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## EVALUATION OF THE CAUSES AND SOCIO-ECONOMIC IMPACTS OF ERO RIVER FLOODING IN MOBA LOCAL GOVERNMENT AREA, EKITI STATE, NIGERIA

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**Abstract:** Flood is a local and global environmental menace. It is worrisome to note that river flood disasters have become an annual endemic problem in many parts of Ekiti State especially on Ero river which usually affect the residents of Moba local government area of the state. There are many studies on the causes and effects of flood in Nigeria. Studies on recent impact of river flood disaster on socio-economic activities of the people in Ekiti State are very scarce in literature. This research work therefore aims at evaluating the causes and socio-economic impact of Ero river flooding in Moba local government area, Ekiti State, Nigeria. The study uses ex-post factor quantitative research design, employs 4-point Likert-type scaling instrument and applies descriptive statistics method of data analysis. The results confirmed loss of human lives, damage of valuable properties, and socio-economic hazards faced by the victims of Ero river flood. The research work recommends effective waste management board, construction and maintenance of deep and wide drainage systems, and compliance with the rules and regulations of the monthly environmental sanitation programme in the process of flood control in Moba local government area, Ekiti State, Nigeria

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## INTRODUCTION

The main goal of the 1999 National Policy on the environment in Nigeria is to achieve sustainable development. The goal specifically was to secure a quality environment adequate for good health and wellbeing as well as to conserve and use of environment for the benefit of present and future generation. Floods are natural phenomena, but man has put himself at risk by developing flood plains for settlements, industry, agriculture, and building roads, bridges and railways lines in floodable positions (Elenwo, 2015). Channels to drain the excess water during precipitation are in many cases not provided and sometimes not adequate especially in less developed countries, Nigeria inclusive (Ahaman, 1997). Even when such channels are available, the flood problem in some cases persists. Flood generally can be: coaster flood, riverine flood, flash flood, pluvial flood (surface water) and fluvial flood (river flood). River flood results when a stream runs out of its confines and submerges

surrounding areas (Stephen, 2011). The major cause of flood in Nigeria has been identified to be excessive rainfall (Akanni and Bilesanmi, 2011; Aderogba, 2012c). Although European Union (2007) sees flood as a temporal covering of land by water but the effects may not be temporal when such occurrence claims several lives and properties which usually increase the poverty level of the people and worsen the economic development of the nation concerned. On the contrary, according to Adetunji and Oyeleye (2013), effects of flood are not wholly negative and that floods can be quite beneficial. Natural flood turns a disaster when flood water occur in areas populated by humans and in the areas of significant human development.

### **Theoretical framework**

The investigator proposes to draw from the theoretical literature of “urban resilience to flood – as an alternative framework for urban flood hazard Management” (Liao, 2012). Philosophically, Liao (2012), opines that resisting floods by means of levees, dams and channelization neglects inherent uncertainties arising from human – nature, couplings and fails to address the extreme events that are expected to increase with climate change. The theory challenges the conventional theories that cities cannot live without flood control and on the contrary affirmed that flood management is better attained through city’s capacity to tolerate flooding and to reorganize should physical damage and socio-economic disruption occur so as to prevent deaths and injuries. This study believes and hopes to draw inferences from both the urban resilience floods and conventional theories. The two theoretical frameworks belong to two different schools of thought in literature. According to Liao (2012), the industrialized world has heavily relied on flood control to mitigate floods hazards, yet it is criticized for harming riverine ecosystems and increasing long-term flood risk (Burby, Deyle, Godschalk and Olshansky, 2000; Smits and Wandel, 2006). On the contrary, Adetunji and Oyeleye (2013) projected construction of artificial channels along main river channels to divert flood flows to desired directions as a reliable way of river flood management.

### **Empirical Literature**

Over the last decade, flooding has been one of the catastrophic disasters which causes environmental deprivations, loss of life, socio-economic challenges and substantial damages to properties and civil infrastructures (Azwa, Nur, Mokhairi, Fadzli, Julaily and Zahrahtul, 2016). On the other hand, as proved by Lee (2021), Lesage et al. (2011), and Xue and Xiao (2020), some industries and organisations may benefit in the immediate aftermath of a natural disaster in recovery process.

Joshua, Mari and Luka (2015) opined that global warming was the most common form of climate change resulting in depletion of natural resources, drought and flooding. Specifically on this, it has been revealed that African will be affected the most by the effects of climate change due to insufficient amenities to tackle the effects and that crop production in the continent will decrease by 50% by 2050 (Madugu, 2009; Bello et al., 2012). Xiao and Feser, (2014) found that flood caused a significant effect on unemployment. From the assertion of Aderogba (2012), human activities such as construction of roads, buildings, factories, bridges and culverts and farmlands have diverted the natural courses of flow of water, especially in the less developed countries. The poor in the society are the most victims of floods, who have no choice but to end up living in flood prone areas (Lutz, Sanderson and Scherbov, 2008).

