Effects of Flood on Sales of Fish among Fishermen in Makurdi, Benue State.

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Abstract
The study was undertaken to analyze the effects of flood on sales of fish among fishermen in Benue state. The population of the study consisted of all the fishermen in Makurdi Local Government. A multi stage stratified random sampling technique was used in selecting 100 respondents. Data were collected using questionnaires and analytical tools were simple descriptive statistics as mean, frequency, percentage and inferential statistics t-test. Results revealed that the average age of fishermen was found to be 36.8 years who were mostly married with average fishing experience of 30.55 years. The mean quantity of fish captured during and after captured were 143.89 and 314.55 baskets respectively, which is significantly different at (p<0.05). The result also showed that 67% of fishermen sold their fish smoked during flooding and 98% sold their fish fresh after flooding. The gross margin during flood and after flood were found to be ₦1554359.70 and ₦4217909.90 respectively which is significantly different at (p<0.05). Furthermore, inadequate market, tax, inadequate cold room, high cost of material and high cost of fuel were identified as major constraints to fishing. The study recommended that, policy makers introduce frequent training and monitoring programmes aimed at credit use by fishermen and experienced fishermen should be encouraged to remain in the fishing business.
Key words: Flood, Sales of Fish, Fishermen,

INTRODUCTION

Flood is an overflow of water that submerges land which is usually dry. The European Union (EU) Floods Directive defines flood as a covering by water of land not normally covered by water (European Council, 2007). In the sense of flowing water, the word may also be applied to the inflow of the tide. Flooding may occur as an overflow of water from water bodies, such as a river or lake, in which the water overtops or breaks levees, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an area of flood. While the size of a lake or other body of water will vary with seasonal changes in precipitation and snow melt, these changes in size are unlikely to be considered significant unless they flood property or drown domestic animals (Okereke, 2007).

Artisanal fishing is a main source of livelihood for those residing in riverine communities. According to the FAO glossary annex, they are sometimes referred to as small-scale fisheries. These are traditional fisheries involving fishing households, using relatively small amount of capital and energy, small fishing vessels (if any), making short fishing trips, close to shore, and mainly for local consumption. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export (FAO, 1998).

Previous studies (Fregene, 2002; Ojo, 2004; Suleiman, 2007) revealed that fishing is an economic activity which requires capital investment which is characterized by the use of dug-out, wooden canoes that are often not motorized, operated by individual or small groups using labour intensive gears of relatively low level of productivity. In general, artisanal capture

fisheries, which are low capital, low operational costs and limited gear coverage, characterize fishing activities in Nigeria (Fregene *et al*, 2003). It may not be capital intensive at the level of artisanal fishermen in the north because subsistence practices characterize the artisanal fisheries as observed in Lagos and Rivers States by Adesehinwa and Bolorunduro (2007). Fishing inputs commonly used include canoe, paddles, hooks, gill nets, cast nets, beach seining and drift nets.
In 2009, the Benue River was a relatively thin river bordered by small, isolated water bodies. Three years later, the river had spilled over its banks, engulfing the small lakes on either side. Three years later, the river had spilled over its banks, engulfing the small lakes on either side. Flood waters often carry heavy loads of sediment, and such sediment might account for the relatively light shades of blue along part of the river. Current understanding of stream ecology suggests stream communities are structured differently by biotic and abiotic controls along some type of environmental gradient (Peckarsky 1983, Ross *et al.,* 1985, Schlosser 1987, Power *et al.,* 1988, Resh *et al.,* 1988). The study area is in a low-lying, flood prone area (wetlands). The areas are located along the Benue River which is usually prone to flood during raining seasons. The population along the river has grown over the years. Most people that are around the area are farmers. Most part of the land along the river is used for crop production, mainly maize and vegetable gardening, the area has suffered floods during rainfall seasons and the floods caused displacement of people from their usual dwelling places resulting into varying impacts on infrastructure, crops, health, education, environment as well as damage to property. Therefore, there is the need to assess the effects of flood on the output of fish among fishermen in river Benue, Benue State. The following hypothesis was tested; there is no significant difference in the quantity of fish captured during and after flood, and there is no significant difference in the gross margin of fishermen during and after flood.

