Environmental Adult Education Programmes for Flooding and Flood Risks Reduction in Selected Local Government Areas of Rivers State

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Abstract

This study examines flooding and flood risks reduction in selected local government areas of Rivers State, with an attempt to establish the role environmental adult education programmes would play in curbing flooding in the study areas. The study adopted a descriptive survey research design with three objectives and three research questions formulated to guide the study. The population of the study consisted 1,350 members of community based organisation in Ahoada East and Ogba/Egbema/Ndoni local government areas of Rivers State. Proportionate sampling technique was adopted in selecting 135 respondents from the population. A 12-item structured questionnaire was used for data collection. The responses on the instrument were structured on a four (4) point modified Likert scale. Data collected were analysed using mean statistics. The results from the analysed data revealed that the causes of flooding in the study areas includes heavy and long rainfalls, deforestation, improper agricultural practices, building on water ways and indiscriminate dumping of wastes on drainages; that the effects of flooding include loss of lives and properties, deterioration of heath condition owing to waterborne diseases. That some environmental adult education programmes can be used in reducing flood risks. Based on the results, the study recommended that there should be synergy between the various environmental management agencies in Rivers State where they can come up with a comprehensive blueprint on how to use environmental adult education programmes in the reduction of flooding and its risks in the state.

Keywords: Environment, flooding, risk, reduction.

Introduction

Over the years, the overall quality of the environment in Rivers State has taken a significant downturn, which has attracted both national and international attention. The state has faced several environmental challenges which have adversely affected man and his activities. The most devastating environmental issue faced by the state is the issue of flooding. Flooding and flood risk have been an issue of serious concern to the state because after every flood case, there are always serious destruction and displacement. According to Chiadikobi, Omoboriowo, Chiaghanam, Opatola, and Oyebanji, (2011) flood is a large quantity of water covering a dry land as a result of flow from storm water (rain) and other sources such as river overflow due to the volume of water within a water body exceeding the total capacity of the body. Flood is a natural and manmade event that can have far reaching effects on people and the environment; it can simply be said to mean too much water in a wrong place. Flooding occurs when a body of water rises and overflows onto a normally dry land. As floods commonly pose hazard to man and his environment, it is important to emphasise

that at the onset, they are natural phenomenon and are only a problem where man has chosen to use areas susceptible to flooding and where he has induced flooding that would not have naturally occurred (Nwogu and Bell-Gam 2018).

Floods, according to Henry in Madumere-Obike and Nwabueze (2016), are defined as extremely high flows of river, whereby water inundates flood plains or terrains outside the water - confined major river channels. Flooding is a rapid and extreme flow of water into a normally dry area. It is a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of a country (Mbalisi, 2016). According to Ace Geography 2013, floods occur when a river bursts its banks if it is carrying so much water that it cannot be confined to its usual course. Flooding is not a normal condition for the river, but is seen as an extreme situation due to high levels of flow. The extent to which the river exceeds the flow that can be contained in its banks determines the severity of the flood and is sometimes related to how often flooding occurs. Usually bigger floods occur less often and less severe flood events occur more frequently. Floods are common events but problems and issues arise when people are affected (Ace Geography 2013). According to Eze and Abua (2003), two types of floods are common in Nigeria, namely the flash and perennial flood. Flash floods occur when instantaneous downpour of limited duration produces surface flow as a result of reduced infiltration. While perennial floods are yearly flooding which arises after heavy down pour, but are permanent in that the areas take weeks and months to get rid of the flood water at certain portions of flood plain.

