A gender appraisal of the impacts of flood-induced migration on livelihoods in rural Nigeria

by

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Abstract

This study examined the impact of the 2012 flood disasters on the livelihoods of migrant male-headed(MHHs) and female-headed households (FHHs) in five rural Local Government Areas (LGAs) of Southeastern Nigeria. These LGAs were selected because they are situated on the bank of Rivers, are vulnerable to floods, and are among the most badly devastated areas during the 2012 floods. Data were obtained using mixed methods comprising questionnaire surveys and key informant interviews. From each LGA, 60 households totaling 300 households were sampled. Descriptive statistics, Asset index technique, and logistic regression were for data analysis. The aggregate index for the MHHs decreased from 0.4600 before, to 0.1000 after the floods, and from 0.5068 before, to 0.0108 after the floods for the FHHs. Age, occupation, income and education are the most significant predictors of livelihood security for the MHHs while income was the major predictor of livelihhood security for the FHHs.

Keywords: *Female-headed households; 2012 floods; livelihoods; migration; Nigeria; male-headed households*

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Introduction

The propensity of migration due to climate change has been rising in the last two decades because of the continuous increase in the frequency of, and severity climate change hazards (Fekete 2009; Ionescu, et al. 2009; Warner et.al 2012). Environmental migration have therefore been noted to help in ameliorating seasonality and risk of hazards, reducing vulnerability, and enabling investment in a range of livelihood assets such as education and access to institutions (Kassie, et al 2012). In this context, the definition of livelihood by DFID (1999) states that:

> *'A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (DFID, 1999, P.1*)

The livelihood situation therefore assumes a worse dimension when one or more of the strategies fail. Understanding the livelihoods of the populations therefore, helps reveal how the populations live through difficulties such as the occurrence of floods. Consequently, the sustainable livelihood approach (SLA) implies taking a holistic view, identifying and building on people's existing assets and needs when planning interventions (FAO, 2006; 2008).The SLA in essence makes the people target of the framework. Livelihoods can only be seen as sustainable when the population are capable of coping with stresses and shocks such as flooding, and most importantly when the livelihoods activities provide benefits without undermining the natural resource base on which they rely especially the communities living close to flood plains (World Bank, 2005 a, b ;DFID, 2002a, b,2006a, b; UNDP, 2006; 2008).

Floods have also been identified as the most costly and wide reaching of all natural hazards, responsible for up to 50,000 deaths and adverse effects on some 75 million people worldwide every year (Oxfam, 2007; FAO 2008).This is especially true in developing countries, especially Nigeria which have been identified as being more vulnerable to climate change impacts due to their low adaptive capacity and growing dependence on resources sensitive to changes in climate (Fussel & Klein, 2006; Madzwamuse, 2010; Speranza, 2010; ; Hinkel, 2011; Malone & Engle, 2011; Nzeadibe et al., 2011; UN-Water, 2011). Flood disasters are therefore not a recent climate

change impact phenomenon in Nigeria and flooding has been identified as the most common environmental hazard in Nigeria cities such as Ibadan (1985, 1987 and 1990), Osogbo (1992, 1996, 2002), Yobe (2000), and Akure (1996, 2000, 2002, 2004 and 2006), Markurdi (2008). In addition, most of the coastal cities of Nigeria, such as Lagos, Port Harcourt, Calabar, Uyo, and Warri frequently experience floods, which have claimed many lives and properties worth millions of dollar (Folorunsho and Awosika 2001; Ologunorisa, 2004; Taiwo, 2008; Etuonovbe 2011; Mordi 2011; Amaize 2011; Aderogba 2012; Olajuyigbe et al. 2012; Akukwe and Ogbodo 2015). However, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA, 2012) stated that Nigeria experienced the worst floods in the past 40 years in 2012. It is estimated that between July and October, 2012 over 7,705,378 Nigerians were affected by the floods, 2,157,419 persons registered as internally displaced persons (IDPs), 363 people died, while more than 618,000 houses were damaged or destroyed. Out of the 36 states of the country, 33 States were affected, including 14 that are considered severely affected. The affected areas also covered a total of 256 out of the 774 Local Government Areas (LGAs) with Kogi State recording the highest number of affected people (1.35 million) followed by Adamawa with 1.11 million affected persons. The floods affected the livelihoods of the affected populations by washing away settlements, critical infrastructure such as roads, bridges, communication and power installations, as well as farmlands.

