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Impacts of flood disaster in Agege local government area Lagos, Nigeria

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Abstract

Against the background of incessant occurrence of flood and its devastating impacts on residents, the paper focused on the causes and effects of flood in Agege local government area of Lagos state. Data were collected through the use of structured questionnaire from the respondents. A total of two hundred and seven (207) questionnaires were administered to the respondents in the study area. The questionnaires were distributed using the systematic random technique at interval of ten housing units. Data collected were analyzed through the use of descriptive statistical analysis such as cross-tabulation and frequency. The study reveals that the major cause of flood in the study area was the non-functionality of the drainage system (65.89%) or total absence of the drainage system (37.68%) as the case may be. Also, high rainfall (65.22%) and dumping of waste into the drainage and water bodies (44.93%) have contributed to the regular occurrence of flood in the area. The regular re-occurrence of flood in the area has also been detrimental to the health of the residents of ALG Area. The study recommends enforcement of environmental laws that will restrict dumping of waste into the water body and sponsoring of public awareness and educative programs on how man's activities has contributed to flood occurrence. Also, the repair and construction of drainage system should also be sponsored by the government at various level as well as proper channelization of river bodies to prevent overflow during heavy downpour. This will undoubtedly control its occurrence.

Keywords: Flood, Development, Disaster, Drainage, Environment

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1. Introduction and background to the study

The complexity of anthropogenic activities of man without adequate attention to geological structure of most cities of developed and developing nations has undoubtedly contributed to reoccurrence of disaster and consequently poses threat to environmental sustainability in most of these nations (Oludare et al., 2012). This irrefutably has led or accumulated to unresolved challenges. Among the unresolved challenges being faced are vicious flood incidences experienced in the last four decades. The occurrence is stern in third world countries where there is intensity in land use, haphazard development, and unprecedented urbanization among others. According to Adeyinka et al. (2008, p. 1) "Most of these cities are also characterized by uncontrolled development , substandard and inadequate housing, poor infrastructure provision and development, poor planning process and administration, weak urban governance, poor land use structure resulting to slum…''. These plethora of problems are bedeviling cities of third world countries and Nigeria in particular.

Consequently, there has been unprecedented occurrence of floods and its associated negativities in most of the urban centers of developing countries (Montoya Morales, 2002). For instance, in Nigeria, reports have shown that devastating flood disaster had occurred in Ibadan (1985, 1987, 1990, and 2011), Osogbo (1992, 1996, 2002, and 2010), Yobe (2000), Akure (1996, 2000, 2002, 2004 and 2006) and the coastal cities of Lagos, Ogun, Port Harcourt, Calabar, Uyo, Warri among others (Olaniran, 1983). This claimed many lives and properties worth millions of Naira.

Several anthropogenic factors have contributed to the incidence of flood. Among these factors is the encroachment of development to flood prone areas. The incursion into such areas have being progressive until now because of unprecedented urbanization and industrialization which has undoubtedly resulted into large scale massive deforestation, loss of surface vegetation and farmlands. According to Okechuckwu (2008 p. 272); "the incursion of unplanned and uncontrolled development into urban infrastructure facilities, violate the major objectives of physical planning and consequently result into misuse of land thereby creating disorderly arrangement of urban landscape and the occurrence flood that is mostly evident in cities of third world countries". Arising from these incongruous and haphazard developments in cities of third world cities, the occurrence of flood, particularly in Lagos, has been known to be paramount to some areas or local government in the state where Agege local government is not an exemption.

According to Oyebande (1990) water will always find its way if not well channelized. Its choice route often poses problems to man by tampering with his physical environment, health and products of agriculture, urbanization and industrialization. This has created a lot of social and economic cost on the environment and the citizenry. Few among these social and economic impacts on the environment are: outbreak of health diseases, infrastructure failure, mental health effects, building collapse, destruction of agricultural farmland and products.

Flood has been reported as a major and devastating problem in some sectors of the economy (Petak and Atkisson, 1982). Its effects are very severe to virtually all forms of land use. The severity of its impact is also reflected on the rate of development of most nations that experience such. Thus if adequate attention in terms of preventive measures are not put in place towards controlling its sporadic occurrence and its associated impacts particularly during rainy season, its incidence can turn a developed nation back into a developing nation.

