CSCanada
Studies in Sociology of Science
Vol. 2, No. 2, 2011, pp. 89-93
DOI:10.3968/j.sss.1923018420110202.053

ISSN 1923-0176 [Print]
ISSN 1923-0184 [Online]
www.cscanada.net
www.cscanada.org

Environmental Influences of Flooding on Urban Growth and Development of Ado-Ekiti, Nigeria

OGUNDELE, J.A.[1,*]; JEGEDE, Amen Osamede [2]

[1]PhD, Department of Geography And Planning Science, Faculty of The Social Sciences, University of Ado-Ekiti, P.M.B 5363, Ado-Ekiti, Nigeria
[2]MSc, Department of Geography And Planning Science, Faculty of The Social Sciences, University of Ado-Ekiti, P.M.B 5363, Ado-Ekiti, Nigeria
Email: honourablejegede@yahoo.com
[*]Corresponding author.
Email: joeogundele@yahoo.com

Received 5 August 2011; accepted 12 October2011

Abstract
This study examined the environmental consequences of urban flood on the growth and development of Ado-Ekiti, Nigeria. Urban flood is any overland flow of water, over urban street, sufficient to cause significant damage to lives and property, traffic obstructions, nuisance and health hazards. Data for this study were collected from primary sources, through the administration of three hundred (300) questionnaires on respondents in the study area. Results from this study revealed that high intensity of rainfall, unturned road, dumping of refuse on drainage channels, poor construction of drainage channels and poor town planning practices are the main causes of urban flood problems in the study area. This study therefore recommends adequate drainage system, proper land use planning, construction of embankments, proper refuse disposal and environmental enlightenment programmes as a panacea to urban flood problems.

Key words: Environment; Consequences; Urban-flood; Developments

OGUNDELE, J.A., & JEGEDE, Amen Osamede (2011). Environmental Influences of Flooding on Urban Growth and Development of Ado-Ekiti, Nigeria. *Studies in Sociology of Science, 2*(2), 89-93. Available from: URL: http://www.cscanada.net/index.php/sss/article/view/j.sss.1923018420110202.053
DOI: http://dx.doi.org/10.3968/j.sss.1923018420110202.053.

INTRODUCTION
Over the years, environmental degradation has been a source of concern to many nations because of the huge amount of expenditure on its resultant effects. (Ebisemiju, 1993). Thus, it is also of concern because, the huge expenditure have not yielded much desired result due to mismanagement and natural factors.

Flooding as a principal agent of environmental degradation is an environmental issue, which remains threatening to most cities, it has been the result of human interference with the natural environment (Ogunyemi, 2002). The Advance Oxford Learner's Dictionary (2006) describes flood as an overflow of a large volume of water over dry land.

Urban flood is any over land flow of water, over urban street sufficient to cause significant damage of lives and property, traffic obstructions nuisance and health hazards (Adebayo Jegede, 2010). Thus, conditions, which lead to flood occur when the rainfall amount over a particular region is more than a certain amount, normal for that region (Oriola, 2003).

A close relationship exists between the growth of urban centers, and urbanization itself. However, it is regarded as a process, whereby an increasing proportion of the world, nations or regions population lives in urban areas (Falade, 2003). Falade (2003) further states that many factors are responsible for the invasion of people to a particular region within a geographical location, some of this factor include education, employment, housing etc. These emigrational factors often result to over urbanization, which constitute a "strike back" effect on the environment".

As a result of the attraction of people to a particular geographical region, as time goes on, there will be competition in various ways by which land can be put to use leading gradually to urban growth in such geographical location. The creation of Ekiti State in 1996 resulted to rapid growth within the geographical location

and equally, the influx of people into Ekiti region. Since then, the state capital, Ado-Ekiti has transformed into a full urban centre, serving as an administrative centre to other parts or areas of Ekiti state.

