Research on Humanities and Social Sciences
ISSN 2224-5766 (Paper) ISSN 2225-0484 (Online)
Vol.8, No.16, 2018

Urban Floods Mitigation Measures in Ado-Ekiti, Ekiti State, Nigeria

Dr. A. O. Aladelokun
Department of Geography, College of Education, Ikere – Ekiti, Ekiti State

Abstract
Most natural disasters are natural processes which become hazardous to us when we live close to a potential danger. Processes like fire, flood, drought, landslide, etc combine to cause loss of life and damage to our properties. In Ado-Ekiti, flood is becoming the most environmental challenge menacing the metropolis as many of her parts experience flood regularly most especially during and after rains. Many efforts have been made to discover the major causes of such floods, but little has been done to advance mitigating measures. This paper, therefore, looks at the issues of flood disaster mitigating measures in a sustainable manner. Both primary and secondary data were sourced to enhance the documentation of the socio-economic and environmental implications as well as mitigating measures of the urban floods in the metropolis. Simple statistical methods were employed in the analysis. Results reveal that flood is becoming the most devastating natural disaster in Ado-Ekiti, claiming more property damages. Floods though not leading in terms of claiming lives but it affects and displaces more people than any other disasters. Mitigation measures such as proper monitoring and enactment of laws forbidden people building structures on flood prone areas of the metropolis; demolition and relocation of existing illegal structures in the area; construction of good drainage system among others are suggested.
Keywords: Urban Floods, Disaster, Mitigation Measures, Metropolis.

Introduction

Flood is any high stream flow which overtops natural or artificial banks of a stream. It is now one of the fundamental environmental challenges that results from interaction between man and his environment. This often emphasis the extent to which man can go to control nature.

Floods normally occur when more rainfall than the soil and vegetation can absorb. That is, excess rain water rain off the land in greater quantities than rivers, streams, ponds and wetlands can contain. Such heavy rains periodically cause rivers or streams to overflow their banks spilling onto the surrounding floodplains (Abaje, 2007 and Giwa, 2005).

In an urbanizing environment like Ado-Ekiti metropolis, the infiltration capacity is further reduced by the replacement of ground cover with impervious urban surfaces which gives rise to overland flow as a means of disposing excess rain water. This is otherwise known as urban flood. In other words, urban flood is conceived as overland flow of urban streets sufficient enough to cause significant property damage, traffic obstructions, nuisance, and health hazards (Mba, 1996; Onokorheraye, 1995; Odemerho, 1988; and Rashid, 1982).

Other causes of river flood and urban flood according to Aladelokun (2004) include land use pattern of the area and bad planning as well as natural factors like dam braking and volcanic activities. However, the nature of floods and their impacts depend on the natural and man-made conditions on the floodplains, economic development and the installation of flood protection measures which has political, economic and social dimension as well as engineering aspects (Aladelokun, Ibid).

Floods occur in Nigeria in three main forms viz: Coastal flooding, River flooding and urban flooding (Ologunorisa, 2004; Folorunsho and Awosika, 2001; Okoduwa, 1999; and Oriola, 1994). Coastal flooding occurs in the low-lying belt of mangrove and fresh water swamps along the Coast. 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. 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.

Across the globe, studies reveal that more than billion people representing one third of the world's population have been subjected to natural disasters in the last decade with floods and drought accounting for 86percent of all such catastrophes. The studies indicate that although earthquakes, volcanic eruptions and landslides may be more dramatic and take a very high toll on human lives, floods have longer lasting and more far reaching effects on the health of ordinary people (World Socialist Website, 2011). This is rampart in floodplains, along rivers and coastal areas. Where such areas are not settled by man, the event attracts little or no attention but where such areas are settled with large population such as the Ganges, Nile, Mississippi, Hwang Ho and Benue floodplains, flooding becomes a menace causing great disaster to lives and properties (Giwa, 2005).