The recent occurrence of flood issues in Agege led to the residents evacuating their dwelling, including other land uses like the industrial and commercial activities. This causes serious setbacks to daily activities and business transactions and consequently making the area susceptible to declination of business activities. To this extent, in Agege local government area, especially during the rainy season characterized with heavy down pour, there has being incessant occurrence of flood with serious devastating impacts on the immediate socio cultural environment. Against this background, the paper documents incidence of flood, its causes and impacts on residents in Agege local government area of Lagos State Nigeria.

2. Literature review

Flooding, although a common phenomenon all over the world is more rampant and distressing in the developing countries like Nigeria (Andjelkovic, 2001). This occurrence has become major issues of concern in the development of the nation as the frequencies of such occurrences and the magnitude of the losses in terms of lives and properties are now becoming startling (Oyebande, 1983). Consequently, many researchers (Montoya Morales, 2002; Carlos, 2006; Tinh and Hang, 2003; Petak and Atkisson, 1982; Adedeji, 2008; Adedeji, 2010; Andjelkovic, 2001; Oyebande, 1983; Oyebande, 1990 among others) have delved into the subject matter to analyze the underlying factors (Kundezeweiz, 1998) responsible for the incidences as well as preventive measures to ameliorate the same (Oriola, 1994).

Flood is an overflow of an expanse of water that submerges land (Wikipedia.org). The European Union (EU) Floods directive (2007), defines a flood as a temporary covering by water of land that is not normally covered by water. In the sense of "flowing water", the word may also be applied to the inflow of the tide. This water comes from the overflow of sea, lakes, rivers, canals, sewers or from rainwater.

Flooding is normally caused by natural weather events such as heavy rainfall and thunderstorms over a short period, prolonged rainfall or extensive rainfall. It can also be caused by high tide combined with stormy conditions. It is predicted that climate change will increase the risk of flooding in the UK and other parts of the world (Petak and Atkisson, 1982). Ministry of Agriculture and fisheries (2004, p. 1) also reported that "risk is also experienced when there is heavy downpour or portion of rainfall or thawing snow flows overland away from the area it originally precipitated, this is called runoff". Odunuga et al. (2012, p. 367) also established "that Flood occurs when there is overflow of urban drainages over the streets to extent that it cannot be absorbed by earth surface and consequently results to property damage, traffic obstruction and nuisance as well as health hazards".

Flood may also result from overflowing of a great body of water over land and extreme hydrological events or an unusual presence of water on land to a depth which affects normal activities (Olajuyigbe, 2012; and PointBlankNews.com). It also occurs as a result of combination of meteorological and hydrological extremes as well as activities of man on drainage basin (Adeaga, 2008). Floods often cause damage to homes and businesses if they are located in natural flood plains of rivers (Tinh and Hang, 2003).

The effects of flood on man cannot be overemphasized because it cut across all spheres of man's life. This includes man's physical environment, man's health and agriculture products. Flood, depending on its volume and velocity can damage any type of structure, including bridges, cars, buildings, sewerage systems, roadways, and canals. It can also result into contamination of water. The consequence of this is unhygienic condition in the affected areas making the victims vulnerable to water-borne diseases such as; cholera, dysentery, typhoid. Crops and food supplies are often affected and consequently resulting to shortage of food

crops resulting from loss of entire harvest. Its effect is also obvious on trees thereby causing non-tolerant species to die from suffocation. It also affects transportation system by destroying transport links. Conversely, lowlands near rivers depend upon river silt deposited by floods to improve the nutritional value to the local soil.

The devastating consequences of flood are enormous. For instance it has resulted to swamped homes, loss of properties and lives, environmental socioeconomic and psychological consequences among others (Adeaga, 2008). Oludare et al. (2012, p. 1) also established that "in flood disaster there is always loss of lives, destruction of public utilities and disruption in smooth functioning of the system that renders fear and uncertainties among the populace, loss of livelihoods, damage to environment, financial loss and diversion of resources epidemics, migration, food shortages and displacement of people". These require urgent intervention by the concerned Government and related bodies on environmental management. This will indubitably ensure and promote environmental sustainability. Economic losses such as temporary decline in tourism, rebuilding costs, food shortage leading to price increase, among other factors are also the impacts of flood.