Consequently, households living in areas that are susceptible to floods, or are inaccessible or unsuitable for agricultural production are also highly vulnerable to livelihood insecurity. Four household profiles of using migration in response to rainfall variability and livelihood insecurity have also been identified (Warner et al 2012). The first category of households uses migration to improve their resilience while the second category uses migration as a survival strategy. The third category perceives migration as indispensable for human security while the fourth group struggles to survive in their areas of origin and cannot easily use migration to adapt to the negative impacts of rainfall stressors such as floods. Within these households whose livelihoods are vulnerable to climate disasters such as floods, different studies have generally observed that the female-headed households (FHHs) are more vulnerable than male-headed households. The FHHs are more vulnerable to climate change disasters because the female head, who is the main income earner, faces various disadvantages in many productive activities, is a responsible for

household maintenance and child care in addition to working outside, and faces a higher dependency ratio for being the single income earner (Fuwa, 2000; Mallick and Rafi, 2009). Chant (2003) and Musekiwa (2013) define a female-headed household FHH as one in which an adult woman (usually with children) resides without a male partner (or, in some cases, in the absence of another adult male such as a father or brother). On the other hand, male-headed households (MHHs) heads are those whose head are males, irrespective of the marital status of the man.

Despite the increase in the frequency and magnitude of floods, no proactive or comprehensive impact assessment study on the impacts of these recurrent floods on the livelihoods of people has been undertaken in Nigeria as the responses to the impact of hazards such as floods has been reactive. Most importantly, there exists dearth of research on gendered assessment of the impacts of flood disasters in Nigeria. It is therefore on this premise that this research proposes to carry out a gender assessment of the impact of flood on the livelihoods of the population of Nigeria using the flood-induced migrant male-headed- households (MHHs) and female-headed households (FHHs) in rural communities of Anambra State. The specific objectives of this paper in the study area are to; highlight nature of the floods; compare livelihood security of MHH and FHH migrant-households before and after the floods; and estimate the predictors of livelihood outcomes of MHHs and FHHs in the study area. This study is germane because the gendered assessment of the impacts of flooding on the livelihoods of affected households has remained necessary since flooding events are multi-dimensional and may generate a wide array of consequences on livelihood activities and sustainability of MHHs and FHHs (Timalsina, 2007). The findings of this research are expected to assist flooded MHHs and FHHs in the future to reduce their vulnerability, and adapt to flood, while at the same time helping them to improve the livelihoods of their households. The results of this research will also furnish policy makers with relevant information on how to intervene, and assist in resolving gendered flood-related negative impacts in the study area and even in other parts of the country and developing world.

Materials and methods

Conceptual Framework

The sustainable livelihoods framework according to DFID (1999) and Timalsina (2007) represents a tool which helps to define the scope of, and provides the analytical basis for livelihoods analysis through the identification of the major factors affecting livelihoods and the relationships between them. This framework identifies five interacting elements which are vulnerability contexts; assets/resources; structures and processes; strategies; and outcomes. This framework was further modified by LMU (2004) as shown in Figure 1. The crux of the framework is that there exist assets upon which households or individuals depend on for their livelihoods whether they are in the rural or urban areas. Therefore, for the assessment of the livelihoods of any set of population, the framework identifies livelihood outcomes which are measurable through certain indices such food security, water and sanitation (Watsan) security, gender equity etc. The impacts of flooding on livelihoods of MHHs and FHHs in the study area will be comparatively assessed using these livelihood outcomes prior and after the flooding events.

Research Methodology

The study area is made up of five (5) rural LGAs in Southeastern Nigeria. These areas were are selected because they are situated on the banks of major Rivers, are very vulnerable to floods, and are among the most badly devastated areas in the country during the 2012 floods. A multi-stage random sampling technique was used to establish the sampling frame. In each of the LGAs, a list of 2012 flood-affected communities was drawn up from which three (3) communities were selected making a total of fifteen (15) communities for the study. From each of the selected communities, twenty (20) rural households comprising of ten male-headed (MHHs), and ten female-headed (FHHs) households were randomly selected. All the households used are those that migrated outside the community because of the floods but have returned back to their communities after the floods. This translates to sixty (60) rural households for each rural LGA, and three hundred households for the study area. The data for this study were generated using a structured questionnaire-based survey was carried out with the heads of the 300 rural households selected for this study.