METHODOLOGY
The study area was Makurdi Local Government Area of Benue State, Nigeria. Purposive sampling was used to select Wadata and Wurukum which are areas that engaged more in fish enterprise. Random sampling was used to select 100 fishermen from the areas afore selected. Data used for this study were obtained from primary sources. The primary data was obtained through the administration of structured questionnaires.The tools used in this study were descriptive statistics, gross margin analysis and value addition analysis.

Gross Margin Analysis
The gross Margin analysis was used as a budgeting tool to estimate the cost and return of fish among fishermen in River Benue. Gross margin by definition is the difference between Gross farm Income (GFI) and Total Variable Cost (TVC) (Olukosi and Erhabor, 1988). Algebraically, it is defined as;

$$GM = GR - TVC$$

Where:
GM = Gross margin from acha production (N/ha)
GR = Gross return (or net income) from acha production (N/ha)
TVC = Total variable cost (₦/ha)

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1 presents the result of socio-economic characteristics of fishermen in river Benue. Analysis of age of respondents indicated that majority of them 50.0% of the sampled respondents were in the age bracket of (21-40) years. These age groups are energetic, productive and could stand stress of fishing of any kind in the study area. The average age of respondents was found to be 36.5 years. The result further revealed that reasonable numbers of fishermen in the study area 40% were in the age bracket of (41-60) years of age. The result also showed that only 10% of the surveyed sampled were in the age bracket of less than 20 years of age, this age are not fully involved in fishing in the study area.

The result for marital status indicated that 75% were married and 25% single. This could be that there could be tendency that most fishermen in the study area are stable since marriage guarantee stability which may lead to productivity. The survey also showed that that fishermen who had no formal education 18%, primary education 16%, secondary education 62% and tertiary education 3% respectively in the study area. This high percentage of formal educational status of 82% showed that fishermen are literate from one level to the other and do not wait for white kola job rather engaged themselves in fishing.

The result of household size showed that the mean household was found to be 4.5 persons in the study area. This may be because most fishermen in the study area adopt recent family planning program. Majority of the respondents 69% were less than 5 persons, 28% were (6-10) persons and only 2% were (11-15) persons in the study area respectively. Analysis of year of experience in fishing showed that the mean age of fishing by respondents in the study area was found to be (30.55) years. This means that experience increase ones behavior and decision (John, 2003). The result further showed that 6% of respondents had experience, less than 10years experience, 2% had (10-20) years experience, 27% had (21-30) years experience and majority 46% had more than 30years experience respectively. The result showed than only 16% of the respondents hired labour to carry out fishing activities in the study area while 74% of the sampled respondents in the study area made use of family labour.

Table 1: Socio-Economic Characteristics of Flood to Respondents (n=100)

Variable	Frequency	Percentage (%)	Mean
Age			36.8
<=20	10	10.0	
21-40	50	50.0	
41-60	40	40.0	
Marital status			
Single	25	25.0	
Married	75	75.0	
Education			
Non-formal	18	18.0	
Primary	16	16.0	
Secondary	62	62.0	
Tertiary	3	3.0	
Household size			4.63
<=5	69	69.0	
6-10	28	28.0	

11-15	2	2.0	
Fishing experience			30.55
<=10	6	6.0	
11-20	21	21.0	
21-30	27	27.0	
31+	46	46.0	
Source of labour			
Hired	16	16.0	
Family	74	74.0	

Source: Field survey (2016)

Fishing Equipment in the Study Area
Table 2 presents the result of fishing equipment during and after flooding.
The analysis showed that big fish net were used by all the sampled respondents in the study area during flood and small fish net were also used after flood in the study area. This implies that the big fish net were used commonly by fishermen in the study area to capture high quantities of fish. The result indicated that 95% of the respondents in the study area made use of engine boat in fish capture during/after flooding in the study area. This helps the fishermen in reducing the stress in manual paddling with canoe as they can go far distance to fish.
The result also showed that 14% of fishermen used hook and line after flooding. This is because during flooding, the volume of water that increases and spread to the bank and quick spread fish and tendency for hook and line to capture fish with ease during flooding. 68%of the fishermen used special basket in fish capture during and after flood in the study area. The survey indicated that 99% used canoes during flood and 98% used canoes after flood in the study area.