3. Research methodology

The sources of data employed for this research includes both secondary and primary data sources. The secondary data include information obtained from publications such as textbooks, journals, official documents, previous research works as well as newspapers on the various occurrences of flood disasters and pertinent issues relating to the subject.

Primary source of data were extracted from field survey, personal interviews and through questionnaires administration. The structured questionnaire was prepared and administered to the residents residing in the flood prone areas within the Agege local government. Interview was conducted with selected respondents who were unable to fully comprehend and answer the questionnaire provided while, field survey was done for inspection of some areas adversely affected so as to obtain firsthand information.

The sample size was determined based on the population distribution (461,743) of the study area for 2006 as estimated by National Population Commission. From this, the population was projected for the year 2012 at growth rate of 3%. The estimated population for Agege LGA was given as 551,345. The sample size was determined by selecting 0.04% of the population size. This is summarized in the Table 1. A total of two hundred and seven (207) questionnaires were administered. The sampling technique adopted was *systematic random technique*. This was done by selecting residents at random and questionnaire was administered at an interval of every ten (10) houses. The data collected were analyzed using SPSS, while descriptive and cross-tabulation method was employed for the analysis. Also, chi square was employed to examine the variation between independent and dependent variable.

4. Results and discussion

4.1. Availability of drainage and its condition

As illustrated in Figure1, a larger proportion of buildings (62.32%) in the study area have drainage system while fewer numbers (37.68%) lacks drainage facilities. The availability of drainages doesn't

eradicate flooding issue completely because several of the available drainage has been blocked with debris. Further analysis on the condition of available drainage system reveals that, 11.11% of the drainage are open and functional while 30.91% is also open but not functional. 10.15% of the available drainage is closed and functional while the same proportion is also closed but not functional. Even with the state of the drainage, one needs to make reference to the conditions of the drainage. 65.89% of the available drainages are blocked completely (plate 1) while 34.11% of the drainages are free flowing. This implies that higher proportions of the drainages are blocked and cannot support free flowing of storm water. The chi- square test as shown in Table 2 reveals that there is a significant relationship between the availability of drainage and the type of building where the p value is 0.000.

Table 1. Questionnaire Distribution According to Ward

Ward Name	Population Census (2006)	Projected Population Census (2012) With 3% Growth Rate	Questionnaire For Each Ward (0.04%)
Orile Ward	135,806	162,160	61
Okekoto Ward	55,322	66,057	25
Powerline/Oko Oba Ward	95,064	113,511	43
Papa Ashafa Ward	64,003	76,423	29
Oyewole/Alagba Ward	43,645	52,114	19
Isale Odo/Ayige Ward	67,903	81,080	30

Authors' Compilation (2012)