Flooding in Rivers State has been a source of concern, several local government areas have been severely hit by flood risks. According to reports by Olumide, Godwin, Nwaoku and Osayande (2022), over 200 communities in four local government areas of the state which includes Ogba/Egbema/Ndoni, Ahoada West have been displaced by ravaging flood. In 2016, 2017 and 2018, flooding wreaked serious havoc in Ogba/Egbema/Ndoni, Ahoada West local government areas, while communities in these LGAs were trying to recover from the flood risks a more severe case of flooding happened in 2022 where over 20 communities in Ogba/Egbema/Ndoni Local Government Area (ONELGA) were submerged with flood water. In these communities, bridges and schools were submerged in water while several farmlands were washed off and many artisans rendered jobless when their shops were submerged. Flood hazard is measured by possibility of occurrence of their damaging consequences, conceived generally as flood risks or by their impact on society. Flooding comes with devastating effect both on man and the ecosystem. In recent times, it has become a recurrent problem in most parts of the country and Rivers State has had its own share of the flood risks.

Causes of Flooding

Flooding is caused by some anthropogenic factors such as dam failure, improper waste disposal practices, structural encroachment into flood plains, and siltation of river channels as a result of escalated soil erosion etc. (Ibrahim, 2002). This view of Ibrahim was supported by Ace Geography

(2013) when it asserted that flooding may be caused by a number of natural causes or physical factors such as:

1. Excessive levels of precipitation occurring over a prolonged period of time. This eventually leads to saturation of the soil. When the water table reaches the ground surface, there is increased overland flow or runoff
2. Intensive precipitation over a short period of time particularly when the ground surface is baked hard after a long period without rainfall. In such circumstances the infiltration capacity is such that the ground cannot soak up the rainfall quickly enough, so more water reaches the river than would normally be the case
3. The melting of snow particularly when the subsoil is still frozen, so that infiltration capacity is reduced

According to warnings from experts in all the various environmental establishments (Federal and States Ministries of Environment, Federal and States Environmental Protection Agencies, and National Environmental Standards and Regulations Enforcement Agency (NESREA) in Nigeria, the causes of floods include poor habit of throwing waste into drainage channels, and unplanned construction of buildings in low land areas adjoining drainage channels. Others include high precipitation, coastal proximity and climate change. Based on the unanimity of the various environmental establishments position on the causes of floods, state governments in the affected areas have been advised to embark on the demolition of buildings and structures believed to be obstructing free flow of water. Such actions have been taken in both Lagos State and Rivers State (Omotayo, 2013). Similarly, Omotayo further affirmed that floods are caused by two main factors, namely: nature and man. Those due to nature are high rainfall; snowmelt; relief; coastal tides and storms. Those due to man are deforestation; poor farming (overgrazing and over cultivation); poor water management and population pressure.

Flood Risks

Flood risks could be seen as the combination of the probability of a flood event and the potential adverse consequences for human health, the environment, cultural heritage and the economic activity associated with a flood event. It is believed that the universal consequence of flooding which can be seen as flood risks is disruption of normal life reflected in the breakdown of economic production and failure of the social system. Ebisemiju in Ebuzoeme (2015) noted that the most significant impact of flooding arises from urbanization, because it involves deforestation; land use changes, precipitation; temperature modification; stream network change; inter basin water transfer; the creation of impervious surfaces; modification of soil physical properties and structure and the exposure of bare soil surfaces, especially at construction sites all of which bring about changes in the morphological and hydrological state of water.

Floods destroy croplands, residential buildings, factories, highways, offices, water supply system, electrical installations, and all too often sweep away valuable items, which obstruct traffic flow by rendering roads impassable (Mba in Nwogu and Bell-Gam 2018). Ibrahim (2002) noted that some of the flood risks include loss of lives, destruction of vegetation, building and other man-made

structures. Similarly, Ayoade in Nwogu and Bell-Gam (2018) classified the damages caused by floods into two categories namely the intangible and tangible damages. Intangible damages that result from flooding include fear, anxiety, distress, insecurity, ill health and eventual loss of life. Direct tangible damages that result from the direct physical contact of damageable properties with floodwater include physical damages of buildings and their content, other structures like roads, bridges and agricultural land including crops. Indirect tangible damage is loss arising from the breakdown of linkages in the economy caused by the flood. Such loss includes the loss of income, business and production and delay in the movement of goods and people.

