



Effects of Flood on Crop Farmers in Riverine area in Niger State Nigeria

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ABSTRACT

The research examined the effects of flood on crop farmers in Niger State, Nigeria, ascertain the frequency of occurrence of floods; determine the effects of floods on the livelihood of rural farmers; identify the strategies/measures adopted by farmers in cushioning the effects of floods; identify the constraints faced by the rural farmers in adopting the control measures of floods along riverine area. Structured questionnaire was used to elicit data from 426 respondents drawn from Niger State. Data were collected and analysed using descriptive statistics, perception index and ordinary least square. The result reveals that farmers mean age were ($\bar{X} = 42$ years), 89.5% were male, 83% married, 62% had had household size of 1-10 person, 71.37% had formal education, annual mean income of 888,666.72 95.7%. Majority 94.84% had river over flood as major source of flooding and 50% had it once in year. New farming methods rank 1st in terms control measures followed by early planting. Risk of been drown is the major constraints which ranked 1st. It was concluded that flood occur mostly once in a year and the farmers had low livelihood status. Occurrence of floods had effects on the livelihood of farmers, the major flood control measures employed by the farmers were early planting, new farming practices. It was recommended that farmers should adhere strictly to early warning climatic indices. Crops resistance varieties.

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INTRODUCTION

Globally, an estimated damages of \$70.72 billion were associated with hydrological (flood-related) disasters in 2011, thereby making floods the second most damaging catastrophe for that year while flood-related events have an annual average damage of \$21.39 billion between 2001 and 2010 (Guha-Sapir *et al.*, 2012). According to Abayomi and Oyekale (2013), Flooding as a natural disaster affects at least 2% of Nigeria's population and as

noted in the Nigerian disaster data base, flooding affected more than three million people in selected urban areas between 1983 and 2009. This led to loss of many lives and destruction to the environment which is the source of people's livelihood. The threat to lives and property by floods is now becoming an annual event in many urban and rural areas in Nigeria (Olanrewaju and Fadairo, 2003). Parker (2000) observed that in many African countries, floods create great natural

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threats to life, health and population as the combination of this natural hazard and human vulnerability result in intense disasters. Natural disasters can have major impacts on the social and economic welfare of a population, and often pose serious obstacles in the achievement of sustainable social and economic development.

In 2012 however, Nigeria experienced severe flooding across the nation destroying properties, farms and displacing millions of people from their homes. The flood was in the rainy season and due to the high intensity of prolonged rainfall this caused dams and reservoirs in riparian countries to fill and overflow with water which triggered a decision by the authorities of the riparian countries to open up the dams and release large amount of excess waters into the Nigerian rivers Niger and Benue (National Emergency Management Agency (NEMA), 2012). Floods are one of the most common environmental issues in Nigeria, it has caused serious danger to people's lives and properties across the country; resulting into about one third of all deaths, injuries, and one third of all danger from natural disasters (Ayinde *et al.*, 2016). Though a lot of studies have been carried out on the impact of floods, yet there is a dearth of information on effects of floods on the life of rural people along river banks in Niger State who are more prone and vulnerable to floods. The study examined the effects of floods on crop farmers in riverine areas in the riverine areas of Niger state, Nigeria. The specific objectives are to;

- i. Describe the socioeconomics characteristics of rural farmers along riverine area in the study area;
- ii. Ascertain the frequency of occurrence of floods;
- iii. Determine the effects of floods on the livelihood of rural farmers;

- iv. Identify the strategies/measures adopted by farmers in cushioning the effects of floods;
- v. Identify the constraints faced by the rural farmers in adopting the control measures of floods along riverine area.

The result of this study will assist the various agencies of government on the type of relief materials and rehabilitation programmes to be embarked upon in the affected communities. Information obtained from the study will help the extension agents in providing guidance to farmers on strategies to adopt in order to reduce the effect of floods on the affected area. Information on factors that influence adoption will provide insight on factors that are instrumental to adoption strategies. Information on constraints will shed more light on the challenges limiting adoption and the appropriate action by government or extension agents to remove or reduce this menace.