As soon as floods occur, day to day lifestyles and trades are put on hold, electricity and communication lines are disrupted, health challenges such as outbreak of cholera due to contaminated water and malaria due to stagnant water are increased (Aderogba, 2012; Agwu and Okhimamhe, 2009; Aladelokun, 2011).

From the biblical times, flood has been very devastating. Presently, the concern for the environment especially river flood, is now a global agenda under the threat of climate change in the twenty first century. In 2012, National Emergency Management Agency (NEMA) reported that between June and September, 2012 over 363 lives were lost and about 1.2 million Nigerians were displaced. The havoc caused by the flood incidence of Ogunpa River in Ibadan in 1980 is still fresh in the mind of many victims. For the past 3 decades, Nigerian cities have experienced great physical development, in times of construction of roads without any appreciable infrastructures such as drainages and canals to support them (Aderogba, 2012)

The National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (2011) has predicted that between 2046 and 2065, the annual average rainfall in the Southern part of Nigeria will increase by 15cm, indicating increasing river flood possibility in the mentioned region. Several studies have been carried out in Nigeria on the causes and effects of flood (Adetunji and Oyeleye, 2013), global warming and challenges of flood (Aderogba, 2012), environmental effects of flooding (Bariweni, Tawari and Abowei, 2012) and assessment of flood risk (Mayomi, Dami and Maryah, 2013), studies on the recent impacts of river flood disaster on the socio-economic development in Ekiti State, Nigeria especially in Moba Local Government area of the state, are very scarce in literature.

Specifically, on the Ero river in Ekiti State, Ero Dam was constructed by the government in Ikun – Ekiti in Moba Local Government Area of the State as a way of conserving the river water during the wet season and to be supplied during the dry season for domestic uses and to improve agricultural output through irrigation. The issues of concern now is that the size of impounded water has grown beyond the excavated reservoir basin of the river thereby poses serious threat on the life and properties of the residents of Ikun – Ekiti, Iye – Ekiti and Ewu Ekiti and many other towns and their environments (TERB, 1997; Aladelokun, 2010). Thus, it worth questioning that: what are the causes of Ero river flooding? To what extent has the Ero river disaster affected the socio-economic welfare and progress of residents of the state? These questions among others are the basic issues of this study, with the bid to advance lasting solutions to flood challenges in the research areas. In the light of the research questions, and the risk of possible losses of lives and properties through river flooding, the research work evaluates the causes and socio-economic impacts of Ero River flooding on the residents of Moba local government area of Ekiti state, Nigeria.

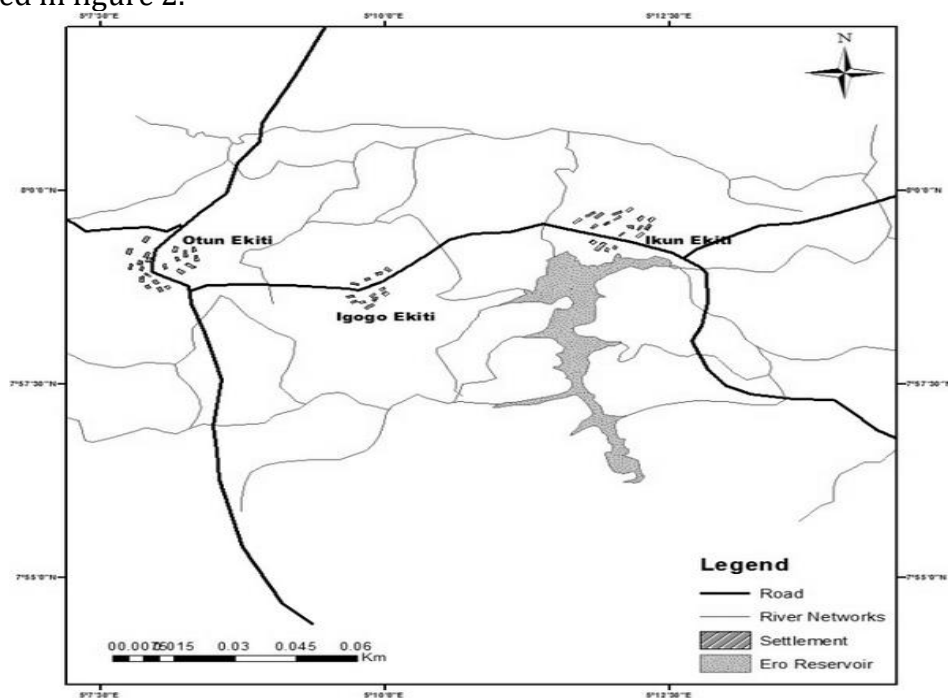
### **Study Area Description**

Moba local government area is one of the local government areas grouped under Ekiti North senatorial district. It has its administrative headquarters in Otun-Ekiti. It shares boundaries with Ilejemeje, Ido-Osi, Ijero local government areas and Kwara state as presented in the figure 1.