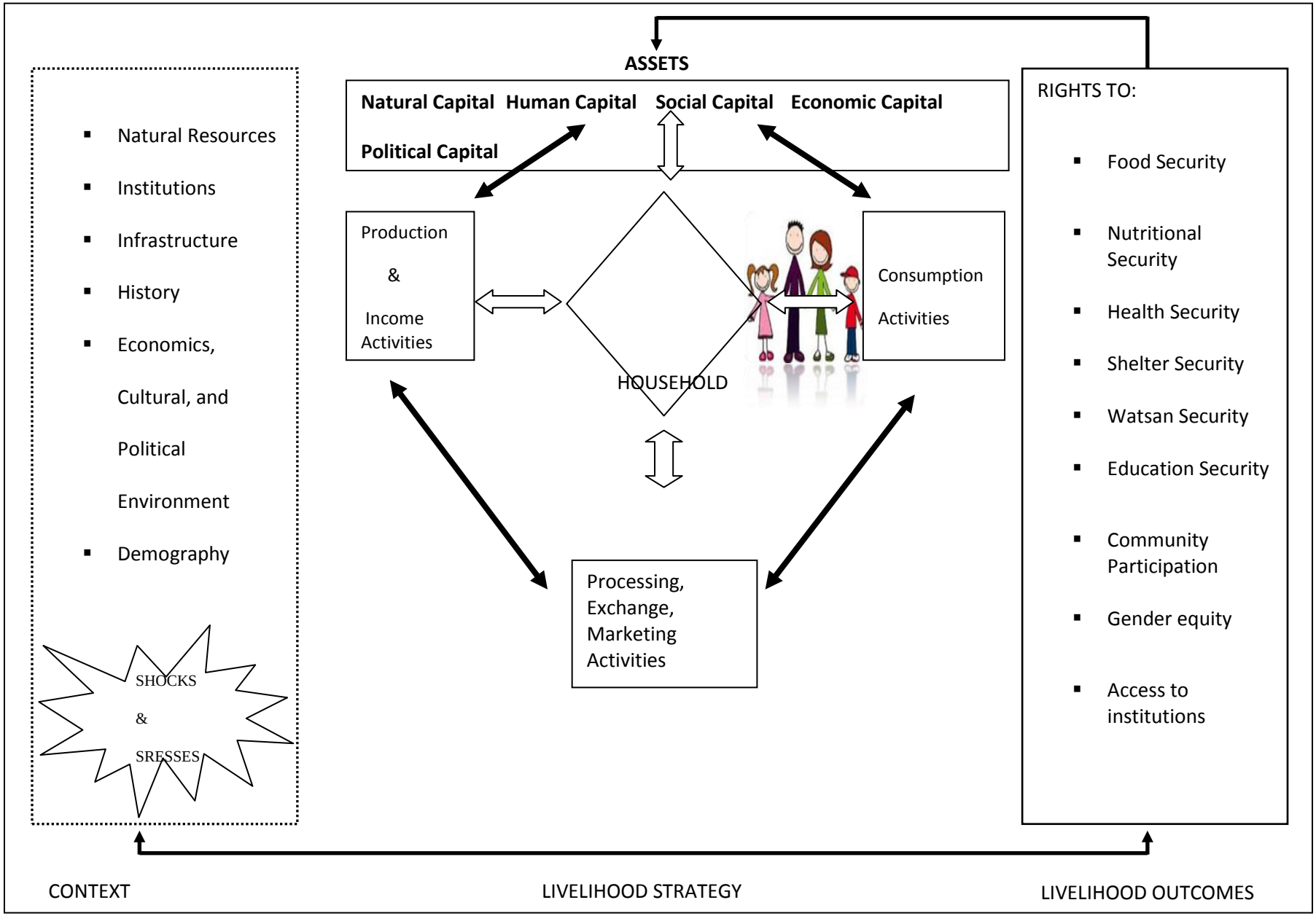

Figure 1: HOUSE HOLD LIVELIOOD SECURITY (LMU, 2004)

In addition, fifteen (15) Key Informant Interviews (KIIs) were conducted with key stakeholders such as traditional rulers, Town Union leaders and enlightened or educated persons. The fifteen KIIs for the study area translate to three KIIs in each of the selected LGAs. The KIIs was used to capture some information which the questionnaire survey was not able to capture such as the historical development of the area, and the culture of the people that may affect their vulnerability to, and response to floods. Finally, direct personal observations, photographs and published literature were utilized in this study.