METHODOLOGY

The Study Area

The study was conducted in Niger State, Nigeria. The state is located between Latitudes 8°22'N and 11°30'N and Longitudes 3°30'E and 7°20' East of the Greenwich Meridian. Niger State has an estimated projected human population of 5,152,270 in 2017 with an annual growth rate of 2.7%. (NPC, 2006). The State covers a total land area of 74.244sq.km, which is about 8% of Nigeria's total land area. This makes the State the largest in the Country. The rainy season commences in April/May and ends in October/November with annual rainfall amount of between 1,000mm to 1,600mm. Major crops grown in the State include yam, cassava, cowpea, sorghum, maize and rice with natural and rich vegetation for grazing and forestry (NAMDA, 2014).



Sampled outlay

A multi-stage sampling technique was used for the study. The first stage involved the purposive selection of two (2) riverine Local Government Areas (LGAs) from each of the zones to make up a total of six (6) LGAs. The second stage was random selection of two (2) communities each from the selected LGAs to make a total of twelve (12) communities. Third stage involved random selection of two (2) riverine villages from each district to make up a total of twenty-four (24) villages. At the fourth stage, Taro Yamane's formula was applied to obtain a sample size of 426 respondents. Primary data were used for this study. A structured questionnaire, complemented with interview schedule was used to elicit the necessary information from the respondents by the researcher and enumerators. The questionnaire was pre-tested to ensure its validity and reliability for the research. Data were collected on the socio-economic characteristics of the respondents, the frequency of floods occurrences, effects of floods on livelihood, control measures/coping strategies adopted by the respondents against floods and the constraints associated with the adoption of flooding control measures in the study area. Descriptive and inferential statistics were used for this study to analyze data in line with the stated objectives. The descriptive statistics used include mean, frequency distribution and percentage while the inferential statistics were Ordinary Least Square (OLS) multiple regression analysis and multinomial logit regression model. Objectives i, ii, and v were achieved using descriptive statistic such as mean, frequency distribution and percentages, Objective iii was achieved using livelihood index, Objective iv was achieved using ordinary least square regression analysis.

Model Specification. A Livelihood Index (L.I.) was used as follows:

$$\text{Livelihood Index} = \frac{\text{AI} + \text{AS} - \text{AE} + \text{AD}}{4} \times 100 \dots\dots\dots(2)$$

Where;

AI = Actual Income (₦)

AE = Actual Expenditure (₦)

AD = Actual Debt (₦)

AS = Actual Savings (₦)

The livelihood index categories were expressed as:

1 – 30 = Low level livelihood

31 – 69 = Medium livelihood

71 – 100 = High livelihood

Multiple regression analysis was used to determine the effect of flooding on the livelihood of rural farmers in the study area.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The result as presented in Table 4.1 revealed mean age of 42 years. The result depicts those farmers in the study area falls within the active age group of taking decision to control floods. Majority 89.67% were males, married 83.57% with house hold size of 6-10 persons. This suggest that when floods occurs male can easily swims and escape while the female may fall victim. The result further showed that the mean farming experience of the farmers was 22 years which indicated that farmers in the study area had a lot of experience and this could increase their probability to adopt flood control measures. Only 27.23% of respondents had tertiary education. This means that they may not have knowledge on modern way of controlling flood. The mean household size in the study area was 10 persons. The means that they may have enough family labour flood control. The mean income of the respondents in the study area was ₦888,666:00 per annum. This implies that most of the respondents are average



income earner and were able to cushion the effects of floods and adopts the control measures. This finding corroborates with

that of Izeovbuwa and Adeolu (2015) which stressed that the mean income of floods victim was ₦876,480:00.