At the national level, Nigeria's incidence of urban growth is presently frightening with a population of about one hundred and forty million (140 million) people (National Population Commission, 2007). Nigeria is currently among the foremost country rapidly experiencing urban growth among the countries in Africa. On the average, Ado-Ekiti urban population growth rate is about three percent per annum, although higher growth figures as much as 6 percent) has been recorded in metropolitan areas such as Lagos and Kano state in Nigeria (Adebayo and Omotoso, 2000).

Adebayo and Jegede (2010) discovered that flooding results from excessive rainfall, blockage of natural drainage channels, and the overflow of river banks etc. this at the moment is on the increase, due to poor management of waste habit and the degree of urbanization of cities are most important factors determining the spatial variation in the intensity of river floods in towns.

Trinic (2002) stated that losses of flooding is enormous and can be categorized into economic and social losses. Economic losses can be quantified and this includes loss of economic goods like crops, crop damage occurs; when flood come earlier, rise or occur rapidly. Also, the uprooting of economic trees by the forces of erosion and flooding leads to reduction of construction materials, as such, the forest and soil becomes denuded. Owing to lack of capacities in the soil, surface rainfall runoff and flood peaks become higher.

Flooding is inimical to human activities, especially when it occurs on a large scale (Ogunyemi, 2002). Flooding has been a threat in some parts of Ado-Ekiti, e.g. Basiri, Irona, Bawa Estate, Adehun, Omisanjana, Atikankan, Ureje areas of Ado-Ekiti, Ekiti State, Nigeria. This is as a result of low rate of infiltration of the soil, as a result of pavements in the areas. This means that, the soil is non-porous; it does not retain water and immediately there is rainfall, the surface of the soil will be covered with water, and as such, flood and runoff characteristics occur.

The phenomenon of flood hazards, according to Ward (1978), comprises several aspects including structural damage, erosion damage, loss of lives and property, disruption of social-economic activities, including transport, communication and the destruction of agricultural land. According to Ayoade (1979), floods are natural phenomena rather than natural disasters. They, like drought, form parts of the normally occurring range of stream flow conditions. Flood disasters are man-made as they occur when and where man puts himself at risk by developing and occupying floodable areas, thereby causing damage, congestion and hold ups to the transportation networks in the area. Man therefore develops and occupies flood plains, at risk of flooding, out of ignorance or for economic reasons

The basic cause of urban flooding is man's modification of the basic network and channels characteristics during the process of settlement on the particular flood plain (Adeleke, 1978). Natural surfaces are replaced by more impermeable roads and concrete, which have very low infiltration capacity. The hydrological consequences of this is that water, which should normally infiltrate into the ground or be intercepted by vegetation and then delay for some time before running, would be immediately available for runoff. This considerably decreases the lag time between rainfall and storm water and increase the runoff with concomitar increase in peak discharge and total volume runoff (Adeleke, 1978).

OBJECTIVES

The major objective of this study was to examine ways to achieve effective management of urban flood in Ado-Ekiti, Ekiti State, Nigeria.

The specific objectives were to:

i. examine the factors that aid urban flood problems in Ado-Ekiti.

ii. ascertain the physical and socio-economic implication of urban flood in the study area.

iii. proffer appropriate remedial measures on the existing problems of urban flood and ways to prevent future occurrence of such problems in the study area.

THE STUDY AREA

Ado-Ekiti is the capital of Ekiti state; Nigeria. Ado Ekiti is the administrative centre of Ekiti state, Nigeria. The land in Ado-Ekiti rises Northwards and Westwards from 335 metres in Southeast and attains a maximum elevation of about 730 metres in the southwest (Adebayo, 1993).

The low relief and gentle gradient characteristics of Ado-Ekiti region favour agricultural and construction activities, and make much of the region susceptible to erosion and flood hazards during the rainy season.

Ado-Ekiti is located between latitude 7o31 and 7o491 North of the equator and longitude 5o71 and 5o71 East of the Greenwich Meridian.