An overview of some specific effects of flood at the global, national and local levels in the autumn of 2000

in the United Kingdom 16,000 residential properties were flooded in central and southern England (United Nations Environmental Agency, 2003). In the same manner, however, in Nigeria, the flood of 1980 at Ibadan rendered 50,000 people homeless and properties with million of naira were destroyed. In 1988 at kano, over 40,000 people were rendered homeless and another 2,000 people in Dekina, Kogi state. At Lafia 1,000 people were left without a place of abode after flood event. In Kwara State over 10,000 people were rendered homeless in the floods that ravage Pategi, Kpada and Gbogdondogi Local Government Areas in May, 1997.

Know Risk (2005 observed that the economic impact of natural disaster show a marked upward trend over the last several decades. The hazards tend to hit communities in developing countries especially the developed countries, increasing their vulnerability and setting back their economic and social growth sometimes by decades. The floods have led to loss of human life, destruction of social and economic infrastructure and degradation of already fragile ecosystems. The study indicates that social impacts include changes in people's way of life, their culture, community, political systems, environment, health and wellbeing, their personal and property rights and their fears and aspiration (Yande, 2009).

However, in spite of the recommendation of researchers and government efforts at mitigating the menace, urban, flooding has assumed a more devastating dimension in Ado – Ekiti metropolis. It is now an annual event and the magnitude of the occurrence have more than double in recent times. This results from the fact that the urban population (Ado – Ekiti metropolis) keeps on increasing and more and more people are compelled to live in flood prone areas, such as areas along river beds and floodplains which consequently increase the damage and death toll. Meanwhile, experts have predicted that climate change will make problem of urban flooding more serious because of the increase of the study livelihood of more intense and frequent rain storms (Action Aid, 2006). It is against this background that this study aims at evaluating the socio-economic consequences of recurrent flooding in the metropolis. Sequel to this, the following objectives from the guide to the study such as to:

i. Identify the areas prone to flooding in Ado Ekiti metropolis
ii. Evaluate the socio-economic consequences of the floods, and
iii. To advance solutions to the socio-economic problems emanating from the floods.

The Study Area

Ado –Ekiti is the capital of Ekiti state, Nigeria. It is about 48km away North of Akure and about 344km away North-East of Lagos, the former Federal Capital Territory of Nigeria. The city spreads over an area of about 18squre kilometers.

Ado –Ekiti lies between latitudes $7^{0}3^{1}$ and $7^{0}49^{1}$ north of the Equator and longitude 5071 and $5^{0}27^{1}$ east of the Greenwish meridian. The city is vintagely located among other towns and villages in the state. It is bounded in the north by Iworo-Ekiti, Irepodun/Ifelodun Local Government, and in the South by Ikere and Ise/Orun Local Government Areas.

Ado –Ekiti metropoly is characterized by two major seasons viz: The dry and rainy seasons with the wet season having higher number of months than the dry season. Therefore, rainfall is the key climatic variable that causes flooding in the area. The annual rainfall is between 2000mm – 3000mm and the length of the rainfall is between 7months and 8months with between 4months and 5months of dry seasons results from recent world climate variability. The city enjoys a climate which is characterized by relatively high temperature throughout the year. The average annual maximum is 31^{0}c while the average annual minimum is about 24^{0}c.

Ado-Ekiti has two erosion surfaces separated by a scrap in the north/ west and by the steep faces of massed inselberg in the south west. The lower erosion surface is a gently undulating to flat plain which occurs at elevation of 335 meters to 400 meters above sea level. It is essentially a pediment surface, which has developed across the weathering profile of the less resistant migmatite-gneiss complex. The upper erosion surface occurs at elevations of 530 meters to 730 meters above sea level. It is present only in the western and south western parts of the town, where it forms the watershed between the south-flowing River Ogbese and Owena and the north flowing River Ero and Oge. The water shed is maturely dissected by the headwaters of these major rivers. Consequently, it is a moderately rugged terrain dotted with many regolith mantled ridges and hills in the north and massive inselbergs in the south. The massed inselberg unit is an extremely rugged terrain which dominates the northern part of the popular dissected Akure – Ikere – Ado – Ekiti batholiths. (Adebayo,1993).

