EFFECTS OF FLOODING ON FOOD SECURITY STATUS OF FARMERS OF OGUTA LOCAL GOVERNMENT AREA OF IMO STATE, NIGERIA

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Abstract
The study assessed the effects of flooding on food security status of farmers of Oguta Local Government Area of Imo State, Nigeria. Data were collected with structured and validated questionnaire from 120 farmers for the study. Data were analyzed using descriptive statistics and a 3-point likert type scale and ordinary least square multiple regression. The result revealed that majority of the farmers were males (67.5%) with a mean of 12.60 years farming experience and annual mean income of N267,900.00.They were moderately educated with a mean of 12.6 years spent in school. The major causes of flooding in the area were heavy rainfall, poor constructions and maintenance of drainage channels. Their food security status before the flood was high, but deteriorated thereafter .This flooding affected domestic water use and land use negatively. The aftermath were increased food prices and increased crops and livestock diseases .Age, farming experience, marital status, educational level were important factors that influenced the effects of flooding on the respondents' food security status.

Keywords: Flooding, food security, farmers, Oguta LGA, water use, land use.

Introduction

In the past four decades, economic losses due to natural hazards such as floods, and flood-related disasters have increased in folds and have also resulted in major loss of human lives and livelihoods, destruction of economic and social infrastructure, as well as environmental damages (Munich Re, 2002). Adeleye and Rustum (2011) define flood as a natural hazard like drought and desertification which occurs as an extreme hydrological (run off) event. On the other hand, Adelekan (2000) defines flood as large volume of water which arrives at and occupies the stream channels and its flood plains in a time too short to prevent damage to economic activities including homes. Flooding is one of the major environmental crises one has to contend with within the century. This is especially the case in most wetlands of the world. It is an extreme weather event naturally caused by rising global temperature which results in heavy downpour, thermal expansion of the ocean and glacier melt which in turn result in rise in sea level, thereby causing salt water to inundate coastal lands. Flooding is the most common of all environmental hazards and it regularly claims over 20,000 lives per year and adversely affects around 75 million people world-wide (Adelekan 2000). Floods cause about one third of all deaths, one third of all injuries, and one third of all damages from natural disasters (Askew 1999). Urban areas in Nigeria are particularly vulnerable to flooding due to inadequate capacity of drainage structures, changes to ecosystem through the replacement of natural and absorptive soil cover with concrete and deforestation of hillsides, which has the effect of increasing the quality and rate of runoff, soil erosion and silt up of drainage channels.

According to Action Aid International (2006), flood hazards are natural phenomena but damages and losses from floods are the consequences of human action. Flash flooding or urban flooding destroys agricultural produce, for example, crops, rice paddy, fruit trees and vegetables, thereby posing the risk of hunger to those engaged in subsistence farming and great loss to those

engaged at a commercial scale (Kolawole,Olayemi & Ajayi 2011). Recurring floods and other related disasters such as erosion, health hazards, loss of farm land and crops etc have been identified as a serious threat to sustainable development. Significantly, floods and its related disasters result from human-created vulnerability which is an outcome of our interaction with the environment by some human activities (Hualou, 2011). During flooding, water supplies become contaminated (water pollution), clean drinking water becomes scarce and there is the spread of water-borne diseases, destruction of buildings and agricultural lands, livestock are washed away. In extreme cases, flooding may cause loss of lives (Adeleye & Rustum 2011). There is loss of personal valuables, fear and insecurity caused by the experience. With the increasing number of urban dwellers worldwide, the number of people vulnerable to flood hazards is likely to increase. Any increase in disasters, whether large or small, will threaten developmental gains and hinder the implementation of the Millennium Development Goals (UN-ISDR, 2008). Climate change will act as a multiplier of existing threats to food security.