In data analyses, percentages were used to highlight the nature of floods in the study area. In estimating the impact of flooding on livelihoods, the assets of households derived from questionnaire data were analyzed with the aid of "Asset Indices" which were calculated from variables of household ownership of assets. Asset Indices according to Filmer and Scott (2008) are of the basic form:

$$A_i = b_{1i}.a_{1i} + b_2.a_{2i} + \ldots\ldots\ldots\ldots + b_k.a_{ki} \quad (1)$$

where A_i is the asset index of household "i", a_{1i}, a_{2i},……,a_{ki}, are k indicators of asset ownership variables (such as radio, television, corrugated iron roofs), and b_1, b_2,……, b_k, are weights to be used in aggregating the asset indicators into an index (Filmer and Scott, 2008). In calculating an asset index, principal component analysis (PCA) was used to determine the weights as a factor score for each asset variable, and to also achieve a linear combination of the variables in which the maximum variance was extracted from the asset variables. The first component to be extracted from each asset variable is known as the linear index or efficient component of the asset variable because it has the largest amount of information about the variable. Consequently, the scoring factors of the first principal components (efficient components) will used for constructing the asset indices using the asset indices formula by Filmer and Scott (2008). The variables used in the asset indices computation are shown in table 1.

Table1: Variables used in the computation of livelihoods assets indices

Indices	Variables used to compute the indices
Education	❖ The highest level of formal education of the head of household. ❖ The proportion of household members in primary, secondary and tertiary schools. ❖ The proportion of household members that have completed primary, secondary and tertiary education.
Water	❖ The primary source of domestic water supply for the households. ❖ The secondary sources of domestic water supply for the households.
Economic	❖ The ICT equipment owned by the households. ❖ The transportation facilities owned by the households ❖ The house equipment eg blender, fan, etc owned by the households.
Food	❖ The number of square meals consumed by the households per day. ❖ The percentage of income spent on food by households.
Shelter	❖ The types of house owned or lived in by households ❖ Nature of material used in building the house.
Access to Institution	❖ The institutions the households have access to, or benefit from. Eg, Government, NGOs ❖ Membership of community associations by household members.
Financial	❖ The level of income of the household in a typical month. ❖ The proportion of income saved by households in a typical month.
Aggregate	❖ Sum of all the asset indices e.g education, water, and economic.

Furthermore, we calculated quintiles of these livelihood indices in order to highlight and compare the proportion of MHHs and FHHs in each quintile before and after the floods. In addition, binary logistic regression models were used to estimate the predictors of livelihoods security for both MHHs and FHHs in the study area after the floods. The dependent variable is the dummy of aggregate livelihood index where scores less than the mean index score were assigned the value of 0, and index scores above the mean index score assigned the values of 1. The independent variables used are demographic variables such as age and sex, as well as the duration of migration by the households. In all, there are four regression models, two for the MHHs, and two for the FHHs. The models for each of the MHHs and FHHs are;

- Model 1: Demographic characteristics alone
- Model 2: Demographic characteristics + migration duration (the period of time the household spent outside their communities when they migrated because of the floods)

Results and discussion

Characteristics of the study population

Majority of the heads of households interviewed in this study are aged 21-59 years old comprising of 73% and 65% of the MHHs and FHHs respectively. Also 62% and 61% of the heads of the MHHs and FHHs respectively are married while 4% of heads of MHHs and FHHs are widowed (Table 2). About half of both the MHHs and FHHs earn an amount of less than or equal N30,000 naira per month as against 29% of MHHs and 25% of FHHs that earn more than N90,000 naira per month. More than half of the heads of the households in the study area have either secondary or university education while more than 80% of the households migrated and spent at least 3 months outside their community due to the 2012 floods.

Table 2: Characteristics of the study population (%)

Demographics	**Males**	**Females**
Age		
Less tha 20 years	11.18	19.59
21-59 years	73.03	64.86
60+ years	15.79	15.54
Marital Status		
Never married	18.42	21.62
Married	61.84	60.81
Widowed	3.95	3.38
Sep/Div.	15.79	14.19
Occupation		
Farmer	44.08	44.60
Civil servant	30.92	31.08
Business/technician	25.00	24.32
Income (Naira)		
Less than 11,000	32.00	32.43
11000-30000	18.67	20.27

