

An Assessment of Flood Hazard in Nigeria: The Case of Mile 12, Lagos

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Abstract: *Apart from traffic congestion, flood is the most common serious physical urban problem in most Nigerian cities. This usually results from high river levels, concentration of overland flow following heavy rainfall, limited capacity of drainage systems and blockage of waterways and drainage channels. This study identified the factors responsible for perennial flooding in Mile 12 area of Lagos, Nigeria which has constituted serious menace in terms of socio-economic and environmental consequences. The research methodology involved questionnaire administration on households, key informant interview especially on Lagos State Physical Development Authority (LASPPDA) officials and participant-observation, while other data were collected from secondary sources including various relevant publications and text books. The result shows that the perennial flooding problem in Mile 12 is as a result of consistent high rainfall and water releases from Oyan dam in the neighbouring state of Ogun, Nigeria. Other causes of flood in the study area include blockage of drainage channels by refuse and other wastes, narrow river channels and construction along floodplain. In a bid to ameliorate the seemingly intractable problem of flooding in the study area, the recommendations made include: provision of sufficient setback to streams and rivers, construction of roads with good drainage system, channelization and building of more dams to avoid excess loading of the existing dam.*

Key Words: *Flood, Lagos, Mile 12, Hazard and Oyan Dam*

1. Introduction

Flood is a large amount of water covering an area that is usually dry. It is an overflowing of a great body of water over land not usually submerged. Nwafor (2006) defined flood as a natural hazard like drought and desertification which occurs as an extreme hydrological (run off) event. On the hand, Abam (2006), defined flood as large volume of water which arrives at and occupy the stream channel and its flood plain in a time too short to prevent damage to economic activities including homes.

Flooding is the most common environmental hazard in Nigeria (Etuonovbe, 2011). Flood disaster is not a recent phenomenon in the country, and its destructive tendencies are sometimes enormous. Reports have it that serious flood disasters have occurred in Ibadan (1985, 1987 and 1990), Osogbo (1992, 1996, 2002), Yobe (2000) and Akure (1996, 2000, 2002, 2004 and 2006). The coastal cities of Lagos, Port Harcourt, Calabar, Uyo, Warri among others have severally experienced incidences that have claimed many lives and properties worth millions of dollar. Floods occur in Nigeria in three main forms: coastal flooding, river flooding and urban flooding (Folorunsho and Awosika 2001; Ologunorisa, 2004). Coastal flooding occurs in the low-lying belt of mangrove and fresh water swamps along the coast (Folorunsho and Awosika 2001; Ologunorisa, 2004). River flooding occurs in the flood plains of the larger rivers, while sudden, short-lived flash floods are associated with rivers in the inland areas where sudden heavy rains can change them into destructive torrents within a short period (Folorunsho and Awosika 2001; Ologunorisa, 2004). Urban flooding on the other hand occurs in towns, on flat or low-lying terrain especially where little or no provision has been made for surface drainage, or where existing drainage has been blocked with municipal waste, refuses and eroded soil sediments (Folorunsho and Awosika 2001; Ologunorisa, 2004). In spite of series of recommendations

from research and government efforts at mitigating the menace, urban flooding has become a perennial event in most Nigerian cities.

Urban flood problem is a global experience but the management practices differ according to prevailing technologies and aptness in planning concerns. The experience is however worse in Third World cities where unplanned and uncoordinated development is prevalent. Odemerho (2004) and Nwafor (2006) identified 12 causes of urban flooding. These include: surcharges in water level due to natural or man – made construction on flood path, sudden dam failure, inappropriate land use, mudflow, inadequate drainage capacity to cope with urbanization, excess encroachment in flood ways, ice jam, rapid snow fall, deforestation of catchment basins, reclamation, construction sites and solid waste. Odemerho (2004) also identified three factors accentuating flood problems in Benin City, Nigeria namely: land and physical development problems, gaps in basic hydrological data, design and implementation problems and cultural factors. Okereke (2007) listed the consequences of urban flooding in his studies in Dhaka, Bangladesh to include: loss of human lives, flooding of houses, streets, inflow to soak away, municipal pollution, damage to properties, health hazards, cleanup costs, disruption of services, traffic problems, adverse effects on aesthetics, disturbances on wildlife habitats, economic losses and infrastructural damage.

