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AN ASSESSMENT OF THE EFFECTS OF FLOODING IN TALOKA WARD, GORONYO LOCAL GOVERNMENT, SOKOTO STATE, NIGERIA

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Article Info

Abstract

This research study was carried out through descriptive survey design based on assessment of the effect of flooding disaster in Taloka ward Goronyo local government sokoto state, Nigeria. The objectives of the research are Assessment of the major causes of urban flood in Taloka A identification of the effects of urban flooding in Taloka. An investigation of possible risk management strategies for the study area. result from analysis of the major causes of flooding in Taloka presented in table 2 shows that 19 respondent with 26% said is deforestation, followed by 16 respondent with the 22% whose said is caused by heavy rainfall, while 17 people with 24% said river over flow, 3 people with 4% said is coastal storm surge, 10 people with 14% said is poor drainage system, 4 people with 6% said is dam failure and 3 people said it caused by urbanization. result from the analysis of the effect of flooding in Taloka ward of Goronyo local government sokoto state presented in table 3 shows that the 21 respondents with 29% said is agricultural losses, followed by 13 peoples whose said is destruction of habitat, 8 respondents with the percentage of 11 said is soil erosion, 6 peoples with 10% said is water quality degradation 11 peoples with 15% said is property and infrastructure damage5 peoples with 7% said is business disruption and other 5 people said is water borne diseases, while 2 people said is educational disruption. Result from analysis of possible risk management strategies for the reducing respondents of flooding in Taloka ward Goronyo local government presented in table 4 shows that 14 with 19% said is educating the public, followed by 12 respondents with 17% whose said establishing community-based flood plan, while 6 peoples with 8% said building levees and dam and 9 peoples with 13% said constructing retention basin, 11 peoples with 15% said reforestation watershed, 10 people with 14% said limiting construction in flood-prone area, and other 10 peoples said improving drainage system. In conclusion the study has revealed that heavy rainfall of long durations and river overflow are the most important causes of flooding in Taloka. It was also discovered that depth of flooding, duration of flood, perceived frequency of flood occurrence, perceived extent of damage arising from flooding, percentage deviation of seasonal rainfall from the mean, area or location/relief, proximity to hazard source, land use or dominant economic activity as well as adequacy of flood alleviation measures are the main factors influencing the incidence of flooding phenomenon in Taloka.

Keywords:

Effect of Flooding, Environmental Sanitation, Urban flooding, Flooding disaster, Risk management

INTRODUCTION

Floods are the most common and widespread of all natural disasters (Smith and Tobin, 2019). Many countries around the world experience some kind of flooding. Examples of such flooding include settlements around the Nile river in Egypt, Mississippi river in U.S.A, the Ganges in Bangladesh, the Rhine in Germany, Thramans River in Britain, the Kalimantan in Indonesia and in Nigeria along the major rivers like Niger, Benue and the river basins as well as Niger Delta. Damage to property in urban areas due to floods run into huge sums of money when quantified in most cases and sometimes human and animal lives are lost. The United States, for example, estimated an annual loss of property to flood at $12 billion in 2019(Smith and Tobin, 2019).

Today, many countries are trying to reduce property damage and loss of human lives to floods through flood prediction and by creating a database of flood hazard areas. It has been shown by various studies that floods can be more effectively managed when flood predictions are complemented with maps of flood risk zones (Balogun and Okoduwa, 2010; Sarma, 2016; Sanyal and Lu, 2013). However, like many other natural hazards, floods may also bring benefits such as the recharge of ground water and deposition of silty materials quite useful for agricultural purposes (Smith and Tobin, 2019).

In Nigeria, the hydrological changes associated with urbanization have received numerous attention (for example, Akintola, 2014; Enendu, 2021; Ojo 2021; Gobo, 2021; Olaniran, 2023; Oriola 2014) Various factors, including topographical conditions, rainfall characteristics and land use have been adduced as the major causes of flooding in our cities (Ologunorisa, 2011). The human factors especially increase in paved area, refuse disposal habit and occupation of the flood plain were emphasized by Oriola (2014) while Babatolu (2026, 2017) and Gobo (2018, 2021) emphasized the role of rainfall. amount and intensity.

