaced persons from the affected settlements were the major roles played by the government at both national and State

level. The study thus, recommend for the control of flood plains in all parts of the state to avoid the development of permanent settlement that will put the life of residents at risk

KEYWORDS:

Flood, Risk,
Adaptation,
Mitigation,
Preparedness,
Disaster.

when disaster strikes and that government at both national and State should embrace the teaching of Disaster risk reduction to school children and women organizations, considering the fact that women, children and the aged are the most victims of flood disasters.

Introduction

A disaster is "a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistances; an unforeseen and often sudden even that causes great damage, destruction and human suffering" (Centre for Research on Epidemiology of Disaster (CRED). Disasters are defined by the disruption of the functioning society, involving widespread human, material, economic or environmental losses, and this is largely influenced by population and their location (Bouwer, 2010 and CDERA, 2006).

Earthquakes, storms, and other hazards killed about 3.3 million people between 1970 and 2010, which is an annual average of 82,500 deaths worldwide in a typical year (NHUD report, 2010). Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities. Events of hydro meteorological origin constitute the large majority of disasters. Despite the growing understanding and acceptance of the importance of disaster risk reduction and increased disaster response capacities, disasters and in particular the management and reduction of risk continue to pose a global challenge (UNDP, 2004a and Colten, Kates, and Laska (2008).

Flood is the accumulation of excess runoff water that piles up in the environment thereby causing destruction to lives and properties. Scholarly definitions are many however this simple definition above shows that when water accumulates and does not have channel to follow it becomes a problem. Bwalaet'al (2015) defines it as "an environmental hazard which occurs when there is an overflow of water that submerges land that is usually dry." Flood has been classified as one of the major disaster the world over. In countries along the seashores and major rivers, the major cause of concern is flood. In Nigeria the areas around the coast; Lagos, Port Harcourt, and areas along the river Niger and Benue basin has suffer a great deal from flooding especially in 2012.

Of recent the Adamawa State government reported that between 30th August 2015 and 25 September 2015, 302,200 were affected by flooding following a technological breakdown between Dadinkowa dam in Gombe State and Kiri dam in Adamawa State. This was however, exacerbated by the rainfall and the flood affected six local governments.

This aims to investigate how flooding occurrences were managed in the flood prone areas in Adamawa State with view to proffer measures that will curtail damages resulting from flood disaster. The objectives of the paper are to:

1. Identify areas prone to flooding in Adamawa state
2. find out the causes of the flood
3. Assess the level of prevention, preparedness and mitigation taken by both the Federal and the state government.
4. Recommend possible flood control measures to manage/reduce damages caused by flood disaster in the state and the country at large

CONCEPTUAL CLARIFICATION

FLOOD

Flood may occur along rivers, coasts or near storm water network in human settlement. Flood waters are highly dangerous. Dhamejah (2009) observed that fast flood can sweep people off their feet, move vehicles and substantially damage buildings. Deeper, slow-moving waters or ponds can also be dangerous. Flood water can cause physical damage and disruption to infrastructural facilities and services. Those frequently affected by flood and natural disasters are the flood prone and disaster affected poor.

CAUSES OF FLOODS

Floods are essentially caused by heavy storms. There are two types.

1. *Long-duration storms.* This type of storm is associated with the northeast monsoon, when incessant rain of low to moderate intensity occurs over an extensive area. The resultant consequence culminate into a huge volume of rainwater thereby causing wide-spread flooding and, in extreme cases, island-wide flooding (Wanda, Medugu, & Ayuba 2015).
2. *Short-duration storms.* Parallel to long-duration storms, short-duration storms, such as thunder storms, occur in localized areas with rain of high intensity (intensity that can be several times more than that of long-duration storms). Notwithstanding the high rainfall intensity, because of its short duration and localized nature, relatively small volume of rainwater is generated in a short-duration storm. Consequently the resulting flood is transient, hence the term flash flood. Flash floods may be of nuisance value or they may cause varying degrees of damage and loss such as were witnessed in the Central Business District not too long ago (Cheong, 2012).

CONTRIBUTION OF URBANIZATION TO FLOODING

Urbanization is perhaps the most significant factor that contributes to the worsening of flooding conditions. This is because urbanization leads to a dramatic increase in surface water runoff, i.e., the volume of rainwater which directly flows

into rivers and drains during a storm. Figures obtained elsewhere with similar climatic and geographical conditions show that the surface runoff generated in a forested/vegetated catchment is typically of the order of 30% of the total volume of rainwater, the other 70% being made up of different amounts due to interception by foliage, detention on ground depressions and infiltration into the ground. For a moderately urbanized catchment, the ratio can be reversed, i.e., the surface runoff can now be 70%. The proportion is even higher for a highly urbanized catchment due to the near absence of foliage and ground depressions and the fact that a higher percentage of land is covered by surfaces impervious to the infiltration of rainwater (Cheong, in Wanda, Medugu, & Ayuba. 2015).