The Nigerian Punch (2010) reporting on flooding in Lagos, Nigeria made detailed report of frequent flood occurrences in Ikoyi, Victoria Island, Ipaja-Ayobo, Ajegunle, Ikorodu, Agiliti and Mile 12 (the study area). The report concluded that there is a need for flood control coordination between relevant departments. It also clamored for a well articulated flood control policy and societal re-orientation on this critical issue.

This study is therefore a further attempt to identify the factors responsible for perennial flooding in Mile 12 area of Lagos, Nigeria with a desire to suggest plausible solutions to this seemingly intractable problem which has constituted serious menace to livelihoods and environmental quality.

2. Materials and Methods

The study area is Mile 12, Lagos State, Nigeria. It is one of the 35 settlements in Kosofe Local Government Area of Lagos State (Figs 1 and 2). Due to its location as the gateway to Lagos state, Mile 12 houses people from the Northern and the Eastern parts of the country who engages in commercial activities. The population of the settlement according to the 2006 national population census is 682,772 (National Population Commission, 2006). The vegetation is the swamp forest which had made way for the construction of houses, markets and other infrastructure. The area is influenced by two climatic seasons namely: dry and wet seasons. Dry season occurs between November to March, and wet season, between April to October. Ogun River and its tributaries drain the Northern part of the town, which is densely settled. Some of the residential neighbourhoods are traversed by Ogun River.