In the Nigerian Niger delta and the South-West of the country studies on flood hazards showed that the urban areas are seriously affected due to poor planning (Ayoade and Akintola 1980; Oriola, 1994; Ologunorisa and Adeyemo, 2004). Other studies on urban floods problems in Nigeria have also received numerous attention. For example, Odemerho (1988) and Rasheed (1982) studied urban flood problems in Benin City, Omiumu (1981) studied flood disaster in Ogunpa River Plain, Ibadan, while Ologunorisa and Tersoo (2006), and Ologunorisa and Diagi (2006) studied urban flood problems in Makurdi and Warri respectively. The issue of flood risk assessment in Nigeria has also engaged the attention of Ologunorisa (2001, 2004, 2006) and Ologunorisa and Abawua (2006).

Flooding became a serious environmental menace when Nasarawa State was created in 1996 and Lafia was made the state capital. Doma witnessed the influx of people to the town which has led to the indiscriminate building of structures in places within the natural courses of river. It is a known fact that as the urban population expands, new industrial and housing development also increase with inadequate urban infrastructure such as drainages and roads. Urbanization generally has the effect of increasing the volume of runoff due to inadequate urban drainage facilities or poor drainage management. The effects of extreme rains and floods in urban environment are often broad, devastating and costly. Over the years, Taloka has been experiencing serious flooding problem during the rainy season which may not be unconnected with the recent development attributed to the increase in the number of inhabitants in the town. Thus, Taloka as ward center has witnessed an unprecedented growth in physical structures over the

last few years. This has resulted in the replacement of large hectares of open land with concrete houses and bitumen roads thereby creating complex problems to drainages. Flooding has thus become an annual occurring event in Taloka especially after heavy rainstorms. The problem is further worsened by the nature of the topography of the area, which is a low-lying plain, and the poor inadequate drainage network. Taloka lies in the low land area of the Goronyo trough which makes it more prone or vulnerable to flooding. Taloka suffers from perennial problem of flooding during the rainy season as a result of improper drainage designs and poorly maintained drainage systems. Consequently, most residents in Taloka are rendered homeless (NBS Documentary, 2008).

At present, there is dearth of data on the level of flood vulnerability in Doma and on the nature of the behavioural responses of the Doma flood dwellers to the risk of flooding which will help policy planners in the development of the floodplain and in reducing the large scale damage and losses that may arise from flooding in Doma. It has also been observed that little or no efforts have been made by scholars to carry out flood risk assessment studies in Doma town where flood is becoming a great environmental challenge to the inhabitants. The above limitations will constitute the main thrust of the study.

Aim and Objectives of the Study

The present study deals with assessment of the effects of flood in Taloka ward of Goronyo local government sokoto state, Nigeria.

To realize this aim, the following specific objectives were addressed:

1) Assessment of the major causes of urban flood in Taloka

2) An identification of the effects of urban flooding in Taloka

3) An investigation of possible risk management strategies for the study area.

LITERATURE REVIEW

The Concept and Types of Floods

In the ordinary hydrologic literature, a flood is referred to as any relatively high flow that over-tops the natural or artificial banks in any reach of stream (Chow, 2020). It is also regarded as an over flow or inundation that comes from a river or other body of water and causes or threatens damage (Alii, et al 2022), or a deluge or inundation (Wright, 2020).

A flood is also defined as the highest value of the stage or discharge of a stream during the water year (Cicioni et al, 204). This view implies the distinction between floods of the same magnitude, but there might exist several different inundations or none at all. If there are several inundations in a year, the greatest one will be a flood but "a flood need not be an inundation, even a dry year has a flood (Gum bel, 2022).

It is necessary to state here that these definitions do not contradict themselves. The latter is necessary only because of the technical exigency including at least one flood for every year in the computation of flood magnitudes and their probable frequencies of occurrence. A year for which a rare flood is recorded

for instance, will transform logarithmically to infinity which introduces computational problem (Dalrymple, et al 2020).Floods have been divided into two namely: River Floods and Coastal Floods (Chow, 2020).

1. River Floods

Are caused by precipitation acting either directly by rainfall, or indirectly by snow or ice melt, and those resulting from dam collapse and earth slides (Ward, 1978). Floods resulting from melting of snow and ice, with or without an additional increment from rainfall, are a major component of the hydrological region in the high latitude areas of Canada, the United States and Russia, and parts of Europe and at high altitudes in the major mountain areas of Europe and Asia (Ward, 1978). Such floods normally occur only once a year.