Table 2: Fishing Equipment Used During/After Flood (n=100)

Equipment	Frequency (During)	Percentage (%)	Frequency (after)	Percentage
Big/small fish net	100	100.0	100	100.0
Engine boat	95	95.0	95	95.0
Fish hook/line	14	14.0	13	13.0
Special basket	68	68.0	68	68.0
Canoe	99	99.0	98	98.0

Source: Field survey (2016)

Distribution of Fish Captured in the Study Area
Table 3 presents descriptive statistics of quantity of fish captured by fishermen during and after flooding in the study area. Analysis of the result of quantity of fish captured showed that during flood, 80% of the sampled respondents captured less than 100 baskets of fish while 30% captured less than 100 after flood. Reason been that during flood, fishermen maneuver easily without much time waste to get fish captured. But only 22% captured 101-200 after flood with no person capturing in this range during flooding.
The result also showed that 3% captured 201-300 baskets of fish during flood while 9% captured 201-300 baskets of fish after flood. This could be as a result that after flood as the volume of water the fish reduces and it affords the river to get much fish. The result also showed that 3% captured above 300 baskets during flood and 39% after flooding. The average quantities of fish captured during and after flooding in the study area were found to be 143.9 and 314.6 respectively.

Table 3: Quantity of Fish Captured During/After Flood

Quantity	Frequency (during)	Percentage (%)	Frequency (after)	Percentage (%)
Basket				
<=100	80	80.0	30	30.0
101-200			22	22.0
201-300	3	3.0	9	9.0
301+	17	17.0	39	39.0
Mean	143.9		314.6	

Source: Field survey (2016)

Gross Margin Analysis of Fishermen in River Benue

The result of table 4 presents gross margin of fishermen in the study area. The result indicated that that the mean net cost incurred was ₦22,695.00 with standard deviation of 9784.521. The result further revealed that the cost of hook and line of fishermen was ₦89.30 and this form a negligible part of total variable cost. Cost of big basket showed mean cost of big basket was ₦504 with its standard deviation of ₦497.49. Tax also has a mean cost incurred to be ₦350.00 with standard deviation 238.49. Levy had no cost incurred and this mean that levies did not form part of the total variable cost.

The survey showed the mean cost incurred on hired labour was found to be ₦9334.00 with standard deviation of 123789.99, this form 19.2% of the total variable cost. The mean cost incurred on hiring canoe was found to be ₦8824, feeding ₦27,768.00 with their respectively standard deviations of 4030.51 and 81217.5. Survey also showed that the mean total variable cost incurred was found to be ₦153590.30 and standard deviation of 153616.75. The mean total revenue realized during flooding was ₦170795.00 and standard deviation of 3034483.20. The mean total revenue realized after flooding was found to be ₦4371500 and standard deviation 3959687.7. The mean gross margin during/after flooding was found to be ₦155439.7 and ₦421790.7. Capture of fish by farmers is a profitable enterprise in the study area both during and after flooding but preferably after flooding.

Table 4: Descriptive statistics of sales by fishermen in the study area

Sales	Mean	Standard dev.	Minimum	Maximum
Net cost	22695.00	9784.521	1000	50000
Cost of hook & line	89.30	222.961	0	700
Cost of basket	524.00	497.493	0	5000
Cost of tax	350.00	238.472	0	1000
Cost 0f levy	0.00	0.00	0	0
Cost of hired labour	93340.00	123789.99976	0.00	104000.00
Cost of hiring canoe	8824.00	4030.52	0.00	24000
Cost of feeding	27768.00	81217.5	0.00	780000
TVC	153590.30	153616.75	10100.00	1129500
Total revenue during flood	1707950.00	3034483.20	30000	15000000
Total revenue after flood	4371500.00	3959687.7	30000	16000000
Gross margin (TR-TVC) during flooding	1554359.7	2989694.08	-779500	14729500
Gross margin (TR-TVC) after flooding	4217909.7	3936744.4	-779500	158580000

Source: field survey (2016)

Value Addition to Fish Captured in the Study Area
Analysis of the value addition of fish sold in the study area (both smoked and dried) during and after flooding showed that 32% of the fishermen in the study area sold their fish in the form of smoked fish while 67% as fresh is shown in table 8. This means that 32% of the sampled respondents preserved their further or for future to raise money when flood is over. The result also indicated that only 2% of the sampled respondents sold their fish captured as dried, while majority 98% sold it fresh. This is because much fish were not available and not enough for preservation in the study area