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage	Mean
Age (years)			
< 31	92	21.61	
31 – 40	102	23.90	
41 – 50	118	27.70	
51 – 60	74	17.39	
> 60	40	9.40	41.60
Gender			
Male	382	89.67	
Female	44	10.33	
Marital Status			
Single	28	6.57	
Married	356	83.57	
Divorced	36	8.45	
Widowed	6	1.41	
Experience (years)			
1 – 10	92	21.40	
11 – 20	132	31.00	
21 – 30	120	30.50	22
> 30	72	16.92	
Educational Level			
No Formal	78	18.31	
Quranic	44	10.33	
Primary	92	21.60	
Secondary	96	22.54	
Tertiary	116	27.23	
Household Size			
1 – 5	104	24.43	
6 – 10	182	42.71	
11 – 15	80	18.77	10
> 15	60	14.10	
Farm Income (₦)			
< 201,000	68	15.97	
201,000 – 400,000	78	18.33	
401,000 – 600,000	72	16.90	
601,000 – 800,000	34	7.95	888,666.70
801,000 – 1,000,000	44	10.33	
> 1,000,000	130	30.52	

Source: Field survey, 2018

Frequency of Flood Occurrence

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The results in Table 2 showed that majority 96.24% of the respondents experienced flood on their farmland and the type of flood experienced were river overflow 94.84% and dam burst 59.62%. The table further reveals that frequency of flood occurrence. Only 50.23% of the respondents experienced floods once in a year while only 37.09% experience twice in a year. This implies that the frequency of

flood occurrence in the study area was once in a year as indicated by majority of the respondents. This result is in line with the findings of Adegbile (2014) who studied the vulnerability of farmers to floods disaster in Akinyele Local Government Area of Oyo State and stated that majority of farmers in the study area experiences one form of flood or the other.

Table 2: Frequency of flood occurrence

Variables	Frequency*	Percentage
Experienced flood	410	96.24
Types of floods		
River overflow	404	94.84
Dam burst	254	59.62
Coastal flood	10	2.35
Flash flood	14	3.29
Frequency of flood		
Once in a year	214	50.23
Twice in a year	158	37.09
Once in two years	46	10.80
Once in three years	8	1.88

Source: Field survey, 2019

*Multiple responses

Effects of Floods in Riverine Area

The result of the perceived effects of flood on the respondents in Table 3 revealed that majority 90.10% of respondents had < 10 hectares of farmland which was submerged by flood. This implies that majority of farmland was destroyed and invariably affect their income and livelihood status. Majority 96.70% of the respondents had their houses collapsed by floods thereby exposing them to hazard, untold hardship and losses of livelihood to floods. Majority 88.70% of the respondents had their livestock submerged by floods. The result indicated that alternative source

of income of the respondents were also affected by the flood thereby making life very difficult for them. The mean amount of crop submerged by flood was ₦193,460.10 which was on the higher side thereby affecting the livelihood status of the respondents negatively. Furthermore 96.20% of the respondents lost < 2 persons to floods. Also, 49.30% of the bridges in the study area were lost to floods thereby making the agricultural produce loosed their economic value before reaching the market. Majority 66.20% were damaged by floods making access to urban areas very difficult.



Table 3: Distribution of respondents based on perceived effects of floods

Variables	Frequency	Percentages	Mean
Hactare of farmland submerged (Ha)			
1-10.0	380	90.10	
10.1-20.0	28	6.60	
>20.0	14	7.60	4.60
Number of Houses Collapsed			
1-10	412	96.70	
>10	14	3.30	2.53
Amount of Livestock Submerged (₦)			
1-100,000:00	378	88.70	
>100,000:00	48	11.30	36,615.05
Amount of Crop Submerged (₦)			
1-100,000:00	172	40.40	
101,000-500,000	226	53.10	
>500,000	26	6.20	193,460.10
Number of Lives lost			
0-2	410	96.20	
>2	16	3.70	
Number of bridges collapsed			
1-2	202	47.40	
>2	224	52.60	1.38
Number of roads damaged			
1-2	282	66.20	
>2	144	33.80	1.91
Number of electric poles destroyed			
1-10	382	89.70	
>10	44	10.40	4

Source: Field survey, 2019

Control Measures Adopted by Farmers in Cushioning the Effects of Floods

Table 4 indicated that the major control measures adopted in the study were adoption of new farming system 67.61% such as fertility management, contour banding, construction of floods diversion trenches and planting of cover crops ranked 1st, early planting 61.03% ranked 2nd indicating that it is often used to

cushioned the effects of floods, while the use of resistant crop varieties 51.17% such as Faro 66 and Faro 67 ranked 3rd. This result affirms the findings of Coker *et al.* (2014) asserted that the coping strategies adopted by flood affected respondents includes adoption of new farming system, support from friends and relatives, foreign organizations and NGOs, as well as personal savings.