In view of the markedly varying flood response to different rainfall conditions, many attempts have been made to classify floods on the basis of the storm event itself. Thus, Ward (1978) recognized two types of river floods related to different causal factors namely, Flash floods, and long rain floods. Flash floods are often the results of convectional storms while long rain floods are associated with several days or even weeks of low intensity rainfall and are the most common cause of major flooding.

2. Coastal Floods

Coastal Floods are of three kinds:

Those caused by meteorological disturbances, such as hurricanes and other disturbances at sea (typhoons, cyclones, tsunamis, etc). Those caused by seismic disturbances such as submarine earthquakes, landslides and other disturbances of the sea (Langbein, 1978); and

Lakeshore floods (Hewitt and Burton, 1971). According to Omuta (2020), the combination of these different types of floods account for 40 percent of the world's natural disasters. As noted by Langbein (1978), most of the world's population and property are located on lands subject to overflow of rivers or seas. Thus, flood-prone lands comprise about 5 percent of the area of the United States, more than 10 percent of the Hwang Ho basin in China, almost all of the Netherlands and nearly all of the southern part of Vietnam. There is therefore an imperative need for a proper and comprehensive understanding of floods if the safety of flood plain occupancy and coastal areas are to be guaranteed.

Causes of Floods

Wisler and Brater (1959) discussed 17 factors which may influence runoff and hence floods in any stream. They divided these into three broad categories namely: climatic factors such as precipitation, interception and evaporation; physiographic factors which include basin characteristics and physical factors; and channel characteristics.

These factors are in complete agreement with those discussed in detail by Ward (1967) and Benson (1968). The most exhaustive list is, however, that of Chow (2020), who observed that runoff and indeed floods are caused by a number of hydroclimatic factors. These factors include but not limited to climatic factors, interception, evaporation and transpiration. For example, there are rainstorm floods, snow melt floods,

floods due to ice jams, floods due to glaciers and floods due to precipitation characteristics such as intensity, duration, time distribution, area distribution, frequency of occurrence, direction of storm movement, and antecedent precipitation.

The effects of all these factors are fairly accurately known except for the effect of land use on floods. Wisler and Brater (1959) contend, for example, that of all the many physiographic factors that affect the runoff of any area, one of the most important is land use and land management. Ward (1967) agrees completely that "it is largely the human factor that apparently increases severity of floods during recent times." Similarly, according to Waltham (1978) observations of the Hwang Ho Bain floods, concludes that floods will always occur with or without the presence of man.

In 1999, more than 200,000 people were displaced by flooding in Niger state, where it is believed that about a million people living in the low-lying plains of the Niger River are at risk. Flooding is recorded every year in all the states long the Niger and its tributaries. In the lower Niger basin, these floods frequently cause disasters (Trevor, 2010

Beneficial Effects of Floods

Besides the literature on causes of floods, there are a number of studies that discussed the beneficial effects of floods. For examples, Langbein (1978) noted that it is probably safe to attribute the rise and growth of the early civilizations to the occurrence of floods. Civilizations here is used loosely to refer to the period when man settled and embarked on cultivation of agriculture. Naturally, these early settlements(later to be he foci of civilization), as well as Niger Delta.

These rivers have over the years built extensive and fertile floodplains that were ideally suited for tilling with the crude instruments possessed by the early man. Hence, Tarhule (1988) observed, "since the beginning of recording history and probably predating that, man has always had an affinity for floodplains and riversides". This is because there is lack of road and rail networks, and hence greater affinity for rivers and ports.

Detrimental Effects of Floods

Flooding have been known to cause damages to lives, landed property, household property, business, traffic, drains, and surface and underground water (Ward, 1967). Between August 6 and 13 J 986 series of floods hit the city of Kano culminating in the collapse of the Baguda dam is estimated to have claimed a total of over 100 lives. More recently in June, 2011 a more devastating flood occurred at Fage area in Kano where many houses/buildings collapsed and properties and lives were also lost.

On July 22, 2012 a rampaging flood tragedy struck Rukuba Road, Angwan Rogo, Angwan Rukuba, Rikkos, Gangare and Farin-Gada in Jos killing over 35 people and destroying more than 200 houses as a result of torrential rain and water from the Lamingo dam which overflowed and swept across several neighborhood in the city. A 90 - year old woman and a three - month old baby were among the victims, while more than 15 people were declared missing (Plateau State Diary of Events, 2012).