FLOOD MANAGEMENT STRATEGY

Flood management strategies are many and divergent in nature. Many scholars have proposed flood management techniques. Ekopet'al (2007) proposed flood avoidance delay, river control and embanking, flood loss reduction and developing guidance and control strategy as strategies for flood mitigation and adaptation. Ekopet'al (2007) further suggests that there should be a sustainable settlement strategy which will guide and control urban development as well as there should be flood control regulations which should be accompanied with monitoring and evaluation.

Freire and Stren (2001) and GFDRR (2010) also stated that limiting development near important water sources does not only preserve water quality but also prevents flood and provides connection to nature. They further observed the importance of incorporating community perception into project planning which they believed has helped in the case of public projects designed to relieve flooding in the slums of Indore, India. Keeble (1969) stated that in the planning of new settlements attention must be focused on the underground water level of the areas proposed so as to prevent flooding in wet seasons. Hoornweg (2011) reports Midley and others (2005) as saying that a vulnerability assessment for Western Cape proposed creation of a 5 - meter buffer zone along the coast. Hoornweg et'al (2011) and Gilber&Gouy (1998) also stated that in the case of Mumbai due to climate change the city has adapted coastal zone planning. Hoornweg et'al further identified and distinguished four closely related aspects of adaptation in the case of flood mitigation. These are long - term resilience, pre-disaster damage limitation, immediate post disaster response and rebuilding. Kadalaet'al (2014)

suggests that developers should partner with the government in the provision of drainage to channel runoff water to its appropriate discharge locations.

TERMS USE IN DISASTER RISK REDUCTION AND MANAGEMENT

- a. Prevention can be referred to as guiding or controlling an activity or process that results into an action, such that the action does not occur.
- b. Mitigation is the process or action involve in reducing theseverity/seriousness or impact of something, especially disaster.
- c. Preparedness is making ready to contain or reduce the impact of an action such that the impact is met with readiness.
- d. Responses/Relief can be defined as the reaction given back after an action to cushion the effects of the action.
- e. Recovery/ Rehabilitation is the putting back in place anything that has been worn out due to time (life span) or stress or pressure, to its initial functioning.

RESEARCH METHODOLOGY

The study area is Adamawa State in the Upper Benue valley in the North-eastern part of Nigeria. The river Benue runs through the state and possess annual threat to communities. It traverses 6 local governments it has river Gongola as one of its major tributaries. Major settlements such as Jimeta, Demsa, Numan and Fufore are situated on the river bank, thus making Adamawa State vulnerable to flooding when disaster strikes. Methods of floods mitigation and adaptation are not so much different from what is applied in the study of climate change and its vulnerability on the environment. Considering the broad nature of risk assessment in flood prevention, this research was designed to examine the pre-damage limitation stage. This is a short term measures to limit the impact of flooding. This stage therefore examines the heterogeneity of the residents of the study area and their preparedness in the face of emergency responses measures, the level of awareness of residents on what to do in terms of emergency was also examined. It also examined the involvement of Community Base Organizations (CBO's) and Non-Governmental Organizations (NGO's) in flood risk reduction. Interviews were conducted among villagers as beneficiaries of government intervention to determine methods government used in the prevention of the flood. The

interviews were conducted in three local governments namely; Yola North, Demsa and Numan, where villages and settlements were submerged in the flood.

THE STUDY AREA

The North-East region of Nigeria has become frequently plagued by disasters, especially those arising from conflict, civil disturbance (**Boko Haram**) and natural phenomenon (flood) resulting in the displacement of the indigenes mostly women, children and the aged. The case of flood seems to be annual and reoccurring thus, the need for this research to determine the preparedness of stakeholders involved in flood prevention mitigation in Adamawa state.

