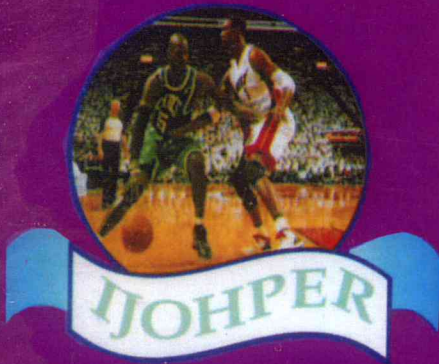


ISSN: 0795-6061



ILORIN JOURNAL OF HEALTH, PHYSICAL EDUCATION AND RECREATION (IJOHPER)

**VOLUME 10,
No.1 [2017]**

A Publication of
**The Department of Human
Kinetics Education,
University of Ilorin, Ilorin Nigeria**

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FACTORS RESPONSIBLE FOR FLOODING AMONG RESIDENTS IN ILORIN EAST LOCAL GOVERNMENT AREA, KWARA STATE, NIGERIA

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Abstract

This study investigated factors responsible for flooding among resident in Ilorin-East Local Government, Kwara State. The purpose of this study was to determine whether: (i) indiscriminate waste and inadequate drainages are responsible for among resident in Ilorin East Local Government Area, Kwara State. Descriptive research design of the survey type was adopted for the study. Multi-stage sampling techniques consisting of purposive, proportionate and simple random sampling technique were used to select a sample size of four hundred and forty five (445) respondents used for the study. Researcher-designed questionnaire validated by three (3) experts in the related field were used for the data collection. A reliability co-efficient of 0.75r was obtained through split-half method. Data collection was conducted by the researcher and three trained research assistants. Inferential statistics of Chi-square was used to analyse the formulated null hypotheses at 0.05 level of significance. The findings of the study showed that indiscriminate waste disposal and inadequate drainage system are responsible for flooding (267.52 > 21.03, 267.52 > 21.03) among resident in Ilorin East Local Government Area, Kwara State. The researchers' concluded that indiscriminate waste disposal and inadequate drainage system were responsible for flooding among resident in the study area. The researchers' recommended amongst others that. Ilorin East Local Government Authority should provide necessary measures to provide more drainage system within the study area and dredge the existing drainages for easy passage of water and other liquid waste.

Key Words: Factors, Flooding, River Bank, Residents.

Introduction

Flooding is one of the major environmental challenges people experience globally. This is especially the case in most wetlands of the world (Prekeyi & Adam, 2015). Floods are defined as extremely high flows of river, whereby water inundates flood plains or terrains outside the water-confined major river channels. Flood hazard is measured by possibility of occurrence of their damaging consequences, conceived generally as flood risk, or by their impact on society, conceived usually as the loss of lives and material damage to society (Henry, 2006).

Floods occur on many rivers, forming a surrounding region known as flood plain and rivers overflow for reasons like excess rainfall. The good thing about river overflows is the fact that as flood waters flow into the banks, sand, silt and debris are deposited into the surrounding land (Abowei & Sikoki, 2005). Flooding may result from the volume of the water within a body of water, such as a river or lake; exceeding the total capacity of its bounds with the

result that some of the water flows outside the catchment. It can also occur in rivers, when the strength of the river is so high it flows out of the river channel particularly at bends or meanders (Khatibi, 2012).

According to Olayinka, Nwilo and Adzandeh (2012), floods occur due to extraordinarily heavy rains. Nigeria has two rainy seasons, the first lasting from March to the end of July and the second commencing in early-September and ending around mid-October. The country often experiences flash floods in these periods. Heavy rains caused River Niger to overflow right from its source. Action Aid (2006) reported that flooding is a major natural disaster that prevents Africans growing population of city dwellers from escaping poverty and stand in the way of United Nations "20-20 goals" of achieving significant improvements in the lives of urban slum dwellers. This sends a very strong signal of dangers ahead to the countries experiencing flooding if concerted action is not taken and it also remind us that urgent attention is needed to tackle the trans-boundary climate problems (Nwedu, 2015).

The recent reported cases of flood disasters across the globe buttressed the point being made by the Action Aid International. For instance, within the month of September 2012 alone, Nigeria witnessed the most devastating flood disaster in the past decade which killed over 148 people including a local chief in Delta State. It also displaced more than 64,000 people and destroyed properties worth millions of Naira (Daily Sun, 2014). The 2012 Nigerian floods began by June. The disaster caused death of 363 people and displaced over 2.1 million people. According to the National Emergency Management Agency [NEMA] (2012), 30 of Nigeria's 36 states were affected by the floods and were termed as the worst in 40 years.