Table 4: Control measures adopted by farmers in cushioning the effects of floods

Control Measures Adopted	Frequency*	Percentage	Rank
Raising of buildings	88	20.66	9 th
Construction of concrete structures	64	15.02	10 th

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Control Measures Adopted	Frequency*	Percentage	Rank
Construction of trenches	178	41.78	6 th
Relocation to new site	172	40.38	7 th
Early planting	260	61.03	2 nd
New farming system	288	67.61	1 st
Government donations	20	4.69	11 th
Personal savings	192	45.07	5 th
Support from friends	254	59.62	3 rd
Use of flood resistant crops	218	51.17	4 th
Construction of drainage	178	41.78	6 th
Premature harvesting	154	36.15	8 th

Source: Field Survey, 2019

*Multiple responses

Constraints Faced by Farmers in the Adoption of Flood Control Measures

The results in Table 5 showed that the major constraints faced by the respondents in the adoption of flood control measures. Risk of being drown ranked 1st. Followed by inadequate credit facilities which reduce the farmers' effectiveness in controlling flood. This is in line with Lawal *et al.* (2011) who reported in the work titled effects of livelihood assets on poverty status of farming households in South Western Nigeria that inadequate capital and low awareness affect the adoption of flooding control measures in

the study area. Similarly, inadequate funds limit the adoption of floods control measures. This corroborates the findings of Adegboye (2011) who reported that inadequate fund limit the adoption of floods control measure. Inadequate support was one of the challenges for adoption of floods control measure. This finding is in agreement with that of Lawal *et al.* (2011) who reported that inadequate support, insufficient capital and labour intensity among others were major problems faced by farmers in the adoption of flood control measures.

Table 5: Constraints faced by farmers in the adoption of flood control measures

Constraints	VS(3)	S(2)	NS (1)	WS	WM	Rank	Decision
Risk of being drown	561	36	8	605	2.84	1 st	Severe
Inadequate credit facilities	501	74	9	584	2.74	2 nd	Severe
Inadequate funds	480	96	5	581	2.73	3 rd	Severe
Inadequate support	456	106	8	570	2.68	4 th	Severe
Inadequate information	405	134	11	550	2.58	5 th	Severe
Illiteracy	396	132	15	543	2.55	6 th	Severe
Complexity of the control measures	436	52	41	531	2.49	7 th	Severe
Non-compatibility of the control measures	411	72	40	523	2.46	8 th	Severe
Low awareness	357	122	33	512	2.40	9 th	Severe
Lack of technical know-how	333	158	23	514	2.41	10 th	Severe
Non-affordability of control measures	396	74	44	514	2.41	10 th	Severe

Source: Field Survey, 2019



CONCLUSION

It was concluded that flood occur mostly once in a year and the farmers had low livelihood status. Occurrence of floods had effects on the livelihood of farmers in the study area. The factors influencing the farmer's adoption of flood control measures were gender, educational status, farming experience, farm income and access to credit among others and the major flood control measures employed by the farmers were early planting, new farming practices and planting of flood resistant varieties while the constraints faced by respondents in the adoption of flood control measures in the study area were inadequate credit facilities, inadequate funds, illiteracy, inadequate information on flood and inadequate support from government.

Recommendations

1. Farmers should adhere strictly to early warning climatic indices.
2. Crops resistance varieties of rice (crops) such as Faro 44, 66 and Faro 67 should be made available to farmers in the floods prone areas.

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