On July 14, 2012 property worth millions of Naira belonging to the residents of Wadata, Wurukum, Idye, Vandeikya street, Akphehe and some parts of North Bank in Makurdi were destroyed by three days nonstop flood killing a year old boy and flooding no fewer than 1,000 houses (Benue State Diary of Events, 2012).

On August 8, 2012 a night flood ravaged Mararaba in Nasarawa State, a neighbouring community to the Federal Capital Territory (FCT) Abuja, leading to the death of a man's only two children, an injured wife, as well as the destruction of several other households (Nasarawa State Diary of Events, 2012).

Across the globe the same pattern is repeated. Studies shows that more than two billion people, representing one-third of the world's population have been subjected to natural disasters in the last decades, with floods and droughts accounting for 86 percent 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 (Trevor, 2010).

On September 13, 2010, no fewer than 50 villages were ravaged by floods in Sokoto, while more than 130,000 persons were displaced. Out of the 50 villages affected, 20 were completely submerged, while some bridges and roads were destroyed including the bridge linking the Sokoto metropolis and Usman Danfodio University. This necessitated the closure of the University for about 3 months (Sokoto State diary of Events, 2010).

On September 13 2010series of floods hit the living Foundation Nursery/Primary school in Taloka leading to the collapse of the school.

Assessment of Flood Risk

Various definitions have been used in defining floods (that is large rainfall surpluses) over a region depending on the purpose in view. This simple parameter, rainfall, which can reflect many aspects of floods, is used in practically all definitions of floods. Meteorological flood can be defined as a situation over as region where rainfall is mostly higher than the climatological mean value because adjusted to the long-term average rainfall of that region (Parthasarathy et at; (1987). Therefore, the conditions which lead to flood occur when the rainfall amount over a particular regions is more than a certain amount, normal for that region (WMO, 1975; Friedman, 1957).

Many Countries, notably Costa Rica, Israel, Islands of Aruba, Jamaica, Botswana, Ethiopia, Malaysia, Mauritius, Korea, Pakistan, U.S.A. and Australia, use in one form or other the criterion of a given percentage departure from the normal. In this study, when the seasonal rainfall is in an excess of 26-50 percent of normal over a meteorological subdivision is regarded as a moderate flood, and an excess of more than 50 percent of the normal as a severe flood; while the rainfall between 0-26 percent of normal is regarded as less severe flood. This is the definition that has been adopted by the Indian Meteorological Department (1971), see also Rama, 1975; Government India, 2016), and which many countries in Southeast Asia, and even U.S.A. and Australia (Parthasarathy et al; 2017) have adopted.

Hogue et al; (2017) undertook an assessment of the risks involved with cyclones and storm surges in Chittagong, the second largest city of Bangladesh. The study found the extent of storm surge flooding and the related risk in the metropolitan area. To identify the risk, the depth and extent of 'st or m surge flooding for different probability of occurrence have been predicted and are expressed as a hazard index. The city area is divided into five categories of land-use: industrial area, commercial areas, planned housing areas, unplanned housing areas are mixed areas. For each are, population density and economic importance of the area have been considered and are expressed as an importance index. Using the hazard index and importance index, the risk index for each area is calculated. On the analysis, the whole city area is classified into four categories; the low risk area, the risk area, the high risk area, and the severe risk area.

Laughlin and Kalma, (2020) developed a methodology for frost risk mapping based on regional weather data and local terrain analysis. Minimum air temperatures were measured during three winters with a network of stations in open, undulating terrain. It was observed that the change in minimum air temperature with elevation could be predicted from mean night time wind speed, total night time net radiation loss and a hill-top reference minimum temperature. It was also found that the deviation of temperatures at individual sites could be predicted from a local terrain parameter which reflects the extent of cold air accumulations.

Finally, the study describes the model and illustrates the regional weather and terrain parameter which reflects the extent of cold air accumulations. Finally, the study describes the model and illustrates the regional weather and terrain effects with three- dimensional block diagrams.

Singh et al; (2010) after considering the total seasonal rainfall of June through September as well as its time, developed index that has been evolved for identifying a year as hydrological flood/drought in different parts of India. After giving a margin of 25% to the mean index value for normal years, frequencies of flood/drought years have been calculated. In general, frequencies of both hydrological flood and drought years are more in low rainfall area as compared to high rainfall areas. They compared quite closely with the frequencies of meteorological excessive and deficient rainfall years respectively. But the categorization of some individual years is found to differ between meteorological and hydrological points of view. The nature of these differences is however, not uniform at all stations.