**Figure: Ekiti State/Moba LGA map**

Ero River is a stream of water moving to a lower level in a channel on land. Ero dam is constructed on Ero River. The dam takes its source form the highland region of Orin-Ekiti in Ido-Osi local government area of Ekiti State. Some of the tributaries of Ero river that contribute to the size of the water fall in Moba local government area including Igo, Ayo, Afintoto, Ipu, Ilogbe, Irara, Ofu, and Igbegbe rivers. The description of Ero river networks is as presented in figure 2.



**Figure 2: Map of Ero river networks in Moba LGA**

### Research Design

The study uses descriptive survey and ex-post factor quantitative research designs. The study describes the anthropological experience of the existing structure of the study population, as well employs non-manipulated research variables in the cause of data analysis.

### Population and Sample

The population of the study comprises of all residents of Moba local government area of Ekiti State. The local government is composed of 13 notable towns with the people of similar cultural, social, and economic status. The study proposes 20 respondents from each town, totaling 260 respondents sample size for the research work.

### Research Instrument

Researcher's designed questionnaires were used for the study. In line with the objectives of the study, the research instruments were structured to address research questions on the causes, social and economic impacts of Ero river flooding in the research areas. The study adopts a 4-point Likert-type scaling instrument where responses were scaled as follow: 4 points for Strongly Agree (SA), 3 points for Agree (A), 2 points for Disagree (D), and 1 point for Strongly Disagree (SD).

### METHODS

Considering the nature of the research, the study applied a variety of descriptive statistics for the better understanding of the study's outcome. A standard mean value of 2.50 was used to measure and guide the decision of the researcher on each research question. The standard mean was calculated thus:

$$\frac{SA + A + D + SD}{4} = \frac{4 + 3 + 2 + 1}{4} = 2.50$$

Where: SA= Strongly Agree, A=Agree, D=Disagree, and SD=Strongly Disagree. The study calculates the mean value of the respondents of each item of the questionnaire, using:

$$\bar{X} = \frac{\sum fx}{\sum f}$$

Where:  $\bar{X}$  = mean value

$\Sigma$  = sum of

f = frequency, the number of respondents to a given choice option of Likert-type scaling instrument.

X= score allotted to the choice option of the Likert-type instrument.

### RESULTS AND DISCUSSION

Table 1 reports the outcome of the research findings on the causes of flood in Ero River in Moba local government area, Ekiti State.

**Table 1: Possible Causes of Flood in Ero River in Moba Local Government Area, Ekiti State.**

S/N	Items	SA	A	D	SD	Mean	Decision
1	Heavy rainfall and Climate change are important factors that cause flood in Ero river in Moba local government area.	92 (35.38%)	105 (40.39%)	52 (20%)	11 (4.23%)	3.07	Agreed

2	Poor maintenance of Ero river's reservoir causes flood in Moba local government area.	84 (32.31%)	96 (36.92%)	60 (23.08)	20 (7.69%)	2.94	Agreed
3	Blocked drainage basins with debris and inadequate drainage channels causes flood in Ero river.	116 (44.62%)	98 (37.69%)	38 (14.62%)	8 (3.07%)	3.24	Agreed
4	Poor physical planning and construction of buildings in flood plains are factors for flooding in Ero river.	63 (24.23%)	72 (27.69%)	65 (25%)	60 (23.08%)	2.53	Agreed
5	Irrigation farming by the sides of Ero river causes flood in Moba local government area.	0 (0)	3 (1.15%)	142 (54.62%)	115 (44.23%)	1.57	Disagreed

**Note: Standard mean value is 2.50.**

**Source: Author's Research Findings (2023)**

It is confirmed from Table 1 that majority of the respondents agreed with all the research statements except in item 5. From the table, the mean values of 3.07, 2.94, 3.24, and 2.53 for items 1, 2, 3, and 4 respectively are greater than the standard mean value of 2.50. The mean value (1.57) is less than the standard mean value (2.50) in item 5, where majority of the respondents disagreed with the research statement.

The results imply that the main causes of flood in Ero river include heavy rainfall, climate change, poor maintenance of Ero river's reservoir, blockage of drainage basins with debris, inadequate drainage channels, poor physical planning, and building structures in the flood plains of the river.

Table 2 presents the statistics on the economic impacts of the flooding menace of Ero River.