The idea of food security was presented for the first time at the World Food Conference in 1974 viewed solely from the perspective of having adequate availability of food on a national scale. Today, it is a condition in which all people have access at all times to enough food of an adequate nutritional quality for a healthy and active life (World Bank, 1986 as cited in Tollens, 2000). Experts have argued that significant food and nutrition problems exist in Nigeria (Okuneye 2002, 2000; Olayide, 1982). The basic aim of deregulatory policy measures in the food sub-sector was to correct this problem. Olayide (1982) conceives the food and nutrition problem in terms of food supply and demand imbalance. Factors that constrain food supply and food demand invariably affect food security. The issue of flood-related disaster on food security among farming households in Oguta Local Government Area is not very clear. It is this gap in knowledge that this study addressed. The objective of the study is to ascertain the effects of flood-related disasters on household food security status of the people of Oguta L.G.A of Imo state, Nigeria.

Methodology

Area of study

The study was carried out in Oguta Local Government Area of Imo state.Oguta is a city on the east bank of Oguta Lake in South-East Nigeria. Oguta experiences two seasons in a year, dry and rainy seasons. The rainy season begins in March and lasts until October with annual rainfall varying from 1,500mm to 2,200mm. The dry season experiences two months of harmattan from late February. The hottest months are between January and March. The population is 142,340 persons. Oguta L.G.A shares boundaries with Ihiala L.G.A of Anambra state, Oru west , Ohaji / Egbema, Mbaitoli, Owerri West and Oru East L.G.As of Imo state [NPC, 2006]. The major occupations of the people are fishing, farming, and petty trading, with very few civil servants. They produce cassava, yam, and oil palm produce in commercial quantity. They equally specialise in wooden boat making. The local government area is one of the petroleum producing areas of Imo state, Nigeria. Oguta L.G.A is made up of 20 communities which include Aborshi, Akabor, Egbuoma, Ejemekwuru, Ezi-Orsu, Mbano Agwa, Awa, Mgbele, Mgbella Agwa, Ndiuloukwu, Nkweshi, Egwe, Nnebukwu, Obeabo, Obudi, Oguta, Orsu- Obodo, Uba agwa, Umunwama Izombe and Nworie Agwa.

A multi-stage sampling technique was employed in sample selection for the study. Fifteen communities prone to flooding were purposively selected. Then, six communities were randomly selected. Lastly, twenty respondents were selected from each community to give a total of 120 respondents

for the study. The data used were collected from two main sources, primary and secondary sources .The primary data were collected using structured questionnaire, while the secondary data were obtained from relevant agencies like Ministry of Agriculture, text books. Data were analyzed using means, percentages, frequencies, mean score (likert type rating scale) and bar chart. The scaling statements were assigned with nominal values as follows;

a. Very serious, true, very severe, very effective ----3
b. Serious, not true, severe, just effective -----2
c. Not serious, undecided, mild, not effective ----1

Therefore, DECISION RULE; Above 2.0 is very serious, true, very severe, and very effective.

2.0 is serious, not true, severe, and just effective.

Below 2.0 is not serious, undecided, mild, and not effective.

Also, Ordinary least square multiple regressions were used to analyze the hypothesis which states that "there is no significant relationship between the socio-economic characteristics and the effects of flooding on the food security status of farming households in Oguta L.G.A.

This is expressed mathematically as follows;

$Y = f(x_1, x_2, x_3 \ldots\ldots e)$.

Where Y = effects of flood-related disaster on the food security status among farming household in Oguta L.G.A.

X_1= sex, X_2 = marital status, X_3 = age, X_4 = educational level, X_5= farming experience (years), X_6 = household size, X_7 = income level, X_8 = other sources of income, X_9= social organization, X_{10} = source of information, X_{11} = farm size , e = stochastic error term.

Results and Discussion

Socio-Economic Characteristics

The socio-economic characteristics of respondents such as age, gender, education, house hold size , farming experience and annual income were analysed and presented in table 1. The results revealed that the majority (67.5%) of the people were males, most of whom were married (86.67%). Another majority (48.30%) fell within the ages of 31-40 years .The mean age was 35.80 years, while 31.70% of them had annual income between N201,000.00 N300,000.00. Also 50% spent 7-12 years in school, and 56.70% had 11-15 years farming experience. The mean household size, years of farming experience, annual income and years spent at school were 8, 12.6 years, N267, 900.00 and 12.60 years respectively. This implies that participants were middle aged, low income with very little formal education. This result is in agreement with the findings of other studies on socio-economic characteristics of rural dwellers in Nigeria (Asiabaka, 2002).