Durotoye, (2000) elaborated on the four major sources of water that largely contribute to the inundation of the deltaic plains. These include: (i) The annual river peak discharge of River Niger especially the

“White Flood" in October and the "Black Flood" between December and March. The "Black Flood" discharge, which originates from the Niger's headwaters in Guinea generates freak episodes of high discharge during exceptionally high rain in wet tears. The "White Flood" originates mostly from within the Nigerian catchments areas. It has a high suspended load of fine sand, silt and clay which are deposited to build the deltaic alluvial flood plains and levees. Durotoye, 2000 observed that high peak discharge cause bank and levees failures as the stream burst their banks seasonally to create disastrous flood.

The role of heavy rainfall peaks;

Man induced floods through oil exploitations and explorations, and human interference with the courses of stream channels during various constructional works; and

Tidal floods especially in the coastal areas and mangrove swamps. The tidal flooding by ocean water creates the characteristic brackish water environment. Also ocean surges also generate stormy high tides resulting in destructive flood.

Flood Abatement Schemes

These schemes attempt to control flood by land-use management during the upland catchment phase of runoff. It aims at reducing flood peaks downstream, by a series of land-use changes upstream, so that run off and the timing of the flood hydrography are altered. This is done by retarding the flow of water during the land-to channel runoff phase. This could be achieved through afforestation (Smith and Tobins 2024).

Flood Protection Scheme

This consists of adjustments to building structure, and the contents of buildings, designed to reduce flood damage. It could be temporary or permanent. Temporary measures include the blocking-up of seldom-used entrances to building, the stocking of suitable shields to be placed in position at doors and windows prior to a flood and the use of heavy sliding doors to protect other entrances. Permanent flood-proofing measures include the raising of building above the f1ood level, the permanent use of lower storage for car parks, or the inclusion of pumping facilities in basement (Smith and Tobins 1979).

Structural schemes, apart from flood proofing, all endeavour to change the magnitude and frequency of flood events by the control of excess water and hence reduce flood losses. They are, for the most part, fairly expensive measures, although they are quite reliable up to the design standard of the project. Of the many advantages associated with these schemes, the most significant is the so-called "levee effect", which tend to result in increased investment in flood-prone areas (Burton, 1970).

Non-Structural Control of Flood Hazard

Non constructional or non-structural measures are basically behavioural adjustments. They depend on some form of pre-planned action by floodplain residents prior to a flood. Smith and Tobin, (2019) recognized four types of behavioural adjustments.

1) Loss bearing or simply accepting the losses accruing from flooding. This is probably the most negative of all responses to flooding. No attempt is made by the people at risk to adjust to the hazard, except the replace lost or damaged goods following a flood event. This adjustment is found most frequently in rural areas where other flood alleviation schemes would be difficult to justify.

2) Public Relief Funds. Here people in flood-prone areas may come to expect, as a right both financially and other types of support following a flood. As a result, they may do very little to prevent future flood losses. Relief funds are particularly beneficial to those individuals who could not themselves afford to replace damaged property.

3) Flood insurance. This response to the 1lood hazard does not reduce flood losses, nor does it have any effect on the flood characteristics. Instead, flood insurance allows the payment of flood losses to be made over a period of years rather than all at a time, because of these apparent limitations. It has been observed that (Krutilla, 1966) that flood insurance may eventually prove to be an effective method of alleviating

flood losses, provided some form of reliable association between insurance premiums and flood risk can be established.

4) Flood Zoning. Floodplain zoning aims at reducing flood losses by controlling floodplain development, rather than altering the hydrological characteristics in anyway. The ideal form of zoning would be to evacuate the floodplain completely and return the land to its natural state.

METHODOLOGY

This chapter deals with the research design, population/universe of the study samples and sampling techniques, instrument for data collection validity and reliability of instrument administration of instrument and technique for data analysis.