Table 5: Distribution of Value Addition by Fishermen in the Study Area

Value addition	Frequency	Percentage (%)
Form sold fish		
Smoked	32	32.0
Sold fresh	67	67.0
Form preferred by customers		
Fresh	98	98.0
Dried	2	2.0

Source: Field survey (2016)

Constraints to the Sales of Fish among Fishermen in the Study Area
Table 6 indicates the constraints of the sales of fish among fishermen in the study area. The result revealed that only 2% of the sampled respondents were faced the problem of market or where to sell their fish captured. This is because most fishermen in the study area captured in small quantity and the demand for fish is outrageous because of its high demand nature, almost every home eat fish. This is in variance with the findings of Ayoola *et al., (*2008) who found that 68% of sampled respondents are constrained of market place for agricultural products in Benue state.
The result further revealed that both tax, inadequate cold room affected only 2% of the sampled respondents which is in variance with the findings of Ayoola *et al.,* (2008) who found that 46.3% of sampled respondents were affected with Tax and Levies. The result also revealed that 99% of the respondents in the sampled respondents were affected by high cost of materials in the study area. This is because of the recent inflation in the prices of materials in the country. The fuel cost is another major hindrance of output of fish among fishermen in the study area, the analysis showed 99% of the sampled respondents were affected by high cost of fuel following the recent removal of fuel subsidy from premium motor spirit (PMS) in Nigeria, this affected the fishermen. The result showed that only 1% of the sampled respondents were affected by inadequate credit facilities.

Table 6: Constraints to Fish Sales among Fishermen in the Study Area

Constraints	Frequency	Percentage (%)
High tax	2	2.0
Inadequate cold room	2	2.0
High cost of materials	99	99.0
High cost of fuel	99	99.0
Inadequate credit facilities	1	1.0

Source: field survey (2016)

Result of T-test Hypothesis 1
T-test result of showing difference in the quantity of fish sold during/after flood is presented in table 7. This result indicated the mean quantity of fish sold during/after flood were 143.9 and 314.6 with their respective standard deviation of 258.59 and 278.72. The mean difference was 170.660. This means that there is a significant difference in the quantity of fish captured during and after flood at 1% probability level. (P-7.53<=0.000)

Table 7: Difference in Quantity of Fish Sold During/After   Flood

Variable	Mean	S.D	Mean diff.	T	Df	Sig. (reject)
Qty of fish during flooding	143.9	258.59	170.66	-7.533*	99	0.00
Qty of fish after flooding	314.6	278.72				

 Source: field survey (2016) *t-test significant at 5% level

Result of T-test Hypothesis 2
The mean gross margin during and after flooding were found to be ₦1554359.7 and ₦4217909, showing that revenue exceeds cost and the mean difference of gross -26635.00 is shown in table 8. This means that gross margin of fishermen during and after flooding has significant difference at 1% probability level. (p-7.286<=0.000)

Table 8: Difference in Gross Margin of Fishermen

Variable (GM)	Mean	S.D	Mean diff.	T	Df	Sig. (reject)
During flood	1554359.70	2989694.00	-266355.0	-7.288	99	0.00
After flood	4217909.7	3936744.45				

Source: Field survey (2016) *t-test significant at 5% level
GM: Gross margin

CONCLUSION
This study was undertaken to analyze the effects of the output of fish among fishermen in river Benue. The results revealed that most fishermen are in their productive age group of 21-40years with average size fishermen household of 5persons. The results also showed that majority of fishermen were married with average fishing experience of 30.55years who had one level of education to the other. The results further revealed that equipment used during/after flooding were big fish net, special basket, engine boat, hook and lines, and canoe respectively. The result showed 80% of the sampled respondents captured less than 100 baskets of fish during flooding while 30% of the sampled respondents captured less than 100 baskets of fish. The result shows that there was a significant difference in quantity of fish captured during and after flooding. The result indicated that fishing is profitable during and after flooding with mean gross margin of during and after flooding. The result revealed that fishermen were constrained of inadequate market, high tax, inadequate cold rooms, inadequate credit facilities, high cost of fishing materials and high cost of fuel. The government or Non Governmental Organizations (NGOs)

should create a valid credit facility to the fishermen in the study area to help them purchase fishing materials and/or subsidize those materials for them. Since fishing is profitable in the study area, experienced fishermen should be encouraged to remain on the fishing process to encourage others into the enterprise.

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