Many Nigerian coastal and inland cities experienced heavy rains, and residents of Lagos were "gasping for breath" due to the flooding. In addition, there was a gridlock on major roads, causing people to cancel or postpone appointments they may have had. Thousands of stranded commuters had to pay increased fares for the few bus drivers who were willing to risk travelling on the roads, and construction of work by the Nigerian government on the inner Oke-Afa Road took a "heavy toll" (Inyama, Nnamdi, Chukwuma, Adepetun, & Adeyemi, 2012).

Ayuba, AbdMnaf, Sabrina and Nur-Azim (2013) observed that mankind depends on the environment to sustain their lives and that solid waste is one of the three major environmental problems, other major environmental issues include flooding and desertification in Nigeria and many other developing and even developed countries are threatened by this. Municipal solid wastes consist of day-to-day consumed and discarded items such as food wastes, containers, product packaging and other miscellaneous like residential, commercial, electronic wastes, institutional and industries sources (Babu, Jagadeeswara & Prasad, 2013).

Oftentimes, waste that is not properly disposed enters into drainage systems and clogs drains. This obstructs the free flow of water that enters into these drains causing water to

back up during rainfall flooding the surrounding area (Olukanni, 2013). A buildup of waste can also obstruct the natural flow of water in rivers and streams. This is the major cause of flash flood in urban areas. Low-lying coastal areas such as Lagos, Ibadan and Abeokuta where the flood-plains have been abused due to haphazard physical developments, illegal erection of buildings and other structures as well as unhealthy habit of dumping refuse and solid wastes in open channel drainage systems are particularly prone to flood disasters (Odufuwa et al, 2012). The researcher observed around the study area- Asa river area- that waste materials are often disposed on open dumps, waste burning or disposed in river channel or drainages when it rained.

Researcher observed that flooding is responsible for the number of dilapidation to buildings in the study area, many areas are cut off from major roads and businesses are forced to move out to other areas affecting the economic status of the area. Also, household waste from septic tanks and pit latrines contaminates water sources like boreholes and well water. Flooding also causes breeding of vector which is responsible for the transmission of some diseases.

Nigeria's rainy season is usually characterized by flash floods which are sometimes devastating because of the poor drainage systems in most parts of the country. The need to provide proper drainage and sanitation facilities is essential to match up with the ever increasing population growth (Banerjee & Morella, 2011). Kingsley and Christopher (2013) opined that, although flooding gives urban residents a nightmare especially during the rainy seasons, there is gross inadequacy in the provision of drainage channels coupled with poor design and construction as well as the blockage of available drainage channels with buildings and indiscriminately disposed solid waste among others which are the greatest contributory factors in the state.

Some of the urban in Nigeria that experience flooding are due to inadequate drainage system; changes in ecosystem through the replacement of natural and absorptive soil cover with concrete; and deforestation of hillsides, which has the effect of increasing the quantity and rate of runoff, and through soil erosion and the silting up of drainage channels (Adelekan, 2011). The impacts on both individuals and communities can have social, economic and environmental consequences which may be negative or positive (Apan, Keogh, King, Thomas, Mushtaq & Baddiley, 2010).

As reported by Ajayi (2012), the immediate effect of flooding include loss of human life, damage to properties, destruction of crops, loss of livestock, and deterioration of health conditions owing to waterborne diseases. As communication links and infrastructure such as power plants, roads and bridges are damaged and disrupted, some economic activities may come to standstill. People are forced to leave their homes and normal life is disrupted. Similarly, disruption to industry can lead to loss of livelihoods (Ajayi, 2012; Onifade, Ruth, Adigun, Oguntunji & Ogungboye, 2014). Belete (2011) expressed that high urban population growth rate also results in drainage system challenges because an increase in population requires a proportionate increase in infrastructure (roads and drainage systems) of which

when not properly catered for, the facilities will be imperfect. It is on this premise that prompts the researcher to do assessments of factors responsible for flooding of Asa river bank by residents of Zango ward, Ilorin, Kwara State.

Statement of the Problem

Asa river has been characterized by frequent floods over the years causing damages worth millions of naira and invaluable loss of life and properties. The researcher observed that the channelization project of the Asa river has been identified as a major cause of the recent flooding incident in these areas, this has further caused problems to the people living in the areas where the project's third phase has yet to be done. There has also been an increased level of indiscriminate waste disposal along the river bank; these areas include Aduralere, Duma, Isale-koko, Mubo and Isale Asa area. Large volume of water being carried from the expanded river area now flood homes, shops, schools even house of worship in an area where such carnage has never been experienced.