Research design

The descriptive research method will be use at most appropriately survey design. A survey is an attempt to collect data from members of a population with respect or more variables

Area of study

Taloka ward is among the popular village in Goronyo local government Sokoto state which is bordering with shinaka ward at the East, Illela dawagare village at South, Goronyo at West, Tulaske VI those are villages that surround the Taloka Ward. The population of Taloka ward is 35400 (2006) census. The prenominal language that Taloka community are spoken is Hau sand, Fulfulde . Their main occupation is farming, their religion is Muslim no other religions perform in Taloka community.

Population sample and sampling techniques

The simple random sampling method were use to obtain data in which one hundred (100) peoples were selected from the population and questioner was distributed to them. 72 were returned and 28 were missed. Every person in these ward have an equal chance of been selected so that a dependable and well valid finding may be made from the target population.

Instrument for data collection

Questionnaire method was particularly use in this research work by the researcher to obtain data regard to the researcher topic.

Because questionnaire is the best method or way in having the information from both male and female and the most of peoples the area where usually familiar with it. In this respect questionnaire is formic test and use based on the hypothesis, the questionnaire will be distributed to the sample group of people chosen at random within the area of study and the same questionnaire will be fill and return to the researcher for analysis. In this research the type of questionnaire that will be use in random questionnaire.

Validity of instrument

Validity:- The face and content of the research instrument was established through the judgement of research supervisor, the supervisor critically cross checked that the items contained in the questionnaire corresponded with research objectives, also made sure that the language is clear and comprehensive.

Method of Data collection

The researcher will distribute the questionnaire by himself and will allow maximum of one week after which he will be back personally to collect the filled questionnaire.

Method of Data analysis

A descriptive statistic of sample frequency count and percentage used to analyse the data obtained.

Limitation of the Study

The study were limited in Taloka ward of Goronyo local government sokoto state due to insufficient time, money, and insecurity of the others wards of Goronyo local government

DATA ANALYSIS AND DATA PRESENTATION

Table 1: Demographic Characteristics

Variables	Categories	Frequency	Percentage
Sex	Male	64	89%
	Female	8	11%
Age	18-25	15	21%
	26-30	13	18%
	31-35	12	17%
	36-40	19	26%
	40 and above	13	18%
Marital status	Single	12	17%
	Married	28	39%
	Widow/widower	27	37.5%
	Divorce	5	5.5%
Occupation	Farmers	34	47%
	Business men	27	37.5%
	Civil servants	11	13.5%

The result from analysis of demographic characteristics presented in table 1 show that 64 of the respondent are male with the percentage of 89%, while 8 with the percentage of 11 are female, result shows that the category of age between 18-25 respondent are 15 with 21 percent, 26-30 are 13 with 18 percent, 31-35 are 12 with 17%, 36-40 are 19 with 26%, 40 and above are 13 with 18 %, therefore the result shows that the category of marital status 12 respondent with 17%are single, 28 with 39% are married, 27 with 37.5 are widow and widower, 5 with 5.5 are divorce, while the occupation of the respondent show that 34 with 47% are farmers, 27 with 37.5 % are business men and 11 with 13.5% are civil servants.

TABLE: 2 Which Of The Following Are The Major Causes Of Flooding In Taloka Ward Goronyo Local Government

Variable	Frequency	Percentage
Heavy rainfall	16	22%
River over flow	17	24%
Coastal storm surge	3	4%
Poor drainage system	10	14%
Dam or levee failures	4	6%
Urbanization	3	4%
Deforestation	19	26%
Total	72	100%

The result from analysis of the major causes of flooding in Taloka presented in table 2 shows that 19 respondent with 26% said is deforestation, followed by 16 respondent with the 22% whose said is caused by heavy rainfall, while 17 people with 24% said river over flow, 3 people with 4% said is coastal storm surge, 10 people with 14% said is poor drainage system, 4 people with 6% said is dam failure and 3 people said it caused by urbanization.

TABLE: 3 What Are The Effect Of Flooding In Taloka Ward Goronyo Local Government

Variable	Frequency	Percentage
Soil erosion	8	11%
Habitat destruction	13	18%
Water quality degradation	7	10%
Property & infrastructure damage	11	15%
Agricultural losses	21	29%
Business Disruption	5	7%
Water borne diseases	5	7%
Educational disruption	2	3%
Total	72	100%