Several efforts have been made by government of the Rivers State and Non-Governmental Organisations to mitigate the flood risks in the affected areas but most of the communities are yet to receive proper sensitisation on flood risks prevention or preventive measures. One of the ways by which this enlightenment can be achieved is through environmental adult education programmes.

Environmental Adult Education Programmes for Flooding and Flood Risks Reduction.

Since most activities of man that causes flooding are carried out mostly by the adult population and the efforts to be made in reducing flooding are also to be made by adults, for a proper sensitisation to be carried out, educational programmes must be geared towards the adults which can come in form of environmental adult education programmes. Environmental adult education programmes for reduction of flooding and flood risks are those adult education programmes that are developed for adult learners to inform and sensitise them on the causes of flooding and the ways incidences of flooding can be managed. According to Okorie (2016) some of the adult education programmes required to reduce flooding and flood risks and ensure environmental sustainability includes: waste management education programme, environmental literacy programme, sensitisation programme, functional literacy programme and climate change education programme.

Waste Management Education Programme is designed to sensitise people on how to plan and implement solutions of waste management. Indiscriminate dumping of waste on drainages is a serious cause of flooding. Waste management in our environment is increasing daily and this can be attributed to population explosion and rapid urbanization. Consequently, the manner by which people handle waste has in one way or the other contributed to some environmental problems including flooding. There is need therefore for proper waste management education to create awareness to the public on how to handle different categories of waste be it household or industrial.

Environmental literacy programme is the process whereby people are exposed to understand issues in their environment in order to develop skills for solving the problems. Roth (1992) describe environmental literacy as a set of understanding skills, attitudes and habits of mind that compels individual to relate with their environment in a positive fashion and to take day-to-day and long-term actions to maintain or restore sustainable relationship with other people and the biosphere. Sensitisation education programme is an educational programme that helps inform and educate people on issues concerning their environment and how to network as a group to find solution to

their problems. This programme will help residents in the study area to identify those activities of theirs that leads to flooding and also find ways they can avoid such activities

Climate change refers to a change in the state of the climate that can be identified by changes in the average and/or the variability of its properties such as temperature and precipitation and that persist for an extended period. (Flint in Okorie, 2016). Adults need education on how to prevent them from those activities that will promote the rising of temperature, droughts, flooding heavy precipitation and rising sea levels. When adults are well informed on the implications of climate change, creating awareness in them that climate change existence may lead to disaster in the environment they found themselves. For example, floods and rising sea levels can cause drowning, injuries, severe mental and physical trauma to those living in Islands (Okorie, 2016).

Statement of the Problem

The issue of flooding in recent times has been a source of concern to the government of Rivers State and particularly the people of Ahoada East and Ogba/Egbema/Ndoni local government areas of Rivers State. Flooding in these areas had assumed a more devastating dimension since it is now an annual event which leads to the destruction of buildings, roads, traffic obstruction and health hazards. In and around Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of the state, flooding has constituted environmental hazards which has made communities to experience untold hardship. The flood incidence of 2016, 2017, 2018 and 2020 are very fresh in the memories of most residents. During each of the years, many houses came under heavy inundation soon after every rainfall that lasted for long duration. For instance, from July to September 2021, most houses, workshops and commercial shops in Usomini, Omoku, Obrikom, Egi and Egbema (Ogba/Egbema/Ndoni) in particular were submerged under one meter inundation, and socio-economic activities during this period were brought to a halt, many people were rendered homeless and properties were destroyed. While in Akaramirin, Akoh, Mbiama, Oboh in Ahoada East, houses and properties were lost, roads were destroyed and farmlands were washed away. Though natural occurrences cannot be ruled out, severity of flooding problem in the study area are mostly man-made.

The need for environmental adult education therefore becomes pertinent to create the much needed knowledge on how human activities contribute to flooding in the study area. To expose environmental adult education programmes that can help in the reduction of flooding and flood risks is therefore the problem of this study.

Objectives of the Study

The objectives of the study are to:

1. Find out the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni local government areas of Rivers State.
2. Identify the effects of flooding in the study areas
3. Ascertain the environmental adult education programmes for flooding and flood risks reduction in the study area.