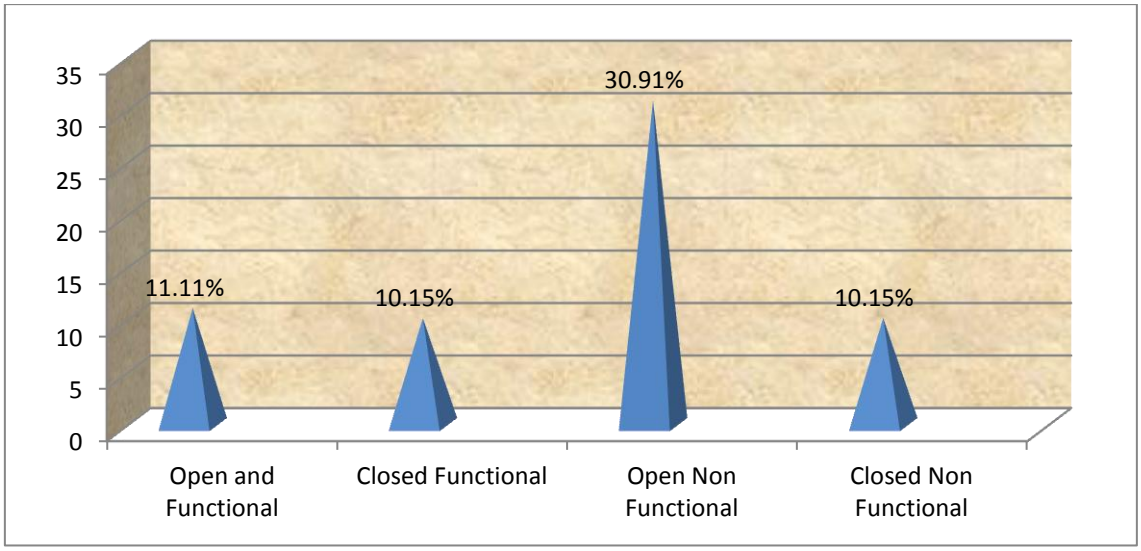

Figure1. Condition of Drainage (Source: Author's Field Survey, 2012)

Plate 1. Blocked Drainage System in Agege

4.2. Causes of flood

The result on likely causes of flood as presented in Figure 2 reveals that a larger proportion of respondents believe that the major cause of flood in the study area is both natural and the man-induced causes (35.75%) while 34.78% of the respondents believe that flood has been caused by man induced 29.47% of the respondent believe it is caused by natural causes (i.e. heavy rainfall).

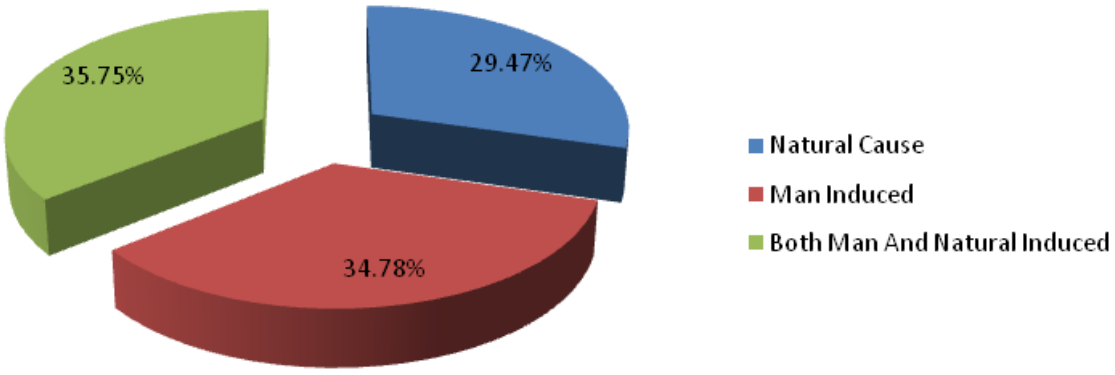

Figure 2. Causes of Flood (Source: Author's Field Survey, 2012)

Table 2. Chi-Square Test

	Df	P value	Remark
Drainage avail/ state of drainage	4	0.000	Significant
Experience of flood/ Occurrence of flood	3	0.000	Significant

Source: Author's Field Survey (2012)

4.3. Flood induced by man's activities

Further analysis on causes of flood with reference to man's induced activities as illustrated in Figure 3 reveals that a large proportion (25.61%) of the respondents perceived that the major cause of the man induced flood is dumping of waste material and refuse into water channels while 22.71% of the respondent affirmed that it is caused by non-functional drainage. A relatively large proportion of respondents (19.32%) also perceived that flood is caused by overflowing of water bodies. While a lesser proportion (10.62%) perceived that the cause of flood is the encroachment of buildings on the flood plain. This finding is an indication that several human attitudes has contributed immensely flood occurrence in the study area.