31000-50000	8.67	6.08
51000-70000	9.33	8.78
71000-90000	2.00	7.43
More than 90000	29.33	25.00
Education		
No formal education	9.21	12.84
Primary education	13.82	15.54
Secondary education	32.89	29.05
Vocational/technical	6.58	12.16
University/Polytechnic	37.50	30.41
Migration duration		
Less than 3 months	14.19	9.29
3-6 months	36.49	44.29
7-12 months	49.32	46.43

The nature of flood in the Study Area

At least 96 % of the sampled MHHs and FHHs households and of all the households in each of the study LGAs were affected by the 2012 flood disaster (Table 3). However, the proportion of those affected increases from the relatively hinterland and relatively higher elevation regions of Ogbaru and Ayamelum to the relatively very lower flood plains of Onitsha South, Anambra East and Anambra West LGAs. The data on the frequency of floods indicates that flood devastations in the study area are epochal with 1969 and 1988 being mentioned by the our key informants during the field work as the years in which flood devastation were significantly more pronounced than in other years. The severity of the damages caused by the floods was more on FHHs (61.49%) compared to 57.24% of MHHs. In addition, majority of the households, with the exception of Onitsha South (33%) and Anambra East (50%) are of the view that the 2012 floods caused very severe degree of damage. This lower figure of the severity of the floods in these LGAs was attributed to the fact that these LGAs are closer to Onitsha urban area (one of the major commercial centers in Nigeria), are easily accessible by road and information on evacuation process, thereby ensuring early evacuation of households away from the floods.

Table 3: Nature of flood on the households, and across the LGAs in the Study Area .

Flood characteristics	Male	Female		Ogbaru	Onitsha S.	Anambra E.	Ayamelum	Anambra W.
Affected by 2012 floods								
Yes	98.68	97.30		96.70	100	100	96.7	100
No	1.32	2.70		3.30	0.00	0.00	3.30	0.00
Frequency of floods								
Occasionally	7.89	6.76		0.00	3.30	30.00	0.00	0.00
Yearly	14.47	16.21		36.00	13.00	40.00	3.30	6.00
After long spells of safety	77.63	77.03		64.00	83.70	30.00	96.7.0	94.00
Degree of 2012 flood damage								
Very severe	57.24	61.49		81.70	33.30	50.00	96.70	86.00
Severe	12.5	7.43		18.30	6.70	16.70	1.70	7.00
Moderate	13.16	16.22		0.00	20.00	33.30	1.70	3.00
Mild	17.11	14.86		0.00	40.00	0.00	0.00	4.00

Assessment of the impact of the 2012 on livelihoods of households

Generally, the means of the livelihood indicators for both the MHHs and the FHHs decreased after the floods with the exception of the education index (that remained constant), and the water index (which increased after the floods). The education index remained constant because during the floods, schools were closed in the study area and no learning took place. On the other hand, the increase in the water index after the floods was due to abundance of water that emanted from heavy rains and flood waters in the study area during and after the floods. In addition, while the aggregate index for the MHHs decreased from 0.4600 before the floods to 0.1000 after the floods, the aggregate index for the FHHs also decreased from 0.5068 before the 2012 floods to 0.1081 after the floods (Table 4). Comparatively, the livelihood outcomes of MHHs were better than that of the FHHs before and after the floods.

Table 4: Mean and standard deviation of asset indices for MHHs and FHHs

Asset Indices	Before Flood			After Flood	
	Mean	***Std. Dev***		***Mean***	***Std. Dev***
Male-headed HHs					
Education	0.3996	0.3443		0.3996	0.3443
Financial	1.4750	0.5401		1.4250	0.5478
Economic	0.9013	0.6660		0.7089	0.6583
Access to Institutions	0.0526	0.1173		0.0394	0.1081
Shelter	0.0199	0.0678		0.0088	0.0462
Water	0.0675	0.1111		0.0708	0.1128
Food	0.0708	0.1128		0.0288	0.0799
Aggregate	**0.4600**	**0.5001**		**0.1000**	**0.3010**
Female-headed HHs					
Education	0.4780	0.4773		0.478	0.4773
Financial	1.4658	0.5241		1.394	0.5448
Economic	0.9324	0.6679		0.7095	0.6382
Access to Institutions	0.054	0.1186		0.0372	0.0983
Shelter	0.0195	0.0672		0.0067	0.0404
Water	0.0653	0.1099		0.0731	0.1138
Food	0.0731	0.1138		0.0179	0.0645
Aggregate	**0.5068**	**0.5017**		**0.1081**	**0.3116**