Research Questions

1. What are the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of the state?
2. What are the effects of flooding in the study areas?
3. What are the environmental adult education programmes for the reduction of flooding and flood risks in the study area?

Methodology

Descriptive survey design was used for this study. The population consisted 1,350 members of community based organiastions in the study areas. A sample size of 135 respondents which represents 10% of the population was drawn using proportionate sampling technique. The instrument for data collection was self-designed Questionnaire titled "Flooding and Flood Risks Reduction Questionnaire (FFRRQ). The questionnaire was made up of two sections. Section A collected information on the demographic variables of the respondents, while section B comprised 12 items designed to obtain answers to research questions set for the study. The questionnaire was structured along a 4-point modified Likert scale of Strongly Agree (SA) – 4, Agree (A) – 3, Strongly Disagree (SD) -2, Disagree (D) -1. This instrument was validated by experts in the field of Adult and Non-Formal Education for content modification and corrections. Cronbach alpha was used to ascertain the internal reliability of the instruments at 0.87. Completed and retrieved 135 copies of the administered instrument were analysed using mean statistics to answer the research questions. The criterion mean used was 2.50 based on the 4point Likert scale. Mean responses from 2.50 and above were accepted while below 2.50 were rejected.

Results

Research Question 1: What are the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas?

Table 1: Responses on the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas.

Items	SA	A	D	SD	Total	Mean	Remark
a. Natural causes like climate change, heavy and long rain fall	123	12	0	0	135	3.91	Agree
b. Deforestation	87	20	17	11	135	3.36	Agree
c. Indiscriminate dumping of waste on drainages	52	48	25	10	135	3.05	Agree
d. Building on water-ways	100	35	0	0	135	3.24	Agree
Grand mean						**3.39**	

Table 1 above shows that item 1, 2, 3 and 4 with mean scores of 3.91, 3.36, 3.05 and 3.24 respectively were all accepted. With a grand mean score of 3.39. This indicates that natural causes like climate change, heavy and long rain fall, disforestation, indiscriminate dumping of waste on drainages and building on water ways are the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. This is anchored on the premise that a criterion mean of 2.50 and above indicates causes of flooding while below 2.50 are not. As seen from the table above. The grand mean of 3.39 is higher than the criterion mean of 2.50. Thus, showing that the respondents in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. agreed that natural causes like climate change, heavy and long rain fall, disforestation, indiscriminate dumping of waste on drainages and building on water ways are the causes of flooding in these Local Government Areas.

Research Question 2: What are the effects of flooding in the study areas?

Table 2: Response on the effects of flooding in the study areas.

Items	SA	A	D	SD	Total	Mean	Remark
a. Flooding causes loss of life and properties	27	97	10	1	135	3.11	
b. It leads to the deterioration of health conditions due to water-borne diseases	111		2	2	135	3.78	Agree
c. It leads to the destruction of roads and farmlands	19	47	60	9	135	2.56	Agree
Flooding causes delay in the movement of goods and people.	58	69	8	0	135	3.37	Agree
						3.20	
Grand mean							

Table 2 above shows that items 1, 2, 3 and 4 with mean scores of 3.11, 3.78, 2.56 and 3.37 respectfully were all accepted. With a grand mean score of 3.20 which indicates that loss of life and properties, deterioration of health due to water borne diseases, destruction of roads and farmlands and delay in the movement of goods and people are the effects of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. As seen from the table above, the grand mean of 3.20 is higher than the criterion means of 2.50. Thus showing that the respondents in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State agreed that loss of life and properties, deterioration of health due to water borne diseases, destruction of roads and farmlands and delay in the movement of goods and people are the effects of flooding in these Local Government Areas.

Research Question 3: What are the Environmental Adult Education programmes for the reduction of flooding and flood risks in the study area?

Table 3: Responses on Environmental Adult Education programmes for the reduction of flooding and flood risks in the study area.