Ado-Ekiti is bounded in the north by Ido-Osi and Oye local government Areas, in the West by Ijero and Ekiti West Local Government and in the South by Ekiti South West Local Government Area (Ebisemiju, 1993).

Ado-Ekiti has a planimetric area of about 884km2. Geologically, the region lies entirely within the pre-cambran basement complex rock group, which underlies much of Ekiti State.

The temperature of this area is almost uniform throughout the year, with very little deviation from the mean annual temperature of 27oC. February and March are the hottest 28oC and 29oC respectively, while June

with temperature of 25oC is the coolest (Adebayo, 1993).

The mean annual total rainfall is 1367mm with a low co-efficient variation of about 10%. Rainfall is highly seasonal with well marked wet and dry season. The wet season lasts from April to October, with a break in August.

CONCEPTUAL FRAMEWORK /LITERATURE REVIEW

Ogunyemi (2002) observed that, it is evident from research, that residence contributes greatly to flood problems of their area and their act jeopardizes the environment which attracts many people for economic, social and recreational facilities.

Olagunorisa (2004) stated that flood is caused by rainfall, snow, melting ice and hurricanes. He further stated that the common feature of flood is the destruction of lives and property. In several countries, a distinction is made between direct and indirect damage. The direct losses include those which result into loss of lives and properties. While indirect losses consist of damage resulting from the limitation or breakdown of human activities during flood.

Oriole (2003) noted that various socio-cultural activities have promoted flooding in many of the Nigerian urban environment. These activities are characterized by stream or river channel encroachment and abuse, increased paved surface and poor solid waste disposal techniques, ineffective town planning laws and poor environmental management etc.

Afolabi (2005) noted that the environment is itself, the point, in which one is found at a time, the surroundings, the more distant places, other earths components, conditions, prospects and problems which accounts for its flourished or otherwise.

Akinbode (2002) stated that the environment is the totality of the places and the surroundings, in which we live, work and interact with other people in our cultural, religious, political and socio-economic activities for self-fulfillment and the advancement of our communities, societies and nations.

The concept of sustainable development is applied to this study. The concept of sustainable development was propounded by the World Commission on Environment and Development (WCED) in 1987. This concept noted that sustainable development is a development that meets the needs of the present generation without compromising the ability of future generation to meet their own needs.

Development involves the purposeful change of the inherently complex environmental systems. Thus, developmental activities implies activities in the physical environment, take into consideration crucial issues of continuity and sustainability is concerned with. Any development process that ignores sustainability would hardly make any positive and enduring impact that could stand the test of time.

Since the aim of sustainable development is to ensure that the needs and aspirations of the present are met without compromising the ability of the future generation to meet their own needs, therefore, it will go a long way in managing urban flood in the study area. The concept will solve the problems of urban flood in the study area, by viewing the relationships among the physical environment, exploitation of resources and economic development integratively, rather than in isolation.

METHODOLOGY

Data for this study were collected from primary and secondary sources.

The primary sources of data collected were from physical survey and the administration of three hundred (300) questionnaires, through multi-stage random sampling techniques. This was used in the selection of household within the study area.

A total number of three hundred questionnaires were administered on respondents in this research, and 100% return rate of the questionnaires administered was achieved. The questionnaire was administered on weekend, because Ado-Ekiti is a civil servant city.

Descriptive method of data analysis was adopted in this research.

FINDINGS AND DISCUSSIONS

Table 1
Showing Existing Situation of Flood Experience in the Study Area

Flood Experience	Frequency	Percentage
Yes	178	59.3
No	50	26.7
Not Sure	42	14.0
Total	300	100.0

Source: Fieldwork Compilation, 2011.

Results from table 1 showed that 178 (59.3%) of the respondents stated that they experience flood problem in the area, 80% (26.7%) of the respondents stated that they have not experience urban flood problem in the area, while 42(14.0%) of the respondents stated that they are not sure, whether or not they have experienced flood problem in their area. This implies that urban flood problem in the study area is high, since it has affected

directly or indirectly majority of respondents in the study area.