**Table 2: Economic Impact of Ero River Flood on the Residents of Moba Local Government Area.**

S/N	Items	SA	A	D	SD	Mean	Decision
1	Ero river flood reduces industrial and agricultural outputs and incomes of residents.	89 (34.23%)	104 (40%)	58 (22.31%)	9 (3.46%)	3.05	Agreed
2	Flooding in Ero river destroys industrial and residential buildings in Moba local government area of Ekiti State.	84 (32.31%)	122 (46.92%)	42 (16.15%)	12 (4.62%)	3.07	Agreed
3	River Ero flood usually result in loss of public and private valuable properties.	67 (25.77%)	160 (61.54%)	23 (8.85%)	10 (3.84%)	3.09	Agreed
4	Market days and trading activities are obstructed and roads become	113 (43.46%)	147 (56.54%)	0 (0)	0 (0)	3.43	Agreed

	impassable during Ero river flood.						
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**Note: Standard mean value is 2.50**

**Source: Author's Research Findings (2023)**

The analysis as presented in Table 2 revealed that Ero river flood challenge has adversely affected the economic activities of the residents of Moba local government area. The research report showed that more than 74% and 79% of the sampled respondents accepted that Ero river flood reduces industrial and agricultural output, and destroys residential and industrial buildings respectively in the local government area.

All the research statements in Table 2 were accepted by the majority of the respondents. Here, the mean scores of 3.05, 3.07, 3.09 and 3.43 for items 1, 2, 3 and 4 respectively, were greater than the standard mean value of 2.50.

The research report specifically confirmed that the economic implication of Ero river flood includes reduction of income of the people, destruction of buildings, loss of valuables and obstruction of trading activities in the research area.

Table 3 shows the research findings on the direct and psychological effects of Ero river flood on the flood victims.

**Table 3: Social Impact of Ero River Flood on the Residents of Moba Local Government Area**

S/N	Items	SA	A	D	SD	Mean	Decision
1	Flood of river Ero use to disrupt teaching/learning process in Moba local government area.	109 (41.92%)	150 (57.69%)	1 (0.39%)	0 (0)	3.42	Agreed
2	Overflow soakaways lead to health challenges of residents of Moba local government area.	86 (33.08%)	96 (36.92%)	51 (19.62%)	27 (10.38%)	2.93	Agreed
3	Religion activities are paralyzed during Ero river flood in Moba local government area.	149 (57.31%)	110 (42.30%)	0 (0)	1 (0.39%)	3.57	Agreed
4	Ero river flood use to damage electricity poles and disrupt communication facility in Moba local government area.	99 (38.08%)	141 (54.23%)	14 (5.38%)	6 (2.31%)	3.28	Agreed
5	Loss of human life use to occur during Ero river flood.	125 (48.08%)	135 (51.92%)	0 (0)	0 (0)	3.48	Agreed

**Note: Standard mean value is 2.50**

**Source: Author's Research Findings (2023)**

Reflecting on Table 3, the mean values of 3.42, 2.93, 3.57, 3.28 and 3.48 for items 1, 2, 3, 4 and 5 respectively, were greater than the standard mean value of 2.50. The result revealed the level of social challenges being faced by the Ero river flood victims.

The study confirmed that the majority of the respondents accepted that Ero river flood imposes variety of social factors including disruption of teaching/learning process, health challenges, damage of electricity poles, loss of human lives and paralyses religion activities in Moba local government area.

## **CONCLUSION**

In this study, the researcher examines the causes and sensitivity of social and economic factors to Ero river flood events. It is evident in the research work that many people have lost their lives and valuable assets to the flood menace.

The study finds evidences of negative relationships between Ero river flood and the socio-economic activities of the residents of Moba local government area, Ekiti state.

Among the causes of the river flood in the local government include inadequate drainage channels, blockage of drainage basins with debris, construction of buildings in flood plains and lack of maintenance of the Ero River's reservoir.

## **RECOMMENDATIONS**

Based on the findings of research work and since a friendly environment remains the most valued possession and legacy of man which we must all strive to protect, the study recommends as follow:

Government should put in place additional wide drainage channels which can accommodate the outflow of heavy rain on Ero River in Moba local government area.

Government should ensure regular maintenance of the excavated reservoir basin of the river in order to accommodate the size in impounding water and control flood.

The official activities of the Ekiti State Waste Management Board should be made effective in Moba local government area to minimize floods being caused by dropping of debris in the drainage basins by the residents.

Flood Zoning ordinances and Land use control acts should be enacted in the Ekiti State government in order to restrict building structures on flood plain in the state.

Individual land owners should be made to construct deep and wide drainage system on their plots, and observe the national monthly environmental sanitation to complement government efforts of flood control especially at Ikun Ekiti metropolis.

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