The quintiles of the livelihood indices calculated for the MHHs and FHHs before and after the floods are shown in Table 5. The results of the quintiles will also aid intervention measures to be targeted at the appropriate livelihoods indices for both MHHs and FHHs which will help them to recover the quality of life of the households prior to the floods, and possibly improve on them too. On aggregate levels, the proportion of MHHs in the first (poorest) quintile before the floods was 54% and after the floods, this number increased to 90% , even as 46% of the MHHs who were in the third quintile reduced to only 10% in the fourth quintile after the floods. Also, the proportion of FHHs in the first quintile before the floods was 49.32% and this number increased to 89.19% after the floods even as the proportion of FHHs in the fourth quintile decreased from 50.68% before the flood to 10.81% after the flood.

Table 5: Livelihood asset indices quintiles of households (%)

MHHs		***Before***	***Floods***			***After***	***Floods***	
Indices	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**
Education	25.66	26.97	38.16	9.21	25.66	26.97	38.16	9.21
Financial	27.33	58.00	0.00	14.67	30	57.33	0.00	12.67
Economic	27.63	26.32	27.63	18.42	23.68	31.58	19.74	25.00
Access	81.58	0.00	0.00	18.42	86.84	0.00	0.00	13.16
Housing	92.04	0.00	0.00	7.96	96.46	0.00	0.00	3.54
Water	73.01	0.00	26.99	0.00	71.68	0.00	28.32	0.00
Food	71.68	0.00	28.32	0.00	88.50	0.00	0.00	11.50
Aggregate	54.00	0.00	46.00	0.00	90.00	0.00	0.00	10.00
FHHs								
Indices	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**
Education	27.70	24.32	31.76	16.22	27.70	24.32	31.76	16.22
Financial	27.40	58.90	0.00	13.70	29.05	56.76	0.00	14.19
Economic	25.00	31.76	21.62	21.62	26.35	29.05	25.68	18.92
Access	81.08	0.00	0.00	18.92	86.49	0.00	0.00	13.51
Housing	92.19	0.00	0.00	7.81	97.32	0.00	0.00	2.68
Water	73.88	0.00	26.12	0.00	70.76	0.00	29.24	0.00
Food	70.76	0.00	29.24	0.00	92.86	0.00	0.00	7.14
Aggregate	49.32	0.00	0.00	50.68	89.19	0.00	0.00	10.81

For both the MHHs and FHHs, the livelihood indicators that were worst affected by the floods were access to institutions, food, and housing indicators. Explaining the reason for the high level of housing insecurity after the floods, one of the key informants noted that;

> *"During the floods, most of the households lost their buildings as most were not even constructed with cement blocks prior to the floods. In order to survive, most households have to borrow food and money. Coupled with the fact that most people still fear a repetition of the floods, the issue using whatever meager resources left in the households to re-erect durable houses was never made a priority*"

With regards to food insecurity after the floods, another informant was of the view that;

> *"Because of fear of the reoccurrence of the floods, many households did not cultivate up to 30% of their farm lands so as to cut loss and use all the left over crops to cater for the immediate food need of the household. Moreover, the food distributed by NEMA got exhausted after maybe a month or two depending on the quantity each household got"*

Since the results of this study have shown that the livelihood security of both MHHs and FHHs were adversely affected by the flood-induced migration in the study area, there arises the need to identify the major predictors of livelihood security/insecurity using binary logistic models.

What then are the predictors of livelihood security after the floods?

The synopsis of the regression results in models 1 (demographic predictors only) and 2 (demographic and migration duration predictors) show that age, occupation, income, migration duration and education are the most significant predictors of livelihood security for the MHHs while income was the major predictor of livelihhood security for the FHHs after the flood (Table 6). In the models for the MHHs, civil servants and businessmen/ technician are for instance, less likely to have secured livelihoods after the floods than a farmer in the study area. However, being married in Model 1 means that a married MHH is 2.86 times more likely to have secured livelihood than a never married MHH while in model 2, a married MHH is 1.13 times more likely to have secured livelihood than the never married MHH. Other characteristics that significantly increase the probability of a MHH having a secured livelihood in Model 1 include being earning income of between N31,000-50,000 (OR= 3.179; $p<0.01$); N51,000-70,000 (OR=4.775; $P<0.000$); and N71,000-90,000 (OR=5.033; $p<0.01$). In model 2 for the MHHs, the significant characteristics that increase the chances of a households having secured livelihood are the income ranges of N31,000 and above. In both models 1 and 2 of the MHHs, increases in age and educational attainment are associated with a decrease in the probability of a household having secured livelihood. The exception being that having primary education is 3.61 times and 1.228 times more likely to make a MHH have secured livelihood than a MHH without any formal education in models 1 and 2 respectively.