Table 1: Distribution of respondents based on socio-economic characteristics (60)

Variable	Frequency	Percentages (%)	Mean
Age(years)			
21-30	28	23.3	
31-40	58	48.3	
41-50	30	25.00	
51-60	4	3.4	**35.80**
Total	**120**	**100**	
Gender			
Male	81	67.50	
Female	39	32.5	
Total	**120**	**100**	
Farming Experience			
1-10	40	33.30	
11-20	68	56.70	**12.60**
21 and Above	12	10.00	
Total	**120**	**100**	
Household Size			
1-5	40	33.30	
6-10	46	38.30	**8.00**
11-15	34	28.40	
Total	**120**	**100**	
Income Level(N,000/ANNUM)			
1-100	28	23.30	
101-200	3	2.50	
201-300	38	31.70	
301-400	32	26.70	
401-500	9	7.50	
Above 500	10	8.30	**267.90**
Total	**120**	**100**	
Years Spent at School			
No Formal Education	-	-	
1-6	4	3.30	
7-12	60	60	
12 and Above	56	46.70	**12.60**
Total	**120**	**100**	

Field Survey, 2013

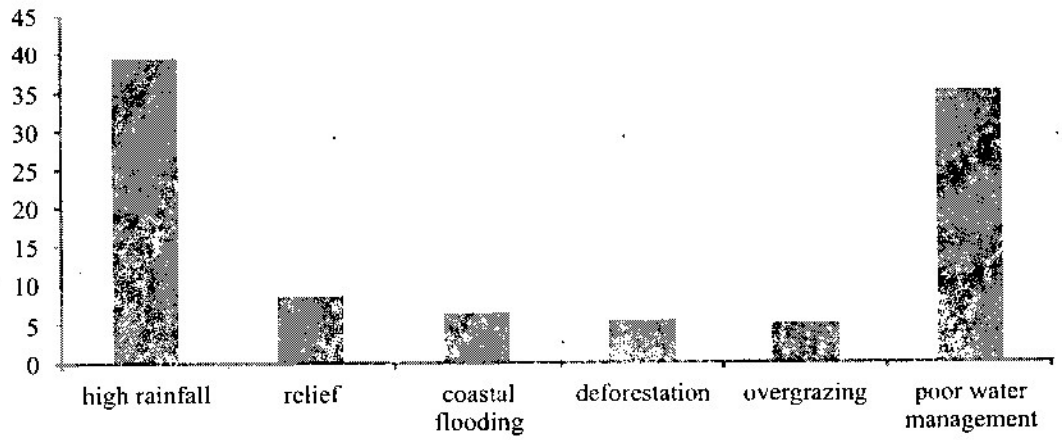
Major Causes of Flood as perceived by Respondents

The majority (39.5%) of the people felt that the major causes of flooding were heavy rainfall and poor construction and maintenance of drainage channels (35%). Deforestation, coastal flooding, overgrazing and relief were not responsible for flooding in the area.

Table 2: Distribution of respondents according to the causes of flooding in the area.

Factors	Frequency	Percentage (%)
High rainfall	104	39.5
Relief (Low land)	23	8.7
Coastal flooding	17	6.5
Deforestation	13	5.3
Overgrazing	14	5.0
Poor construction and maintenance of drainage channels	92	35

*Multiple Responses. Source: Field Survey, 2013



Food Security Status Before and After the Flood

Tables 3 and 4 show the food security status of the respondents before and after the flood. Table 3,shows that the people were food secure before the flood, with a weighed mean of 2.9. They were able to eat 3 square meals per day and had easy access to food, with weighed means of 2.8 and 2.7 respectively. They were able to afford balanced meals, children ate enough and food was cheap and available. On the other hand, table 4 shows that the people were not food secure after the flood. They were worried food would run out and believed food, bought did not last and also relied on few kinds of low cost food with means of 2.6 and 2.4 respectively. Adults ate less than they should for the sake of children. This implies that the respondent's food status after the flood was poor compared to before the flood. This could be as a result of lack of information and early warnings against the flood.