Ado- Ekiti is the most populous settlement in Ekiti State with inhabitants and density of 95.8 inhabitants per sq. km in the 2006 census. The average annual growth rate between 1963 and 2006 is 1.9%. As a state capital and centre of administration, Ado – Ekiti metropolis pulls a great population of civil servants and businessmen who are mostly residents in the city and in turn depend on the available social services and infrastructures. People have migrated seriously from rural to the urban area in search of white-collar jobs, and better standard of living. This has caused the population to increase tremendously.

Consequently, the study focuses attention on the socio-economic and environmental impacts of flooding in Ado – Ekiti metropolis. Both primary data and secondary data were employed in selecting necessary information

for the research. Primary data are those collected directly from the field. This involves the use of questionnaire which was randomly distributed to the respondents in the selected flood prone areas of the metropolis. While the secondary data consist of all written and printed materials already in existence, which were produced for other purposes other than the use of the investigation. These among others include published and unpublished journals, magazines, newspapers, climatic records etc.

The data collected were collated and analyzed carefully based on their merit, significance and relevance to the study. The results of the analysis are presented below.

Suffering remarkable stress of which houses and roads are the most affected. Buildings and roads are constructed haphazardly not considering the hydrological and geomorphologic consequences of such development. In order to cope with the high rate of population increase, peoples, thereby, increasing their chances of suffering from flood disasters.

Areas Affected by Floods

Floods normally occur on flat or low-lying terrain areas in the metropoly especially where little or no provision has been made for surface drainage or where existing drainage has been blocked with municipal waste, refuse and eroded soil sediments.

For residence in Oke ila Housing Estate, Adehun/Bada and Omisanjana areas, the rainy season is undoubtedly not the best time of the year. This period comes with perennial problems of flooding which leaves many homes swamped with resultant loss of properties and sometimes human lives. Properties estimated at several million of Naira were destroyed in the area during last year and this year's floods.

The people of Olorunda area of the metropolis are the next victims as about 200 of the inhabitants were seriously affected by this year's floods. Many people were sacked by the raging flood which displaced over 150 people and about two school children lost their lives.

In some quarters like Irona/Atikanikan, Opopogbooro, Odo-Ado, Dalimo, only streets and roads were affected while in others like Moferere and Ajilosun both houses and roads as well as business were swept away on many occasion Traffic were interrupted.

Flood Events and Associated Socio-Economic Effects in Ado – Ekiti.

Through detailed statistical are not available regarding the cost implication of the losses sustained by the urban dwellers and flood victims, but it is obvious from available data that irreparable havocs have been sustained by the people of Ado- Ekiti metropolis due to what has become perennial natural disaster in the city. The survey revealed that the floods particularly from 2011, 2012 and 2013, rainfall impacted on the critical aspects of the people namely, Housing, Life, Education, Roads, Market, Properties and Assets.

Table 1: Flood Events and Associated Socio-Economic Hazard.

S/N	Area Affected	Date/Year	Associated Hazard	No of people Affected	Lives lost
1.	Dalimo	2012/2013	Houses, and Animas destroyed	Not Available	2
2.	Olorunda	April 2013	Houses Demolished Road, submerged properties destroyed traffic interrupted.	200 people displaced	2
3.	Ajilosun	Sept/oct 2011, 2012	Houses submerged, Road blocked and traffic interrupted	Not Available	Nil
4.	Odo-Ado	Sept/oct 2012	Houses submerged, properties destroyed, traffic interrupted	Not available	Nil
5	Housing Estate (Oke Ila)	2010 till date	Houses submerged, school flooded, properties destroyed, traffic interrupted	Not Available	Nil
6.	Irona /Atikankan	2011,2012,2013	Houses demolished, properties destroyed, traffic and Communication interrupted	About 180 people displaced	Nil
7.	Omisanyana	2012,2013	Houses and school submerged, properties destroyed, traffic interrupted	Not Available	1
8.	Adehun/bawa	2008,2011,2013	Houses submerged Traffic interrupted	Not Available	Nil
9.	Opopogbooro	2012	Houses submerged Traffic Interrupted	Not Available	Nil