Researchers observed that flooding is responsible for the number of dilapidation of buildings in the study area, many areas are cut off from major roads and businesses are forced to move out to other areas affecting the economic status of the area. Also, household waste from septic tanks and pit latrines contaminates water sources like boreholes and well water. Flooding also causes breeding of vector which is responsible for the transmission of some diseases. It is on this premise that prompts the researcher to do assessments of factors responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

Research Questions

The following research questions were raised to guide the study:

1. Is indiscriminate waste disposal is a factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara State?
2. Is inadequate drainage system a factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara State?

Research Hypotheses

The following research hypotheses were formulated to guide the study.

1. Indiscriminate waste disposal will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State
2. Inadequate drainage system will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

Methodology

The research design adopted for this study was a descriptive research design of the survey type. The population for the study comprises all the residents along Asa river bank, Zango ward, Ilorin East Local Government, Ilorin, Kwara State with the estimated population of Seventeen thousand One hundred and Ninety (17,190) (National Programme on Immunization (NPI), 2015). The target population of the study is eight thousand, nine hundred and sixteen (8,916). A multistage sampling technique was used for sample selection. In stage one; purposive sampling technique was used to select areas with physical effects of flood disaster, the researcher did this by going round the study area to take note of such effects like dilapidated buildings, submerged houses, inaccessible buildings and water logged areas.

In stage two; proportionate sampling technique was used to select 5% of the targeted population for the study. In stage three; simple random sampling technique was used to select respondents for the study. According to Research Advisor (2006) for a population less than 10,000 a sample of 384 are sufficient enough to represent the entire population at a level of confidence of 95% and a margin of error of 5%. Therefore, a sample of 445 was used for the study which also represents 5% of the target population. The study population comprises all the residents of Asa river bank (Zango ward). According to the National Programme on immunization (NPI) Census (2015), the population of Zango ward is 17,190. The research instrument used for this study was a structured questionnaire designed by the researcher. The instrument was validated by two experts in the Department of Health Promotion and Environmental Health Education, University of Ilorin, as well as an expert in the Department of Geography & Environmental sciences, University of Ilorin.

The reliability was carried out using test re-test method. This was done in such a way that the questionnaire was first administered to 10 respondents outside the area of the study. After two weeks interval, the instrument was re-administered to the same respondents for the second time. The results obtained from the two administrations were analyzed using Pearson Product Moment Correlation statistic to determine the coefficient reliability of the two administrations. The reliability coefficient of $r = 0.75$ was obtained. The coefficient value obtained was high enough to guarantee the use of the instrument for this study. The researcher together with five trained research assistants administered the instrument to the selected respondents. Their consents were sought for before involving them for the study. The instrument was retrieved immediately after filling it to avoid loss. The data collected for this study was subjected to inferential statistics of Pearson Product Moment Correlation at 0.05 alpha level of significance.

Table 2: Percentage of the Sample Selected for the Study

S/N	NAME OF AREA	TOTAL POPULATION OF THE AREA.	5% SAMPLE SELECTED
1	Aduralere	2188	109
2	Mubo	1266	63
3	Alalubosa	898	45
4	Ipata	1723	86
5	Isale koko	1373	69
6	Isale Asa	1468	73
	Total	8916	445

Results

Hypothesis one: Indiscriminate waste disposal will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

Table 1: Chi-square analysis investigate indiscriminate waste disposal as a factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	Row total	Df	Cal. χ^2	χ^2 value.
1	Dumping of refuse into river causes flooding	212 (47.6%)	111 (24.9%)	87 (19.6%)	35 (7.9%)	445			
2	Dumping of waste on flood plain causes flooding	192 (43.1%)	198 (44.5%)	16 (3.6%)	39 (8.8%)	445			
3	Dumping of municipal waste along roadside may lead to flooding	171 (38.4%)	165 (37.1%)	85 (19.1%)	24 (5.4%)	445	12	267.5	21.03
4	Waste material from nearby drainages also flow into river may cause flooding	201 (45.2%)	165 (37.1%)	45 (10.1%)	34 (7.6%)	445			
5	Build-up of waste materials in drainages may cause flooding	207 (46.5%)	133 (29.9%)	24 (5.4%)	81 (18.2%)	445			
Total column		983	772	257	213	2225			

@ 0.05 level of significance

Table 1 shows the results of the stated hypothesis which stated that indiscriminate waste disposal will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. Since the calculated Chi-square value of 267.52 is greater than Chi-square table value of 21.03 (cal. χ^2 val > tab. χ^2 val) with the degree of freedom 12 and at 0.05 alpha level of significance, therefore, the null hypothesis is rejected. This implies that waste disposal significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. In other words, majority of the respondents agreed that indiscriminate dumping of refuse and other waste materials were responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

Hypothesis two: Inadequate drainage systems will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara state.

