



Ravaging Urban Floods: Consequences and Remedies

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Abstract: *The increasing menace of floods and flooding in the urban areas of Nigeria was studied. The paper reviewed the causes of the flooding, the consequences and possible mitigation measures. While highlighting the beneficial aspects of flooding, the paper enumerates the ugly effects. These include loss of lives and properties, slowing down development, psychological impacts, loss of norms, culture and traditions, pollution among others. Realizing that it may not be possible to have a flood free situation, the paper goes further to recommend remedies. These include the need to respect drains and other facilities by not converting them to waste dump sites. Construction of flood protection structures such as Reservoirs, levees, flood walls to reduce flood peak. Enactment and enforcement of laws, polices to guide against indiscriminate construction of houses that block water ways.*

Key words: Urban, Flood mitigation, Dams, Drainage, Reservoir

INTRODUCTION

Flood, according to Linsley *et al.* (1992) is runoff from rainfall in significant quantities that cannot be confined in river or stream channels. When there is a heavy rainfall, the river channel capacity is exceeded and thus inadequate to carry the overflowing water quantity, causing the river to overflow its banks and inundate the surrounding, thereby producing flood (Reddy, 2008). Flood occurs when water inundates a land that is normally dry and the dominant cause is rainfall. Floods can be classified according to their origin and characteristics and they include fluvial, pluvial, flash or coastal (UNESCO and WMO, 2012). The menace of flooding and the attendant erosion in this country cannot be measured or quantified. It cuts across all states of the country with heavy impacts on the socio-economic development of the people which include damage of properties, loss of lives and businesses, etc. Anika (2019) disclosed that 32 states out of the 36 states in the country were affected with worst flooding scenarios in 2012. Heavy downpour and increase in rainfall which are the major causes of flooding are natural events which cannot be regulated or controlled. Rainfall in quantities, intensities and duration which are not commensurate with the percolation or infiltration capacity of the earth vegetative surface lead to excess water flow. This is otherwise called flood. However, flood is a natural disaster which can be mitigated collectively in order to reduce the global fatality and disturbing calamities it creates. This can be done by putting all the protective measures in check. As long as rainfall occurs on the earth surface, it must generate flood. In this regard, Olanrewaju *et al.* (2019) stated that the most natural occurring disaster is flood with over 2.8 billion people affected in the world, resulting in over two hundred thousand (200000) deaths of humans for the past three decades. Reports from National Emergency Management Agency (NEMA), according to Anika

(2019) unveiled the extent of flood damage in the country. Two million Nigerians were displaced in 2012, with the death of about three hundred and sixty-three (363). In 2015, One hundred thousand (100,000) persons were affected, resulting in the death of fifty-three (53) persons. 2016 was not left out, thirty-eight (38) died while ninety-two (92,000) were displaced. Also in 2017, flood affected two hundred and fifty (250,000) people. Flood disasters are one of the most natural disasters that hit the society with greater impacts (APFM, 2017)

1. Causes of Urban Flooding

Heavy and consistent rainfall cause the rivers and streams to overflow their banks and cause flooding in adjoining areas. Apart from flooding in coastal regions (e.g. Lagos, Niger Delta, etc.) which occurs as a result of rising of sea level, other urban areas, which are ordinarily not susceptible to flood are increasingly becoming affected owing to the following reasons:

A. Uncontrolled Urbanization

Associated with urbanization is increased tempo in the development of physical infrastructure. Thus, more houses are built, roads are widened, etc. In the process, more and more land areas are exposed. Also more areas are giving concrete paving, thus accumulating more runoff. This demands great planning to channel the resulting floods properly. However, when the process of urbanization goes on in an uncontrolled manner, the resultant effect is flooding leading to urban squalor. As Warren *et al.* (1996) puts it, urbanization of land usually results in the highly accelerated removal of storm water with corresponding increases in the volume and peak rate of runoff which directly causes flood

B. Industrial Activities

Increased industrial activities in any community is a welcome development. Of necessity, these industries must discharge their effluents and other wastes. There will be increased vehicular and human movement. Loading and off-loading activities both manually and with the aid of heavy vehicles must go on. The result is further stress on the soil, thus hindering its ability to absorb percolations, hence increased flooding.