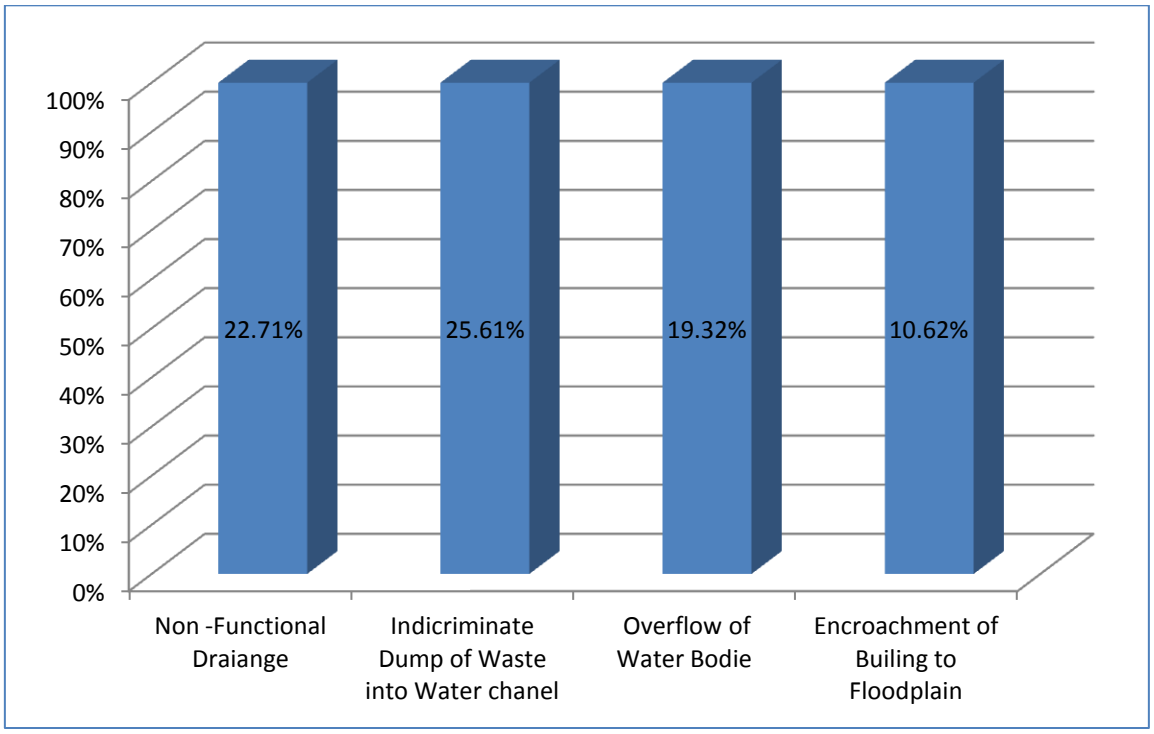

Figure 3. Man Induced Causes of Flood (Source: Author's Field Survey, 2012)

4.4. Means of waste disposal

One of the major causes of flood is indiscriminate dumping of waste in drainage which culminates to blocked drainage. The result of analysis on means of waste disposal in the study area as presented in Figure 4 reveals that 28.02% of the respondents dispose their waste by dumping on a nearby refuse dumpsite which indirectly contributes to flood disaster. During heavy rainfall or wind, the refuse disposed on a dumpsite are frequently washed into the nearby drainage thereby aiding its blockage. Also, 24.64% of the respondents dispose their refuse by burning the refuse while only 13.53% of the respondents give their waste to the government agents for disposal. Although, the government make provision of waste truck to residents, most of the residents neglect the government waste collection vehicle mainly because of the little levy asked to pay for the maintenance of those trucks.