Source: Adefolalu, 2013.

It is revealed from table 1 that devastating floods has hit more than six areas of the metropolis with Olorunda, Housing (Okeila), Ajilosun and Irona/Atikankan areas recorded the highest toll of casualties. It is obvious that more than 250 houses were affected by the floods and 200 numbers of people were rendered homeless.

The study equally revealed that an estimate of five people lost their lives to the floods. The report of April, 2013, however, revealed that those who were mostly affected or killed by the floods were school children. Some animals are as well reported lost their lives to the floods.

Apart from houses and lives that were lost to the floods, communication and traffic are also interrupted. It was discovered that the volume of vehicular movements in particular has been significantly influence by the nature and periodicity of flooding. (See Table 2).

Table 2: Flooded Areas of Selected Roads in Ado – Ekiti.

Road	Length in km	Flooding Area	% of Total length	Periodicity
Odo-Ado	2km	0.85km	42.5%	45minute
Ajilosun	2.2km	0.65km	29.5%	52minutes
Housing	2.6km	0.95km	36.5%	1 ¼ hours
Irona	1.8km	0.75km	41.6%	40 minutes
Omisanjana	2.8km	1.40km	50.0%	1 ½ hours
Adehun/Bausa	1.2km	0.48km	40.0%	38 minute
Opopogbooro	0.8km	0.43km	53.8%	32 minutes

Source: After Adeyemo 2013.

Electrical installations are swept away with valuable items, obstructing flow and roads are rendered impassable.

Beside, untold hardship is experienced especially in the most vulnerable groups (women and school children) whenever there is flood disaster in the area. The study revealed that school children experienced disruption due to the floods. This is attributed to various reasons such as road being impassable and school being flooded.

It is equally revealed that a substantial number of productive and non productive assets were lost to the floods. Those among others include chairs, radios, televisions, clothes, blankets goats, poultry etc. It is pertinent to note that some household indirectly lost their assets to the floods, in that after their houses have collapsed, some of the income sources got disturbed. This forced them to off load some assets to raise money to meet other household basic needs.

Conclusion

It is evident in the study that many people have lost their lives, homes, properties and assets to the floods. It has also been established that the urban floods are an annual occurrence in the metropolis for years. The problem has persisted in the areas prone to floods residential areas located near flood plains/low –lying areas. This is an indication that the various intervention and control measures being advanced by the government are yet to yield the desired results.

Consequently, there is an urgent need for a collaborative effort of both government and stakeholders to support town planning, engineering and other professional agencies to combat flooding in Ado –Ekiti metropolis to avoid long –range consequences. Every individual should try and construct deep and wide drainage system on his/her plots. Waste should not be dumped in the water ways because of its perilous nature in our living domains. The media should as well assist in educating the public on flood causer Factors and consequences.

Be reminded, the environment remains our most valued possession and legacy which we must all strive to protect. It shall be well if we join hands in protecting it.

Recommendations

It is now an established fact based on the revelation from this study that flood is becoming the most devastating natural disaster in Ado Ekiti metropolis, claiming lives and causing more property with many million of naira damaged as well as displacement of people. Consequently, the following controlling measured are advanced to minimize if not the totally eliminate the associated problems in the metropolis.