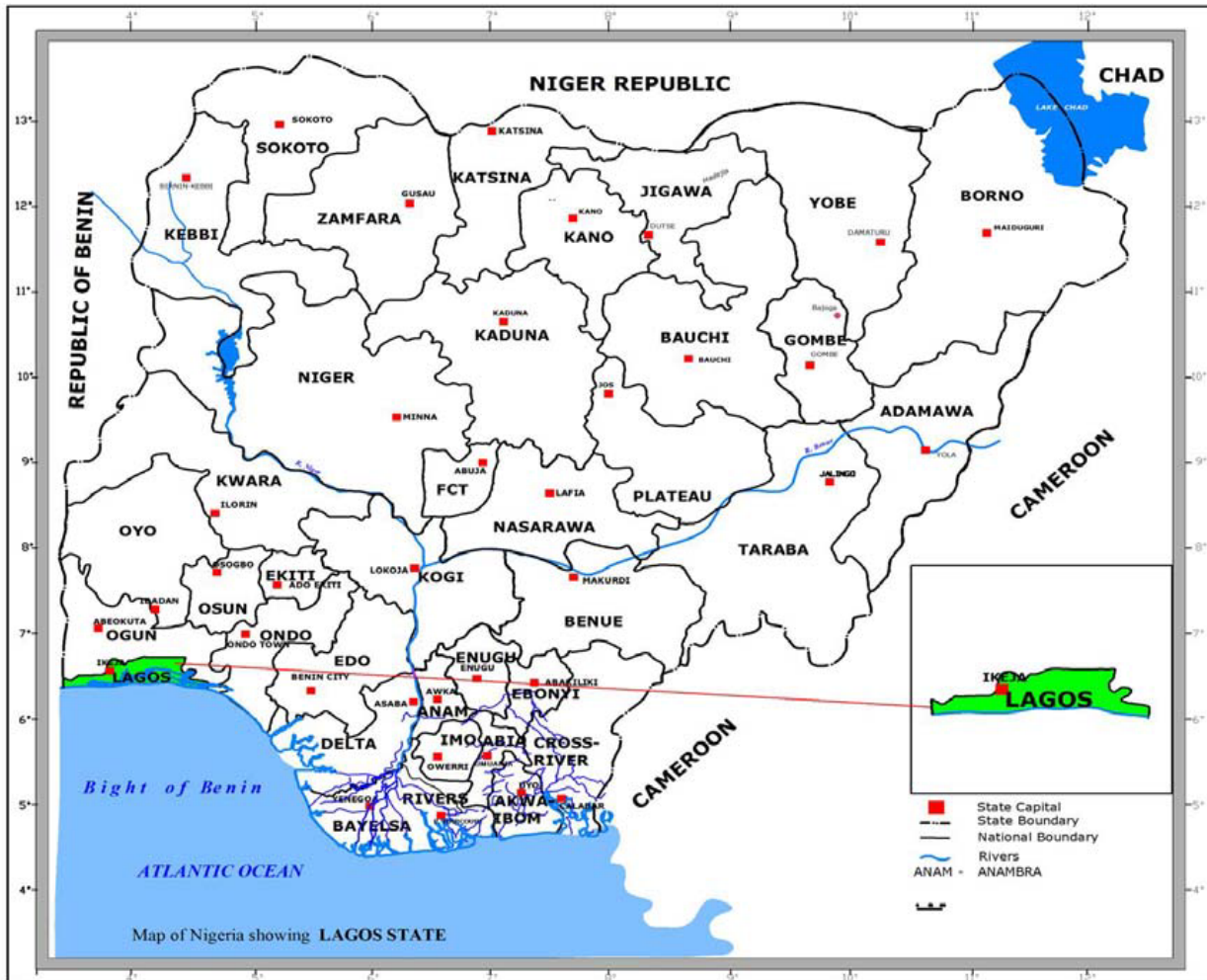


Fig.1: Lagos State in Nigeria

Five neighbourhoods in this settlement that annually experience critical flooding were used for analysis in this study. These are: Ajelogo, Agiliti, Agboyi, Maidan and Owode-Elede. The research populations for this study are households and buildings in the flood prone areas of the settlement. The total numbers of buildings identified to be flood-prone in the areas are 830. These structures were identified using SPOT imagery of Lagos coupled with ground-truthing as recorded by Lagos State Physical Development Authority (LASPPDA, 2010). Out of the total population of 830 structures affected, a 20% sample was taken using random sampling technique. As a result of this 166 household questionnaires were administered. It is imperative to emphasize that the population figure of this settlement was not disaggregated by the National Population Commission. Thus, this study assumed equal population for each neighbourhood.