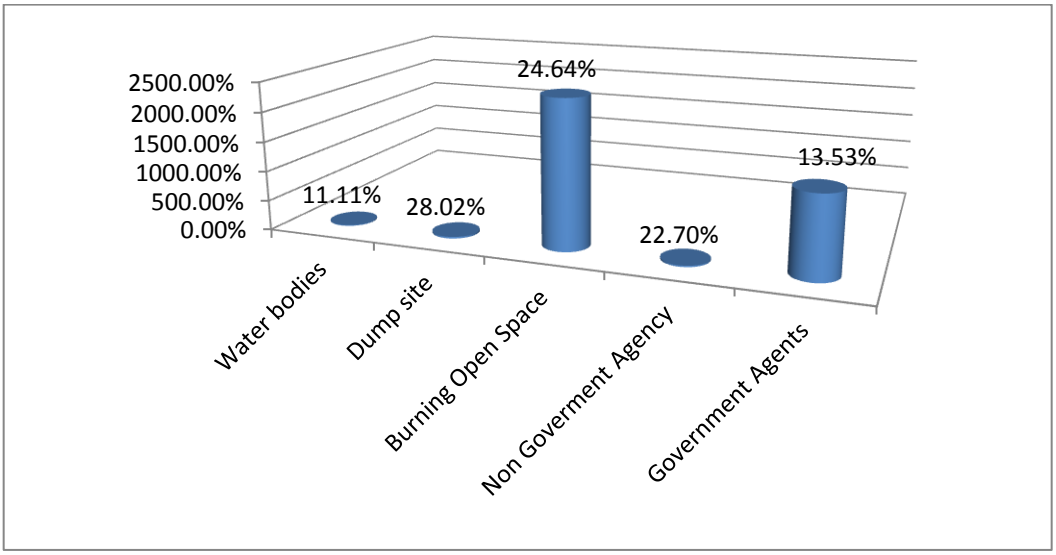

Figure 4. Method of waste disposal (Source: Author's Field Survey, 2012)

4.5. Rate of flood occurrence (2002-2011)

Using a line graph as illustrated in figure 5 to explain the sequence of the occurrence of flood from the year 2002 to the year 2011. The graph reveals that majority of the respondents were not residing in the area until the year 2006 which means that residents does not have pure knowledge of flood incidence in the area. It is also perceived that the occurrence of flood also increases drastically with an average occurrence level of seven (7) times yearly between year 2006 till 2011. The graph shows the sequence of the gradual increase in the occurrence of flood year. Predicting from the graph given below, it can be deduced that the occurrence of flood would be far beyond expected in the next five (5) years.

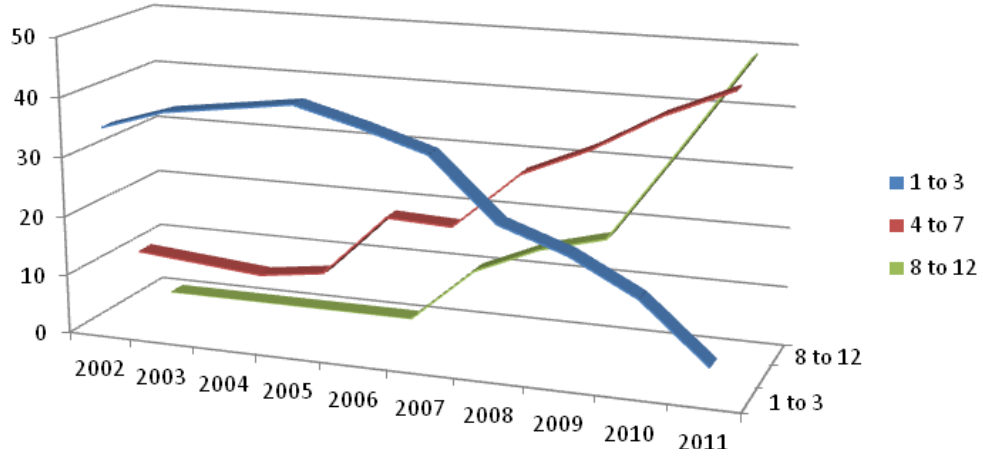

Figure 5. Occurrence of flood disaster (Source: Author's Field survey, 2012)

4.6. Nature of loss during flooding

Floods never occur in an area without leaving a scar on its victims. The victims of flood disaster incur different forms of loss. The analysis of findings in Figure 6 reveals that majority of the respondents (28.02%) losses their property during flooding while 21.25% of the respondents says the nature of their loss is outbreak of diseases that afflict them. 18.36% and 17.87% reveals that the nature of the loss is the death of their livestock and the damage to vehicle due to poor road respectively. A small proportion (0.97%) of the respondents classifies their loss to be the loss of the relatives and loved ones.