The result from the analysis of the effect of flooding in Taloka ward of Goronyo local government sokoto state presented in table 3 shows that the 21 respondents with 29% said is agricultural losses, followed by 13 peoples whose said is destruction of habitat, 8 respondents with the percentage of 11 said is soil erosion, 6 peoples with 10% said is water quality degradation 11 peoples with 15% said is property and infrastructure damage5 peoples with 7% said is business disruption and other 5 people said is water borne diseases, while 2 people said is educational disruption

TABLE: 4 What Are The Possible Risk Management Strategies For The Reducing Effect Of Flooding In Taloka Ward Of Goronyo Local Government Sokoto State

Variable	Frequency	Percentage
Building levees and dam	6	8%
Constructing retention basin	9	13%
Reforesting watersheds	11	15%
Limiting construction in flood-prone area	10	14%
Improving drainage system	10	14%
Educating the public	14	19%
Establishing community-based flood plan	12	17%
Total	72	100%

The result from analysis of possible risk management strategies for the reducinrespondentsg of flooding in Taloka ward Goronyo local government presented in table 4 shows that 14 with 19% said is educating the public, followed by 12 respondents with 17% whose said establishing community-based flood plan, while 6 peoples with 8% said building levees and dam and 9 peoples with 13% said constructing retention basin, 11 peoples with 15% said reforestation watershed, 10 people with 14% said limiting construction in flood-prone area, and other 10 peoples said improving drainage system.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

Figure 5.1 summarizes the possible risk management strategies in the Assessment of the Effects of Flood which the study has addressed in Taloka ward of Goronyo local government sokoto state, This study shows that 14 with 19% said is educating the public, followed by 12 respondents with 17% whose said establishing community-based flood plan, while 6 peoples with 8% said building levees and dam and 9 peoples with 13% said constructing retention basin, 11 peoples with 15% said reforestation watershed, 10 people with 14% said limiting construction in flood-prone area, and other 10 peoples said improving drainage system. The following findings have become obvious from the study. Also the analysis of annual rainfall trend shows that Taloka has a positive correlation which indicates upward annual rainfall trends and consequently the possibility of flooding. therefore the analysis of the major effect of flooding in Taloka that the 21 respondents with 29% said is agricultural losses, followed by 13 peoples whose said is destruction of habitat, 8 respondents with the percentage of 11 said is soil erosion, 6 peoples with 10% said is water quality degradation 11 peoples with 15% said is property and infrastructure damage5 peoples with 7% said is business disruption and other 5 people said is water borne diseases, while 2 people said is educational disruption which are the major effect of flooding that happens in Taloka community.

Conclusion

The study has revealed that heavy rainfall of long durations and river overflow are the most important causes of flooding in Taloka. It was also discovered that depth of flooding, duration of flood, perceived frequency of flood occurrence, perceived extent of damage arising from flooding, percentage deviation of seasonal rainfall from the mean, area or location/relief, proximity to hazard source, land use or dominant economic activity as well as adequacy of flood alleviation measures are the main factors influencing the incidence of flooding phenomenon in Taloka. The study has revealed that the population has fair ide" of some of the causes of flood hazards in Taloka of which heavy rainfall of long durations and river overflow are the most important.

Recommendations

The detailed examination of the findings in each specific issue has been elaborated in chapters 4, and 5 of this study. These findings have formed the cornerstone of the recommendation policies and actions for Taloka, Goronyo local government sokoto state, Nigeria. These recommendations includes;

1) The need for flood forecasting, and warning systems in the study area is very imperative. A fundamental preventive step would be to install devices to foretell a possible flood and to provide evacuation plans. It should be emphasized that the more accurate the forecast and the longer the warning time the better the community is able to react. For the flood forecasting and warning system to be effective for Doma, it should operate under three functional headings:

Environmental monitoring; Preparation of forecasts and warnings; and The dissemination of forecasts and warnings.

There is need to put in place flood forecasting and warning system is the study area for need for proper evacuation and sheltering of flood victims.

2) The need for structural and non-structural control of flood hazards in the study area becomes imperative. The structural measures recommended include river training, construction of floodwall, embarkments and other engineering control of river channels, the use of abatement policies through proper land-use management and flood-proofing schemes which often provide protection to individual buildings on the floodplain.

3) There is the need for legislation for flood disaster prevention in Nigeria. The legislation should establish responsibility for all necessary actions, whether of long-term (i.e. establishment of legal framework and directives for orderly and safe development or redevelopment in a fairly lengthy time scale) or short-term nature (i.e. to facilitates immediate access to rescue and relief).

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