Table 2
Causes of Urban Flood in the Study Area

Causes of Flood	Frequency	Percentage
High Rainfall	55	18.4
Untarred Road	40	13.3
Dumping of Refuse on drainage channels	60	20.0
Poor Drainage Channels	100	33.3
Poor town planning practices	45	15.0
Total	300	100.0

Source: Fieldwork Compilation, 2011.

Findings from table 2 revealed that 55 (18.4%) of the respondents noted that the cause of flooding in the area is high intensity of rainfall, 40(13.3%) of the respondents observed untarred road, 60(20.0%) of the respondents observed dumping of refuse on drainage channels, 100 (33.3%) of the respondents observed poor drainage channels, 45(15.0%) of the respondents noted poor town planning practices. This suggested that the major cause of flooding in the study area is poor drainage system.

Table 3
Flood Occurrence in the Study Area

Occurrence	Frequency	Percentage
Every year	41	13.6
Once in two years	33	11.0
Every wet season	173	57.6
Twice in a year	53	17.8
Total	300	100.0

Source: Fieldwork Compilation, 2011.

Results from table 3 revealed that 41(13.6%) of the respondents stated that flood occurrence in the study area in every year, 33 (11.0%) of the subjects stated once in two years, 173 (57.6%) of the subjects observed every wet season, and 53 (17.8%) of the respondents noted twice in a year. This suggested that the problem of flooding in the study area is always very terrestrial and destructive during the wet season, that other season.

Table 4
Possible Flood Control Measures in the Study Area

Flood Control Measures	Frequency	Percentage
Adequate drainage system	70	23.3
Proper land use planning	90	30.0
Construction of Embarkment	50	16.6
Proper refuse disposal	50	16.8
Environmental awareness on the danger of flood	40	13.3
Total	300	100.0

Results from table 4 shows 70(23.3%) of the respondents states that the provision of adequate drainage system should be adopted in controlling flood problem in the study area, 90 (30.0%) of the respondents observed proper land use planning, 50(16.6%) of the respondents stated construction of embarkment, 50(16.8%) of the respondent stated proper refuse disposal, and 40(13.3%) of the respondents noted environmental awareness on the danger of flood. This indicates that the major solution to long lasting urban flood problem in the area is proper land use planning.

RECOMMENDATIONS

Based on the findings urban flood problems in the study area, the following recommendations were made.

There is need for a well articulated and comprehensive planning of various aspects of Ado-Ekiti land use activities, so as to guide against harphazard development, as well as the prevention of the causes of flooding in the study area.

There is need for actions to be taken in design and enforcing relevant environmental policies and enforcing relevant environmental policies and measures, that would minimize the impact of flood on the area.

There is need for the coordination of policy action in the study area so as to achieve the objectives of the urban flood management.

Enlightenment programmes should be organized periodically for inhabitants in the study area, on the causes, problems and possible preventive measures of urban flood.

Appropriate environmental laws should be put in place to prevent indiscriminate dumping of refuse on drainage channels, as well as bringing offenders to book.

Priority should be given to building of houses, structures and construction of road networks, so as to ensure compliance and non-stretching of developmental activities beyond limit by Government, Developers and individuals, prevent possible room for flood problem in the future.

CONCLUSION

From the findings of this work, it was discovered that urban flood problem majorly emanates from the construction of poor drainage system and co-ordination. This development has contributed immensely to flood problem in the study area. Thus, adequate machinery should be put in place for project implementation, as well as recommendations in this study should be properly taken care of, to ensure better living for the inhabitants in the study area.

REFERENCES

Adebayo, W.O. (1993). Weather and Climate. In Ebisemiju, F.S. (Ed.), *Ado-Ekiti Region: A Geographical Analysis and Master Plan.* Lagos, Nigera: Alpha Prints. 11-14.