C. Non-Provision of Drainages

Many roads are constructed today without provision for drainages. When drainage is not provided, then uncontrolled movements of runoff. The result is flooding in low land areas.

D. Blocked Drainage

Many layouts in the cities are not planned. Where they are planned and water ways provided, the average citizen acts with impunity and blocks water ways with building and other structures. In the words of Anika, (2019), the infrastructural development, expansion and growth of urban areas have been poorly managed and regulated especially in areas of town planning and housing.

E. Poor Planning

In some cases, where there is provision for drainage, relevant professionals are not involved, some of the drainages are not interconnected for efficient water flow to the required or final destination. Some of the drainages are not properly channeled to discharge water. Slopes are haphazard. The result is water logging and flooding in adjoining streets and roads as rainfall increases.

F. Illiteracy

Illiteracy has led to a number of anomalies in behavior. Drainage facilities now serve as refuse disposal sites for wastes thus leading to blocking of drains. Drainage systems are naturally designed and constructed with gradient to increase the water flow but dumping of wastes deny that characteristic, thus storm water cannot flow. This leads to severe calamities as runoff finds its way to some homes. Fig. 1 is Fanikayode road in Warri, Delta State where stagnant, non-flowing drain is causing flooding. Fig. 2 and Fig. 3 are drainages serving as waste disposal sites in Benin City and Warri. Fig. 4 is Lugbe community in Abuja flooded due to clogging of drains as a result of indiscriminate disposal of wastes.



Fig. 1 Non flowing Drain in Fanikayode Road, Warri, Delta State.



Fig. 2 Drainages as dumping ground for wastes in Benin City.



Fig. 3 Drainages as dumping ground for wastes in Warri.



Fig. 4 Lugbe Community flooded in Abuja (Source: Anika, 2019)

2. Socio-Economic Impacts of Floods

It must be admitted that floods and flooding have positive and negative impacts on society. However, the negative impacts far outweighs the positive impacts. If properly managed, some of the positive impacts include its benefit in the cultivation of such agricultural crops like rice. Flooding enriches the soil by depositing necessary sediments and nutrients, thus, reducing the necessity to apply artificial fertilizers which in turn destroy groundwater quality. Also, flood water can be channeled into irrigation sites, thereby reducing the cost of seeking other sources of providing needed water. Flood water also helps to recharge water sources. It helps to meet round the year water demand by restocking both natural and man-made water storage facilities such as dams, ponds, reservoirs, irrigation channels, etc. (www.floodmanagers.com) These benefits, however, are overshadowed by the numerous negative and devastating impacts on mankind. These include:

A. Loss of Lives and Properties

It is already a well-known fact that one of the most dreaded impact of flooding is the loss of human lives, both children and adults. An 11 year old boy alongside with the rescuer was swept away by flood in the Aboru, Alimosho Local government in Lagos on Saturday, October 12, 2019 (www.doubleamedia.com.ng). There are numerous other cases of death as a result of flood. Damage to property, infrastructure, agricultural farm lands and crops, loss of livestock etc. are often associated with flood menace (Avemaria and Ilaboya, 2007).

B. Slowing Down Development

Raging flood water which leads to destruction of property, houses, farm lands and crops, disruption of business and commercial activities affects greatly the pace of development of the nation. The time needed to recover from the effect of flooding is more than the duration of the flooding. The economic loss with the social implication takes time to heal and recover thus affecting development (Anyata, 2000).