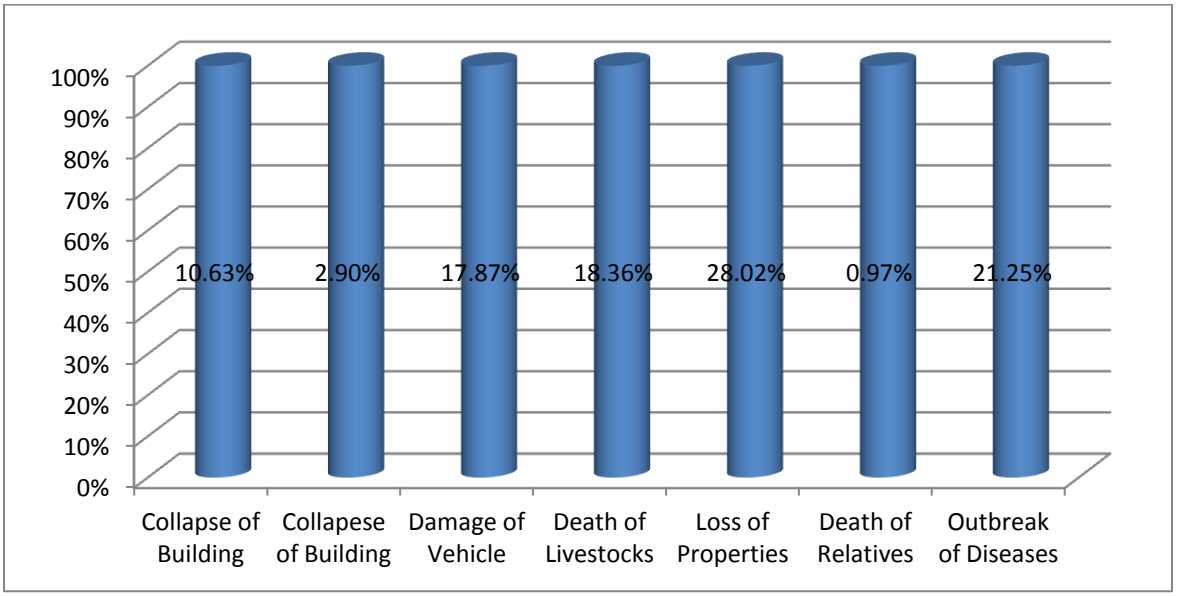

Figure 6. Nature of Loss (Source: Author's Field Survey, 2012)

4.7. Effects of flood incidence

The consequences of flood are numerous. The victims of flood have always had to live with the consequences of the flood disaster. According to the result of the analysis in Figure 7, it has been realized that a larger percentage of the respondent (45.41%) reported that flood incidence in the past has been responsible for the disruption of physical structures and environment, 28.99% of the respondents agree that flood incidence has been responsible for the destruction of lives and property while 25.6% of the total respondent agree with the view that flood incidence causes the disruption of economic activities. This means that the flood disaster in the area is mostly responsible for the destruction of physical structures and environment. This indirectly has an adverse effect on resident of the study area. So, whether some people directly experience the effect of flood or not, they indirectly experience its effect in the disruption of activities as shown in Plate 3, 4, 5 and 6.