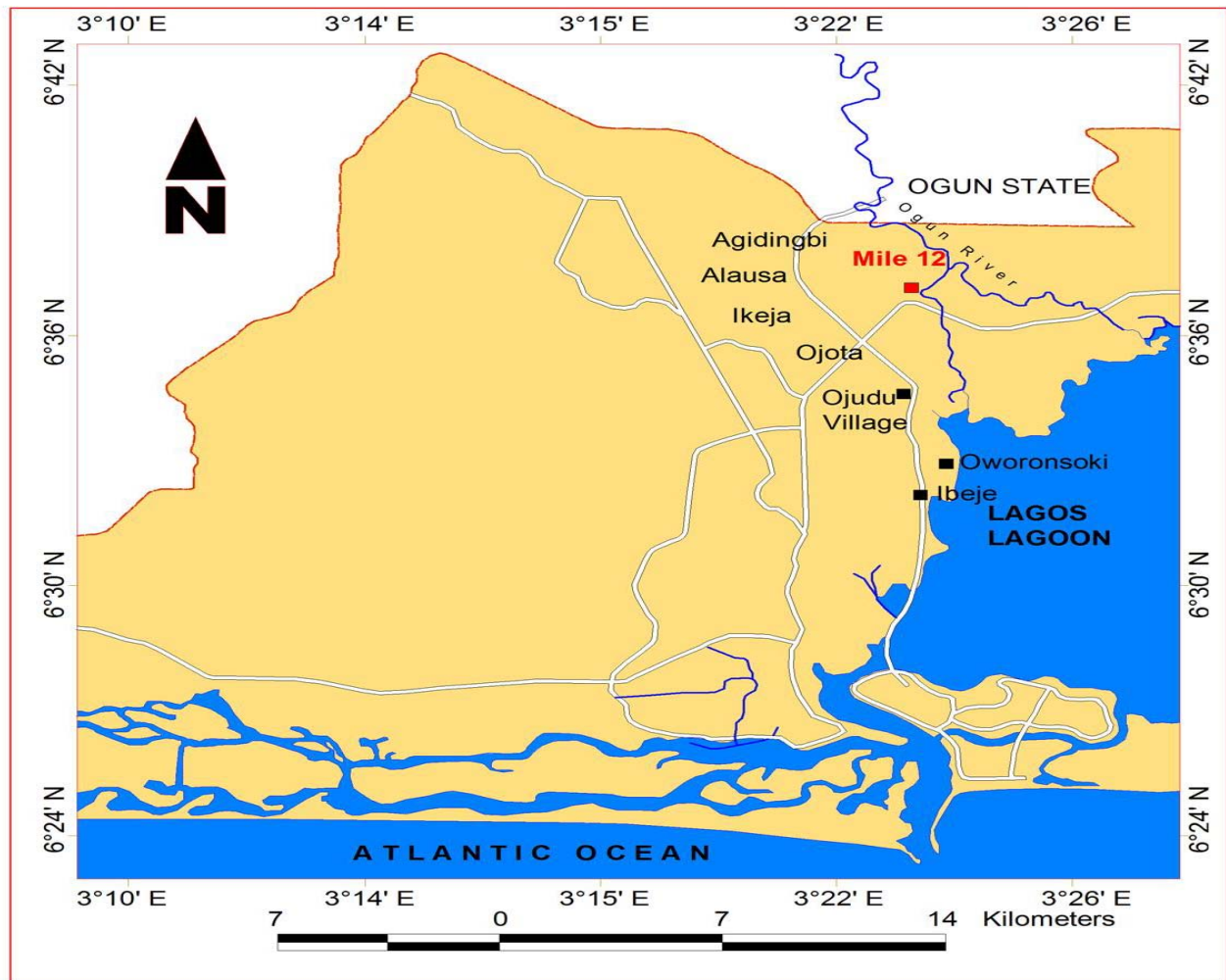


Fig.2: Mile 12 in Lagos State, Nigeria.

3. Results and Discussion

The study shows that the release of water from Oyan Dam built across Oyan River, a tributary of Ogun River in Ogun State arising from heavy rainfall is the main cause of flood in this settlement. Specifically, 75.9% of the households attributed the reason for this menace to this factor (Table 1). Following such heavy falls in the recent years, the reservoir level of Oyan Dam had been consistently high. Consequent upon this development and in conformity with the operational rule of dams, it has become imperative to release water gradually in order to maintain a tolerable capacity level for the dam safety and by extension, safety of life and properties downstream. This scenario is further aggravated by increased water from Atlantic Ocean arising from wave action and the global rise in ocean water which often find its way to Mile 12 especially during high tides.

In this community, waste management is rather too poor. Refuse and other wastes are usually dumped into available open spaces, including drainage channels and river plains and valleys. This practice has led to the blockage of the drainage channels at various points. 7.2% of the households agreed that flooding is usually a product of such blockages. In general, during heavy rainfall which usually leads to partial opening of Oyan dam, the waste dumped along the river plain obstruct the free flow of the river. The drainage channels cannot therefore accommodate the flow of the fast running storm water from the dam making it to spill into streets and houses.

Table 1: Major causes of flooding

Causes of flooding	Frequency	Percent
Heavy rainfall	10	6.0
Poor drainage	4	2.4
Opening of Oyan Dam in Ogun State	126	75.9
Waste disposal	12	7.2
Narrow stream/river channels	14	8.4
Total	166	100.0

Source: Field work (2011)

Flood incidence is further compounded by the fact that most buildings were built right within the immediate floodplain of the river. In general, a greater proportion (63.8%) of these buildings observed less than 30 meters setback to the river. Specifically, 37.3% of the buildings have a setback of less than 10 meters (Table 2). These data indicate the weakness of development control mechanism in this community. The field survey further shows that 79.1% of the inhabitants did not have approval for their buildings from the Planning Authority. Only 13.3% of the buildings were formally approved by the Planning Authority (Table 3). This explains the reason why some of these buildings did not have adequate setback.