RESULTS AND DISCUSSION

Data collected from the National Emergency Management Agency (NEMA) shows that in 2012, the agency was involved in sensitization of the people in North-eastern Nigeria in the areas of flood prevention, preparedness and mitigation. Workshop was held in March 2012 to that effect. In 2012 nine (9) local government areas were affected by flooding. *Numan, Lamurde, Demsa, Guyuk, Gulak (Madagali) Mubi, Yola North, Yola South, Michika and Fufore*, were the local governments affected by flood. According to the annual report of the National Emergency management Agency (NEMA) 2012, there were 61,865 casualties in these areas and about 1,500 in a flood that hit Fufore local government alone in the same year. Damages recorded in these incidences include houses, farmlands destruction and bridges, schools, markets and religious buildings. Similarly in Fufore farmlands and farm produce stores were affected. There were 19 deaths in the flood incidence in the six local governments put together.

In the quest to identify the methods used by the Adamawa state government and the National Emergency management Agencies at both state and national level, the research sought to identify the local and international organizations that participation in the mitigation and adaptation stages. In response to this, the research find that aside from the national metrological agency and the National Orientation Agency of Nigeria (NOA) there was no other organization that participated in the decimation of information regarding the anticipated flood for that year.

PREVENTION STRATEGY ADOPTED BY THE GOVERNMENT

The Adamawa State government in collaboration with media organizations through the ministry of information and culture informed residents and especially

those dwelling in valleys and around major water ways to move out before the expected dates announced by the metrological unit of the Ministry of Environment. Police and the traditional council swung into action to chase people by force and make sure they comply with the directive issued by the government for them to move out during the stated period. Though the prevention was announced by the government and the organized traditional council, compliance is solely the responsibility of individual household and organizations.

PREPAREDNESS

The preparation stage was poorly handled by the government in the sense that government could not provide or make adequate preparation to attend to the affected people. The state government only got involved when the National Emergency Management Agency (NEMA) swung into action to assist and shelter the displaced. The state government was expected to have moved into the vulnerable areas to force the residents to leave the areas under compulsion but nothing was done until the floods came and ravage the settlements and destroyed valuables.

MITIGATION PROCESS ADOPTED

Most people that were evacuated and displaced due to the flood in 2012, 2013, 2014 and subsequently 2015 were left homeless. There was no mitigation measure adopted by the Adamawa state government to lessen the impact of the flood on the people affected. Thus most of the displaced came back to a dilapidated and mostly shattered social life. The National Emergency Management Agency (NEMA) evacuated the sthe displaced persons and sheltered them at various camps and provided them with aid and necessary sanitation during the disaster. But after wards displaced were allowed to go back to same location without making effort to restrict their going back.

CONCLUSION

This research finds that government is involved in the pre damage assessment state of flood disaster in Adamawa State. However, most interventions are in sensitizations only. While in the preparedness government does not however, make adequate arrangement for the displaced. When NEMA comes into the picture the state government seem to be seen to assist in the dissemination of information mostly through radio. At the Mitigation state the people who are

most homogeneous are united by a common bond of tribe and family which makes them. The research also finds that people residing in valleys and along rivers banks are mostly of the same dialect and cultural background except in Yola north where the population is heterogeneous comprising of Hausa migrants and local fishermen from Mbula and Bachama. The Hausas are mostly Dry season farmers. They have devised techniques and method of responses in the case of emergency especially during flood. One of such technique is building of embankment to prevent water from entering into the settlement. Individually also the people have been sensitized against making a permanent development in the valleys and close to the river banks. It was also found out that Community Base Organizations such as tribal associations and clubs play a vital role in sensitizing the people against before or during flooding and providing necessary assistance in the evacuation of children, women and the aged. The CBO's however works in collaboration with the government agencies responsible for evacuation, sensitization and creating awareness, namely the National Emergency Management Agency (NEMA), The Nigerian Metrological Agency (Neasrea) and the National Orientation Agency (NOA).

RECOMMENDATIONS

Base on the findings of this study, the authors proposed the following recommendations.

- i. Government should be actively involved in the control of development in the flood plains both at rural and urban areas to curtail losses of lives and property.
- ii. Government at State and Local levels should be involved actively in the development of flood plains to avoid illegal permanent structures development by the dwellers.
- iii. The government of Adamawa State should replicate the method used in Loko Flood disaster of 1994 by relocating villages that are prone to flood disasters so as to reduce the risk of loss of lives and properties.
- iv. NGOs and Community base organisations (CBOs) should be encouraged to play roles beyond financial and communal ties and to embrace education by social welfare and other NGO's for emergencies as practiced in Japan.
- v. Government should include in its curriculum at all levels of education to prepare individuals pupils to adapt proper measures for disaster risk management.

- vi. Special development control unit should be created by government to monitor and remove all development blocking water ways both by individuals and or corporate organization.

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