Items	SA	A	D	SD	Total	Mean	Remark
a. Waste management Education Programmes educates adult on how to management their waste to reduce flooding.	75	34	19	7	135	3.31	Agree
b. Environmental Literacy Programmes helps adult to develop right attitude and skills that will enable them to relate with their environment positively.	83	46	2	4	135	3.54	Agree
c. Sensitization Programmes are designed to cater for information needs of adult in the management of the environment especially information on the dangers of building on water ways that could lead to flooding.	66	58	6	5	135	3.37	Agree
d. Climate Change Programmes are designed to educate adult to abstain from deforestation that can lead to flooding.	16	57	30	32	135	2.79	Agree
Grand mean						**3.25**	

Table 3 above shows that items 1, 2, 3 and 4 with mean scores of 3.31, 3.54, 3.37 and 2.79 respectfully were all accepted. A grand mean score of 3.25 indicates that waste management education programme, environmental literacy programme, sensitisation programme and climate change education programme are the environmental adult education programmes required for the reduction of flooding and flood risks in the study area.

Discussion of Findings

The findings from research question one disclosed that causes like climate change, heavy and long rain fall, disforestation, indiscriminate dumping of waste on drainages and building on water way are the causes of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. The findings are in line with the comments of Omotayo (2013) who noted that floods are caused by two main factors: nature and man. Those due to nature are (i) high and long rainfall, (ii) snowmelt, (iii) relief, and (iv) coastal tides and storms. Those due to man are (i) deforestation, (ii)

poor farming (overgrazing and over cultivation), (iii) poor water management, and (iv) population pressure. From his assertion, it can be deduced that most human activities for survival often leads to flooding. The findings also corroborate with the warnings from experts in all the various environmental establishments like the Federal and States ministries of environment, Federal and States Environmental Protection agencies, and NESREA in Nigeria, which states the causes of floods to include: (i) poor habit of throwing wastes into drainage channels, and (ii) unplanned construction of buildings in low land areas adjoining drainage channels. Others include high precipitation, coastal proximity and climate change.

The findings from research question two revealed that loss of lives and properties, deterioration of health due to water borne diseases, destruction of roads and farmlands and delay in the movement of goods and people are the effects of flooding in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. This finding is in line with Mba in Nwogu and Bell-Gam 2018 which is of the view that floods destroy croplands, residential buildings, factories, highways, offices, water supply system, electrical installations, and all too often sweep away valuable items, which obstruct traffic flow by rendering roads impassable. Also, the finding corroborated Ibrahim (2002) assertion that some of the flood risks include loss of lives, destruction of vegetation, building and other man-made structures. In the study areas flooding has rendered most roads impassable and has washed away many farmlands.

The findings from research question three revealed that waste management education programme, environmental literacy programme, sensitisation programme and climate change programme are the environmental adult education programmes required for the reduction of flooding and flood risks in the study areas. This finding is in line with Okorie (2016) who affirmed that some environmental adult education programmes required for solving some environmental problems like flooding include waste management education programme, environmental literacy programme, sensitisation programme and climate change education programme.

Conclusion

Based on the findings, the study concluded that flooding occurs when water flow into a normally dry land which has devastating effects both on man and his environment. Due to the devastating effects of flooding, the study concluded that there is the need for environmental adult education programmes such as waste management education programme, environmental literacy programme, sensitisation programme and climate change programme which are required for adequate response to flooding and flood risks in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State.

Recommendations

Based on the conclusion from the findings, the following recommendations were made:

1. There should be synergy among the various environmental management agencies in Rivers State (NESREA, RIWAMA, Ministry of Environment etc) so that they can come up with a comprehensive blueprint on how to use environmental adult education programmes as a proactive measure for reducing the incidence of flooding and flood risks in the state.

2. There is the need for masses conscientisation of communities in the study area on the harmful effects of flooding by environmental adult educators and their roles in fighting flooding.
3. There is the need for massive sensitisation campaign against indiscriminate dumping of waste in the drainage system in the study areas as it will not only create room for flooding but also encourage flooding and flood risks in the area.

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