Adebayo, W.O. and Jegede, A.O. (2010). The Environmental

Impact of Flooding on Transportation Landuse in Benin City, Nigeria. *African Research Review,* 390-400.

Adebayo, W.O., & Omotoso, O. (2000). *Introduction to Human Geography 1.* Abuja, Nigeria: Petoa Educational Publishers.

Adeleke, B.O. (1978). *Urban and Rural Development in Nigeria.* Lagos, Nigeria: Heinemann Press.

Adeniyi, A.O. (1993). Soils and Vegetal Resources in Ado-Ekiti Region. In Ebisemiju, F.S. (Ed.), *Ado-Ekiti Region: A Geographical Analysis and Master Plan.* Lagos, Nigeria: Alpha Prints.

Afolabi, F.I. (2005). *A Crucial Assessment of Environmental Problems in Ondo State: Selected Examples and the Way Forward.* Paper presented in an Environmental Sensitization Workshop Organized by the Ondo State Government. Ministry of Special Duties (Department of Environmental and Mineral Resources Akure).

Akinbode, A. (2002). *Introductory Environmental Resources Management.* Ibadan, Nigeria: Daybis Limited.

Ayoade, J.O. (1979). A Note on the Recent Flood in Ibadan, Nigeria. *Savanna, 8*(1), 64-65.

Durotoye, B. (2000). Geo-Environmental Constraints in the Development of Niger Delta Area of Nigeria. In Akinjide Osuntokun (Ed.), *Environmental Problems in Nigeria.* Lagos, Nigera: Fredrick Ebert Foundation.

Ebisemiju, F.S. (1993). Environmental Hazards. In Ebisemiju, F.S. (Ed.), *Ado-Ekiti Region: A Geographial Analysis and Master Plan.* Ado-Ekiti, Nigera: Alpha Prints.

Falade, J.B. (2003). *The Urban and Regional Process: The Old and New Paradigm.* Paper presented on Continuing Development Programme (MCPDP) of the Nigeria Institute of Town Planners (NITP), Calabar, Asaba and Kaduna, Nigera.

Folorunso, R. and Anosika, L.(2009). *Flood Mitigation in Lagos, Nigeria.* Paper presented at the Wise Management of Solid Waste Institute for Oceanography and Marine Research, Coastal Region and Small Island. Lagos, Paper 12. Retrieved September, 2011, from http://www.hg.org/environ.htm

Henry, D. (2005). *Fundamentals of Soil Science*. New York: Willey and Sons Publications.

Kuchment, L.S. (2002). *Estimating the Risk of Rainfall and Snow Melt Disastrous Flood: Using Physically Based Models of River Runoff Generation.* Croatia, Nigeria: IAHS Publications.

Ogunyemi, E.S. (2002). *The Menance Flood: A Case of Surulere Local Government.* Lagos, Nigeria: Yaba College of Technology Press.

Okoduwa, A.T. (1999). *An Application of Geographical Inforamtion System (GIS) to Flood Prediction: A Case Study of Benin City, Nigeria.* (Unpublished MSc dissertation.) University of Benin, Nigeria.

Ologunorisa, E.T. (2004). An Assessment of Flood Vulnerability Zones in the Niger Delta Nigeria. *Environmental Journal of Environmental Studies, 61*(1), 65-70.

Oriola, O. (2003). *Strategies for Combating Urban Flooding in Developing Countries: A Case Study of Ondo State, Nigeria.* Retrieved October, 2011, from http://www.chemalliance.org/tools/env.laws.

Trinic, D. (2002). *Hydrological Analysis of High Flows and Floods in the Sava River near Zagreb.* Croatia, Nigeria: IAHS Publications.

Ward, R. (1978). *Flood: A Geographical Perspective,* London, UK: The Macmillan Press. Retrived from http://www.springerlink.com/content/geography journal (2011).