Table 2: Building Setback from the river plain

Setback	Frequency	Percent
1m – 10m	62	37.3
11m – 20m	14	8.4
21m – 30m	30	18.1
31m – 40m	26	15.7
41m and above	34	20.5
Total	166	100.0

Source: field survey (2011)

Table 3: Building Plan Approval

Approval Status	Frequency	Percent
Formal Approval	22	13.3
No Approval	131	79.1
Not too sure	4	2.4
No response	9	5.2
Total	166	100.0

Source: field survey (2011)



Plate 1: In this settlement, buildings are constructed along floodplains thereby aggravating the devastating effects of flood events

Assessment of the buildings located on the floodplain showed that they are in poor and squalid conditions. Building and foundation materials for most of these buildings have low water resistance and low water retaining capacity. Table 4 shows that 80.7% of the respondents used cement concrete for their foundation material. The inappropriateness of such material is reflected in the continuous retention of water on building walls which usually leads to building collapse. Only 2.4% used stone materials which could be considered as adequate in this terrain. Again, 2.4% uses mud materials which are rather unsafe. A significant proportion (14.5%) of the respondents used others materials such as wood that are largely temporary in nature. The adoption of such temporary materials is a reflection of non-security of tenure as owners could be displaced at any time by flood.

Table 4: Foundation materials used in the building

Material	Frequency	Percent
Marble concrete	4	2.4
Mud	4	2.4
Cement concrete	134	80.7
Others	24	14.5
Total	166	100.0

Source: field survey (2011)

The overwhelming effect of flooding in this settlement is reflected in the complete submergence of entire streets (Agiliti and Iyase Streets) by water. In addition, more often than not, the flood usually results into traffic snarls along the ever busy Mile 12 - Ikorodu road. In table 5, almost all the inhabitants attested to the fact that the effects of flooding on lives and properties in their community are highly devastating. It was reported that a 12-year old girl was drowned by the flood in October 2010. In addition, animals were lost to flooding while many bridges collapsed and electric poles destroyed. The study also revealed that most people in this area could not go to their places of work for some days since access roads were blocked and submerged for days. Many farmlands were swept away while schools and markets were submerged for weeks. In many other places, residents resorted to boarding canoes to get to their houses. Due to incessant

flooding events, many emergency boat termini had been constructed by people wishing to cash in on this situation to make money.

Table 5: Estimation of the effects of flood on lives and properties

Intensity	Frequency	Percent
Very high	92	55.4
Fairly high	74	44.6
Low	0	0
Total	166	100.0

Source: Field work (2011)

Over the years, 830 structures have been affected by flood while 5,030 inhabitants were displaced (Table 6). The total number of the inhabitants that were displaced is quite significant as this represents 0.73% of the total population of Mile 12. The most affected neighbourhoods are Agiliti and Agboyin. According to LASPPDA (2010), aggravated flooding events in these neighbourhoods could largely be attributed to either blocked drainage channels or lack of drainage channels.

Table 6: Devastating effect of Flooding on Population and Properties

S/N	Location	No. of Affected Structures	No. of Displaced People	Observations (Possible Causes)
1	Ajelogo	80	480	The connecting bridge was flooded due to blockage of drainage channels
2	Agiliti 1 & 2	200	1,200	Lack of drainage channels
3	Agboyi 1, 2 & 3	200	1,600	Lack of drainage channels
4	Maidan	150	900	Blocked drainage channels
5	Owode Elede	200	850	Blocked culverts resulting into lack of connectivity for storm water
	Total	830	5030	

Source: Lagos State Physical Planning Authority (LASPPDA) 2010.



Plate 2: Above is a typical submerged access road and properties following a flood event in the settlement

The devastating effect of floods was not limited to physical structures. Our interaction with the inhabitants also indicates that flooding events are usually accompanied with prevalence of diarrhea and other water-borne diseases as most sources of water are polluted. Other effects include increased poverty arising from destruction of farmlands and disruption of essential services.

Based on the information received from the LASPPDA and from the study it is evident that the level of development control in this area is very low while its physical development is on the increase. In addition, the study area does not have a Master plan guiding its physical development. It is clear that the State government has not found permanent solution to the problem of flooding in the area but always shows concern any time there is flood in the area. Some of the inhabitants affected are relocated to other communities within the state even though such areas are far from the main city. Invariably most people that are rehabilitated after the flood events moved back to their previous places of abode irrespective of their precariousness thereby recycling this teething problem.