Table 3: Distribution according to food security status before the flood

Conditions/Decision	True		Not true		Undecided		Weighed mean	Remark	Ranking
	F	%	F	%	F	%			
Able to eat 3 square meal	111	92.5	7	5.8	2	1.7	2.9	True	1
Could afford to eat a bal.diet	98	81.7	12	10	10	8.3	2.7	True	3
Could afford preferred food	88	73.3	17	14.2	15	12.5	2.6	True	4
Easy access to food	101	84.2	9	7.5	10	8.3	2.8	True	2
Children were eating enough	101	84.2	6	5	13	10.8	2.7	True	3
Household fed as they should	78	65	33	27.5	9	7.5	2.6	True	4
Food were cheap & available	83	69.2	37	30.8	-	-	2.7	True	3
Were not displaced from home	69	57.5	39	32.5	12	10	2.5	True	5
Less repair on housing	80	66.7	17	14.2	23	19.2	2.5	True	5

Source: Field Survey, 2013

Table 4: Distribution according to food security status after the flood

Conditions/Decision	Very serious		Serious		Not serious		Weighed mean	Remark	Ranking
	F	%	F	%	F	%			
Worried, food will run out	71	59.2	48	40	1	0.8	2.6	True	1
Food bought did not last	56	46.7	50	41.7	14	11.6	2.4	True	2
Could not afford to eat bal. meal	40	33.3	54	45	26	21.7	2.1	True	8
Relied on few kinds of low cost food	61	50.8	46	38.3	13	10.8	2.4	True	2
Could not feed the children a bal. meal	38	31.7	72	60	10	8.3	2.2	True	5
Children were not eating enough	47	39.2	55	45.8	18	15	2.2	True	5
Adult ate less than they should	55	45.8	54	45	11	9.2	2.4	True	2
Respondent lose weight	44	36.7	56	46.7	20	16.7	2.2	True	5

Source: Field Survey Data 2013

Table 5 shows the respondents' opinion about the severity of some likely effects of flood disaster on their food security. The effects of flooding on cultivated lands had a mean of 2.9, crop destruction and increased food prices had means of 2.7 and 2.5 respectively. Difficulty in accessing food, increased livestock and crop diseases and contamination of water, land, and food, all had weighed mean of 2.5. None of the likely effects were mild which may imply that the people were not forewarned before the flood.

Table 5: Distribution of respondents according to the effects of flood on their food security.

Extent/Effects of Flood	V.Severe		Severe		Mild		Weighed mean	Remark	Ranking
	F	%	F	%	F	%			
Flooding of cultivated lands	114	95	6	5	-		2.9	v. severe	1
Destruction of crops	85	70.8	32	26.7	3	2.5	2.7	v. severe	2
Damage of livestock	63	52.5	45	37.5	12	10	2.4	v. severe	7
Damage of forestry	58	48.3	52	43.3	10	8.3	2.4	v. severe	7
Difficulty in accessing food	68	56.7	47	39.2	5	4.2	2.5	v. severe	4
Increased food prices	88	73.3	28	23.3	4	3.3	2.7	v. severe	2
Increase in livestock & crop disease	76	63.3	29	24.2	15	12.5	2.5	v.severe	4
Contamination of water, land and food	80	66.7	23	19.2	17	14.2	2.5	v.severe	4

Source: Field survey data, 2013

Regression Estimates of the Effects of Flooding on Food Security Status of the Respondents

Table 6 shows that the exponential model provided the best fit and was thus used in describing the relationship. The F-value was 4.656 and the number of significant variables was five, the coefficient of multiple determinations (R^2) was 0.551. This result implies that the combined effect of the variables influenced the effect of flooding on food security of the respondents by 55 percent. The coefficient of Age ($t = 3.369$, $p < 0.01$), farming experience ($t = -4.034$, $p < 0.01$), marital status ($t = -2.054$, $p < 0.05$), educational level ($t = -2.164$, $p < 0.05$), household size ($t = 2.494$, $p < 0.05$) were significant, implying that age, farming experience, marital status, educational level and household size were important factors influencing the effects of flooding on farming households food security status in the study area. The result showed that age and household size were positively related to the effects of flood on food security of the respondents .This implies that as age and household size increase, the effects of flooding increases. It also implies that as the farmers enter their inactive ages and have an increased number of household sizes, the effect of flooding becomes high on food security. Marital status, educational level and farming experience were negatively related to the effects of flooding, implying that increase in farming experience, educational level and marital status reduce the effects of flooding on food security. High educational attainment is a desirable condition for agricultural development, also increased years of farming experience enables farmers to set realistic goals and employ beneficial coping mechanisms as regards their food security against flood disasters.