Table 2: Chi-square analysis investigate inadequate drainage system as a factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	Row total	Df	Cal. χ^2	χ^2 value	Decision
1	Lack of drainage leads to flooding	227 (51.0%)	112 (25.2%)	73 (16.4%)	33 (7.4%)	445				
2	Poor drainage construction causes flooding	213 (49.9%)	135 (30.3%)	45 (10.1%)	52 (11.7%)	445				
3	Blocked drainage channels with waste may cause flooding	221 (49.7%)	129 (29.0%)	35 (7.9%)	60 (13.5%)	445				
4	Silting up of drainage channels cause flooding	127 (28.5%)	178 (40.0%)	82 (18.4%)	58 (13.0%)	445	12	266.90	21.03	H_0 rejected
5	Building on available drainage may cause flooding	149 (33.4%)	160 (36.0%)	85 (19.1%)	51 (11.5%)	445				
Total column		937	714	320	254	2225				

@ 0.05 level of significance

Table 2 shows the result of the hypothesis which stated that inadequate drainage system will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. Since the calculated chi-square value of 266.90 is greater than chi-square table value of 21.03 (cal. χ^2 val > tab. χ^2 val), therefore, the null hypothesis is rejected. This implies that inadequate drainage system significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. The finding implies that lack of adequate connecting drainage system which helps to carry water and other liquid waste in the area causes flooding.

Discussion of Findings

Hypothesis one states that indiscriminate waste disposal will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. The hypothesis tested was rejected. The finding revealed that improper waste disposal is a significant factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. The finding is in line with Olukanmi (2013) who found that oftentimes, waste that is not properly disposed enters into drainage systems and clogs drains. The clog drains obstructs the free flow of the water that enters into these drains causing water to back up during rainfall flooding the surrounding area. Odufuwa et al (2012) reveals that a build-up of waste can also obstruct the natural flow of water in rivers and streams; this is the major cause of flash flood in urban areas. Aderogba (2012) asserts that cities and towns are increasing in number, area extents, population sizes, and functions. It is not unlikely that it is the large population coupled with the inability of the city governments to provide adequate infrastructure, and the living habits of the inhabitants that are compounding the issues of wastes, that apart from the few designated dumps, wastes litter roads, streets, markets, store areas, schools and office premises, gutters, erosion passages, drainage channels and pathways – to the points of embarrassment. These studies revealed that improper waste materials are responsible for clogging drainages meant to take water away from homes and its surrounding and this also affect the flow of water.

Hypothesis II states that inadequate drainage system will not significantly responsible for flooding among residents in Ilorin East Local Government Area, Kwara State. The hypothesis tested was rejected.. The finding revealed that inadequate drainage system is a significant factor responsible for flooding among residents in Ilorin East Local Government Area, Kwara state.. The finding corroborates with the findings of Agbonkhese et al (2013) that opines that human activities such as rapid industrialization and urbanization, population growth, exploitation of natural resources and location of infrastructures resources and location of infrastructures exacerbate the occurrence of floods.

Causal factors of flood in Nigeria include indiscriminate dumping of refuse on drainage channels, channel adjustment and poor drainage conditions. The finding is also in agreement with Kingsley and Christopher (2013) opine that, although flooding gives urban residents a nightmare especially during the rainy seasons, there is gross inadequacy in the provision of drainage channels coupled with poor design and construction as well as the blockage of available drainage channels with buildings and indiscriminately disposed solid waste among others which are the greatest contributory factors in the state.

Conclusion

Based on the findings of the study, it was concluded that:

- Indiscriminate waste disposal is responsible for flooding among residents in Ilorin East Local Government Area, Kwara State.
- Inadequate drainage system is responsible flooding among residents in Ilorin East Local Government Area, Kwara State.

Recommendations

The following recommendations were made by the researchers based on the findings and conclusion drawn from the study:

- Kwara State Government should educate the community members through mass media on the need for them to keep away from indiscriminate disposal of waste which can result to flood disaster that may destroy their live and property if not properly manage.
- Ilorin East Local Government Authority should provide necessary measures to provide more drainage system within the study area and dredge the existing drainages for easy passage of water and other liquid waste.

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