At the moment government has resumed frantic effort at rehabilitating and re-construction of township roads and other inter-community roads within the local government. This is part of the efforts of the government at eradicating the menace and devastating effect of flood in the area.

4. Conclusion

This research has identified the various causes of flooding and its devastating effects on lives and properties in Mile 12, Kosofe Local Government, Lagos State, Nigeria. Investigation revealed that flooding in the area is largely due to the frequent release of water from Oyan dam in Ogun State during the wet seasons. Secondly, most of the buildings in the study area do not have enough set back to river channels, a situation arising largely from failure to obtain building plan approval from the appropriate regulation agency. Thirdly, blockage of drainage channels by refuse and other wastes as a result of poor waste management.

In order to minimize flood hazard stringent flood control measures are necessary in this area since it is becoming a densely urbanized area. Building without plan approval in this settlement should be unacceptable. Roads that are well furnished with adequate drainage and bridges should be constructed. Channelization of existing streams and rivers in this settlement would go a long way to increase their storm water intake thereby reducing water overspill during heavy rainfall. Strict adherence to dam safety and maintenance regulations should be observed by the management of Oyan dam. In addition, construction of more dams along River Ogun could be a plausible strategy at reducing excess loading of the existing Oyan dam.

Finally, there is the need to monitor the various urban expansion and flood incidences within Lagos Mega city. A flood early warning signal system with the capability to deliver reliable timely and effective flood information at an appropriate response time should be installed. It is suggested that the system option must involve integration of Global Navigation Satellite System (GNSS) technology into Geographical Information System (GIS) framework towards appropriate flood modeling, simulation and forecasting. This will ease service information provision on real time flood risk analysis, flood extent, acceptable risk level modeling and mapping and potential damages and alerts.

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Rural Development As Strategy for Food Security and Global Peace in The 21st Century

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Abstract: *This paper discusses rural development as strategy for food security and global peace in the century. The paper adopts descriptive methodological orientation to investigate how the abysmal failure of governments in the contemporary world to develop their rural areas has adversely impacted on food security. However, the paper argues that why the quest for rural development has remained elusive particularly in the developing countries is largely due to up-bottom approach currently adopted by countries. It further argues that this strategy has not only resulted to abject poverty in most countries, but also failed to achieve food security among individuals, families and communities around the globe. The implication of this sorry state of affairs is that the attainment of global peace in the 21st century has remained an exercise in futility in spite of the over-dramatized efforts of international organizations like the UN. The paper, therefore, recommends among others, the need to establish a specialized agency to study the success of rural development policies and programmes in some countries like China and replicate such strategies in other parts of the world for effective food security on global peace in the 21st century.*

Key Words: *Rural Development, Food Security, Global Peace*

1. Introduction

Rural development as a concept has no generally acceptable definition. This is largely because scholars within the purview of political science, sociology, geography, among others, view the concept from different analytical tradition and disciplinary perspective. Also, scholars sometimes define the concept not only on parochial basis but also on individual perception and experience. However, such definitions most times reflect their cultural orientation, environmental milieu and ideological inclination.

Notwithstanding these unsettled controversies, rural development is conceived as strategy aimed at finding ways to improve the rural lives with participation of the rural people themselves so as to meet the required need of the rural area (Zhude, 2010). According to World Bank (2005), rural development is the process of rural modernization and the monetization of the rural society leading to its transition from traditional isolation to integration with the national economy.

Also, rural development is perceived as a process of not only increasing the level of per capital income in the rural areas but also the standard of living of the rural population measured by food and nutrition level, health education, housing, recreation and security (Diejomoah, 1973). To give more credence to the real meaning of rural development, Ollawa (1971) asserts that:

...rural development aims at restructuring the economy in order to satisfy the material needs and aspirations of the rural masses, and to promote individual and collective incentives to participate in the process of development... this involves a host of multi-sectoral activities including the improvement of agriculture, the promotion of rural industries, the creation of the requisite infrastructure... establishment of decentralized structure in order to allow mass production...

A critical look at the above position by Ollawa reinforces the role of agriculture in the achievement of rural development objectives. Thus, the improvement of agriculture in the rural areas all over the world requires not only the collective efforts and participation of the rural people but also strong political will and commitment