Table :6 Multiple regression analysis of the effects of flooding on food security status of respondents in Oguta L.G.A.

Explanatory variables	Linear function	Exponential function #	Semi - log function	Double log function
Constant	595152.106 (3.405)	14.814 (15.460)	503424.849 (1.243)	13.748 (6.106)
Marital status	-57200.142 (-1.311)	-0.491 (-2.054)*	-73849.049 (-0.990)	-0.592 (-1.426)
Age	7106.658 (3.574)**	0.037 (3.369)**	229354.228 (3.328)**	1.268 (3.309)**
Education level	-26769.903 (-1.208)	-0.263 (-2.164)*	-75008.906 (-1.025)	-0.799 (-1.963)
Farmingexperience	-10795.694 (-3.391)**	-0.070 (-4.034)**	-120608.357 (-2.280)*	-0.763 (-2.593)**
Household size	8325.748 (1.545)	0.074 (2.494)*	25855.859 (0.861)	0.220 (1.319)
Farm size	1176.013 (0.339)	0.002 (0.090)	14296.302 (0.566)	-0.003 (-0.020)
Sex	-37688.685 (-1.382)	-0.229 (-1.532)	-42904.849 (-1.522)	-0.252 (-1.606)
R^2	0.232	0.551	0.189	0.187
F-cal	4.199	4.656	3.236	3.190
N	120	120	120	120

Figures in parenthesis are t-ratio
* = T significant at 5%
** = T significant at 1%
# = Lead equation
Source: Field survey data, 2013

Conclusion

This work established that flood-related disaster affected the food security status of farming households in the area of study. Food security being the adequate supply of food and its availability is the basic right of the people. It also revealed that disaster such as floods could hamper development in agriculture and other sectors of the economy. Flood is a natural phenomenon and so cannot be totally or completely mitigated but its effects could be reduced especially on food security. Agricultural extension which is an educational service mainly concerned with the transfer of innovative information from research to farmers, could be seen as a tool for reducing the effects of flood on food security by providing these farmers with the required information about flood. Therefore, there is need to build peoples' capabilities to prepare, manage, reduce, and cope with the hazards associated with the disaster and this could be done if there were improvements in the

awareness of the disaster and its effects. Although it is difficult to quantify the effects of flood-related disaster in most areas, one thing that is sure is that it increases the number of individuals below poverty thresholds, thus slowing down efforts at sustainable development. It is worthy to note that disaster prevention, mitigation, and preparedness are better than disaster relief and response.

Recommendations

The following recommendations are made.

a. Government should provide appropriate infrastructure investments, flood defenses, dams, and their associated reservoirs that are designed completely or partially to aid in flood protection and control.
b. There is need for installation of community-based early warning system for issuance of timely and effective flood warnings.
c. The intervention strategies of development agencies, extension, and other organizations etc should be guided with specific coping strategies employed by farmers based on time-tested traditional knowledge blended with modern science and technology on flood disaster management in food security.
d. There is need to strengthen research support system to evolve continuous process of analysis, action / reflection which would help to decipher the gap in disaster management plans by encouraging institutions / universities to undertake multidisciplinary research projects in order to provide relevant information about flood to people in prone areas.
e. It is also recommended that the rainfall regimes in the preceding post season must be taken into consideration while assessing the situation likely to arise in the coming months as heavy rainfall is one of the major causes of flood in the area.
f. Government should provide adequate agricultural storage facilities to encourage stockpiling of food for man and fodder for livestock to promote food security in the areas prone to flooding.

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