- Individuals and corporate bodies when looking for plots of land for building and construction purposes should endeavour to find out if the area suffers from floods. In case an area suffers from flood, they should equally find out how serious or the level of the previous floods.
- Also, we should always make a survey of the environment where we are interested to build over houses or live if there are dams up or close to the place.
- A well planned drainage system which can accommodate the localized heavy rains in the metropolis should be put in place by both the state and local governments.
- Flood zoning ordinances and land use control acts should be enacted by the state government. This will

be to restrict future buildings in flood plains. Equally, there should be enforcement of law against indiscriminate dumping of refuse in the drainage system.

- Existing buildings and other forms of illegal structures located on the flood plains should be demolished and relocated.
- The people of the area should be well educated on flood consequence and that no amount of sympathy and relief packages can make up for the pain, grief and the losses they will suffer from flood disaster. Hence, they should prevent becoming victims of floods.
- Having observed that parts of the metropolis are situated in low-lying areas, which can be submerged during heavy rains; such areas should adequately be coped with rather than being controlled or mitigated.

References

Adeyemo, A. (2013), Flooding and Vehicular Traffic in Ado – Ekiti Nigeria. *Olosunta Journal of Humanities, Vol 3, Issue 3*.

Action Aid (2006). *Field Report on Emergency Response to Floods in Western Nepal*.

Abaje, I.B. & P.N. Giwa (2007) Urban Flooding and Environmental safety: A case study of Kafanchan Town in Kaduna State in Mamman, A.B, Chup C.D and S.A. Mashi (eds) *Urbanization, Resource Exploitation and Environmental Stability in Nigeria*. Association of Nigeria Geographer

Aladelokun, A.O. (2004), River Flood Generating Factors in Ikere-Ekiti. *Knowledge Review:* Vol 8: No2.

Folorunso, R. & L. Awosikan (2001) Flood Mitigation in Lagos. Nigeria Through Wisem Management of Solid Waste: a case of Ikoyi and Victoria Islands Nigeria. Paper presented at the UNESCO-CS, Workshops. Mapato 19-23 November 2011.

Giwa, P.N. (2005) *Menace of Flood in a democratic Society: A case of Kafanchan town, Nigeria.* A paper presented at the school of General Studies Week, held at the Kaduna State College of Education, Gidan Waye.

Know Risk (2005) *United Nations*, Genera, Switzerland.

Mba, H.C. (1996) "Towards more Environment Conscious Development Policies in 21st Century Nigeria" *Proceeding of the 27th Annual Conference of the Nigeria Institute of Town Planners, Benin.*

Odunmerho, F.O. (1988) Benin City: A case of urban flood problems. In sada, P.O and F.O. Odermerho (Eds). *Environmental issues and Management in Nigerian Development.* Ibadan: Events brothers (Nigeria Publisher Limited).

Okoduwa, A.I. (1999*) An Application of GIS to Flood Prediction: A case study of Benin City. Nigeria* Unpublished Basic Dissertation. Department of Geography and Planning University of Benin, Nigeria.

Olosunorisa, E.T. (2004) An Assessment of flood vulnerability zones in the Niger Delta. Nigeria. *International Journal of Environmental Studies U.K*. Vol 6 No 1. pg.

Onokorheraye, G.A. (1995) *Urbanization and Environment in Nigeria: Implication for sustainable Development*. Benin City: The Benin Social Sciences Series for Africa.

Oriola, E.O. (1994) Strategies for combating urban Flooding in a Developing Nation: A case Study from Ondo Nigeria. *The Environmental* Vol. 14. No 1 pgs. 57 – 62.

Rashid, F.S. (1998) The urban poor in Dhaka City. Thin Struggles and Copping Strategies during the floods of 1998. *Journal* Vol. 24 No3.

United Nation Environmental Agency (2003).

World Socialist Website WSWS (2001) Northern Nigerian hit by floods Retrieved October 9, 2007 from http // w.w.w. wsuss. org/index. shtml.