C. Loss of Culture, Norms and Tradition of People

Flood can cause widespread devastation and massive migration of communities from their flooded areas to other places. Most times the migration tends to be towards the urban areas thus causing overcrowding in the cities. Such displaced individuals and communities usually lack the zeal and enthusiasm to maintain culture and tradition of their people. Their focus will centre on how to survive and make up for their loss.

D. Psychological Impacts

The psychological effect and impact of flooding on victims and their families can traumatize them for a very long period of time. The trauma can come as a result of loss of loved ones, children, properties, crops, homes, shelter, business ventures, social life, etc. The stress of overcoming all these losses is devastating and leads to loss of hope for life.

E. Pollution

Flood water can increase the pollution level of water bodies thereby deteriorating the quality of the water bodies and increasing the treatment cost. It might also disturb the aquatic eco-system of the water bodies.

F. Economic Growth and Development

Provision of relief materials and items to affected victims hinders and diverts funds which may have been used for other developmental activities. Additional cost of rehabilitation, relocation of people and removal of property from affected flooded areas can divert the capital required for maintaining production. Regions susceptible to flood will not attract any investment either from government or private investors.

3. Urban Flood Mitigation - The Way Forward

Urban flood mitigation are measures adopted to reduce flood damage in urban areas since it is not economically feasible to have an absolute control over the flood (Arora, 2007). Nature cannot be predicted, so no matter the engineering and management strategies adopted, there will always be a risk of flood. While it may not be possible to eliminate flood since it is a natural occurrence, a few measures can however be taken to bring it under control to combat the damages. In order to minimize and reduce the risk of flood to economies, urban and rural areas and environments at large, there is great need to integrate past flood records, advance technology and expertise in developing strategies to combat flood and its negative impacts. Local, State and federal government policies and laws help in reducing the negative impacts of floods, improving emergency responses and optimizing recovery of communities affected by flood. According to APFM 2006, flood and floodplain management help and play crucial roles in protecting humans, animals, properties and socioeconomic developments.

Flood mitigation measures and projects are generally aimed at reducing flood runoff or flow. To achieve this objective:

- i. Drainage facilities must be allowed to perform the functions for which they were constructed. They are not to serve as disposal sites for solid waste materials which end up in blockage of the drains.
- ii. Every road must have drainage. All drains in urban areas subdivided into catchments must be well and efficiently interconnected to discharge flood or runoff into appropriate water bodies.
- iii. Urban and Town planning agencies must enforce laws, policies and other legislations concerning indiscriminate building of houses without approval. Sometimes houses are constructed along water ways thus exposing surrounding areas to flood hazards.
- iv. Responsibility of planning for flood mitigation does not only rest on the government, it involves every individual. The more enlightenment and awareness, the people have about flood issues, the better for society.
- v. Flood Protection structures such as Reservoirs, levees and flood walls should be erected in every flood prone locality. They should also be operated, maintained and monitored regularly. They help to store flood water especially during peak time (World commission on dam, 2000).
- vi. A flood warning system ought to be provided in areas where severe flooding is possible should the protective works fail (e.g. levees can fail, reservoirs can be full when flood occurs, or floods greater than the design capacity can occur) or become inoperative (Linsley *et al.*, 1992).
- vii. Flood channels should be improved, particularly with the lining of the channels.
- viii. Planting of grasses should be encouraged. This is imperative since it is established that vegetal cover removes moisture from the soil by transpiration and also promotes loose organic soil which is favorable for the infiltration of rainfall. The vegetal cover creates a sort of retarding basin that stores a portion of runoff that might otherwise contribute to floods. Loss of vegetation and forest may increase flood discharge resulting in more flood disaster (Bradshaw *et al.*, 2007). Water-retention capacity and infiltration rates are increased through organic matter from roots and leaves (Mirza *et al.*, 2005).
- ix. People should be advised to avoid flood plain in infrastructural development.

CONFLICT OF INTEREST

I hereby state that no conflict of interest will arise in any form from the publishing of this study.

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