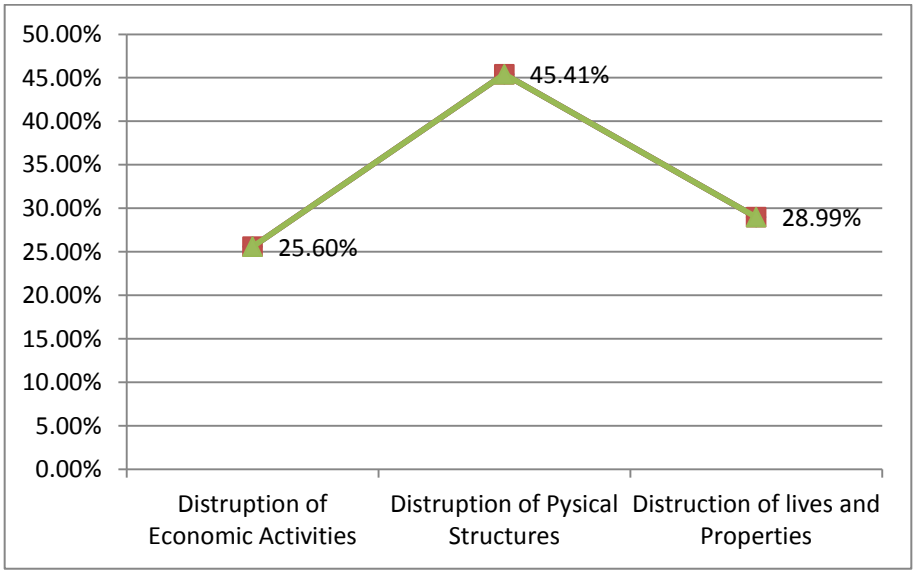

Figure 7. Effects of Flood on Socio cultural Environment (Source: Author's Field Survey, 2012)

Plate 3. Oluwatuyi street in Agege after the 7 days uninterrupted rainfall in June 2012

Plate 4. Vehicle and Pedestrian Immersed in Water in Iju

Plate 5. Flooded church in Isheri (Agege)

Plate 6. Flooded house in Isheri (Agege)

5. Recommendation

Based on the findings of this study, the paper recommends possible solutions that would accommodate immediate remedial and preventive measures to minimizing flood problems observed in the study area. Therefore, the following measures are recommended:

- There is a need for provision of standard infrastructural facilities by the government. These facilities include good surface drainage, potable water supply for consumption and other supporting facilities.
- Repair and construction of these drainages where necessary should be embarked on to further ease the flow of storm water. Also, excavation of solid waste and other deposits which are present in the existing canal at Iju, within the local government.
- There should be improvement in technology on how local building material can be subsidized so as to make structures flood resistant. Likewise, roofing materials should be improved upon to avoid building and structural collapse.
- Environmental sanitation program must be made compulsory and appropriate agency should be vested with the power to punish residents who fail to adhere to the rule of sanitation. There should be fines and penalties for people who fail to comply with the sanitation program.
- Public enlightenment programmes should be organized to educate the public on the dangers of flood disaster and its causes as a result of the habit of throwing and dumping refuse in gutters, drainage paths and river channels. There is also need for government to set up various information programmes to educate the masses on how to respond to flood disaster.
- In order to reduce the risk of flood, the government should provide adequate funding for disaster management bodies and agencies to enable them perform and execute their duties effectively and efficiently. This will go a long way in checking the problem of flood occurrence in Agege local government.

- Strict flood control legislation is required to check unplanned encroachment on urban plains and should be enforced within the study area. Regulatory agencies are required to restrict development in flood-prone areas. This measure can be used to avoid flood rather than control it.
- Resettlement of population can be done when all flood mitigation measures do not seems to work. This measure may be expensive because alternative land and houses in some cases will have to be allocated to each household that is being resettled.
- The road network in the study area lacks drainage system to the extent that water overflow on the road during heavy rainfall. Thus, the state government along with the local government should embark on the construction of wide and deep drainage system that can withstand heavy water flow.
- Quality materials should be used for the construction of drainages and bridges.

6. Conclusion

Water will always find it own path if not channelized by man. The need to research into the causes of flood and provide adequate flood management strategies is an aspect of environmental management that planners must pay ample attention to if they want to make the environment a haven. The improvement of roads and accessibility of cities, provision of funds and equipments for disaster management agencies is critical to abating disasters in the Nigerian urban environment and even in the rural areas too. In both the developed and developing world, the problems associated with flooding constitute a growing hazard to human activities as population densities increase.

Although, studies conducted in different areas, have shown that, a hundred percent (100%) success may not always be achieved in eradication of flooding problems especially in urban environment yet, their damaging effects can be mitigated through management measures that are carefully designed by government or affected communities. These must be effectively and economically supervised and funded.

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