On the other hand, being married in model 2 is 7.343 times more likely to make a FHH have secured livelihood that a never married household. Also, being engaged in business or being a technician will make a FHH in model 2 to have 7.888 times the chances of having secure livelihood that a farming FHH in the study area. Also, as noted in the MHHs, increases in ages, and in educational attainment (except primary education) result in the FHHs being less likely to have secured livelihoods after the flood. However, the only significant predictors of livelihood outcomes for the FHHs are the income ranges of N51,000 and above. The results for the FHHs show that engaging in business or being a technician helps the households survive the floods damage since agricultural production was badly affected by the flood.

Conclusion

This study sought to highlight the nature of floods, compare the livelihood security of MHHs and FHHs, and estimate the predictors of livelihood security/ insecurity in the study area. The findings of the study show that majority of the heads of both the MHHs and FHHs earn an amount of less than or equal N30,000 naira per month, and also have either secondary or university education while more than 80% of the households migrated because of the 2012 floods and spent at least 3 months outside their community. While at least 96 % of the sampled MHHs and FHHs households and of all the households in each of the study LGAs were affected by the 2012 flood disaster, the severity of the damages caused by the floods was more on communities closer to river banks, and on FHHs (61.49%) compared to 57.24% of MHHs. This study also found out that the mean values of the livelihood indicators for both the MHHs and the FHHs decreased after the floods with the exception of the education index (that remained constant), and the water index (which increased after the floods). On comparative and aggregate bases however, the livelihood outcomes of MHHs were better than that of the FHHs before and after the floods.

Table 6: Predictors of livelihood security after the 2012 flood-induced migration

	MHHs	*MHHs*		*FHHs*	*FHHs*
Regression variables	**Model 1**	**Model 2**		**Model 1**	**Model 2**
Age *(continuous)*	1.000	1.000		1.000	1.000
More than 20 years	0.158	0.053*		0.910	0.423
Marital Status					
Never married	1.000	1.000		1.000	1.000
Married	2.863	1.130		2.049	7.343
Widowed	3.337	3.129		0.215	2.234
Occupation					
Farmer	1.000	1.000		1.000	1.000
Civil servant	0.058**	0.015*		1.237	1.351
Business/technician	0.427	0.602		4.490	7.888
Income (Naira)					
Less than 11,000	1.000	1.000		1.000	1.000
11000-30000	2.590	2.290		3.350	4.059
31000-50000	3.179*	3.133**		3.742*	5.469*
51000-70000	4.775***	4.870**		4.562**	5.786**
71000-90000	5.033*	5.153**		4.959*	6.279**
More than 90000	5.196***	5.637***		5.155***	6.968***
Education					
No formal education	1.000	1.000		1.000	1.000
Primary education	3.611	1.228		1.255	1.709
Secondary education	0.294	0.076		0.177	0.160
Vocational/technical	0.084*	0.010*		0.842	0.262
University/Polytechnic	0.292	0.045*		0.169	0.098
Migration duration					
Less than 3 months	1.000	1.000		1.000	1.000
3-6 months		1.874			4.038
7-12 months		0.122*			0.338

* $p<0.05$; ** $p<0.001$; **** $p<0.000$

This is because the proportion of MHHs in the first (poorest) quintile before the floods was 54% and after the floods, this number increased to 90%. On the other hand, the proportion of FHHs in the first quintile before and after the floods was 49.32% and 89.19% respectively. For both the MHHs and FHHs, the livelihood indicators that were worst affected by the floods were access to institutions, housing, and food indicators. Furthermore, the results of the regression models identified age, occupation, income, migration duration and education as the most significant predictors of secured livelihood for the MHHs while income was the major predictor of secured livelihhood for the FHHs in the event of flood-induced migration.

Based on the above findings, it is suggested that dredging of rivers especially the Niger river should be carried out regulary as this will help in reducing the tendency of river overflow and floods. There is also an urgent need to engage heads of households, especially the FHHs in skill acquisition programmes that can always help them in cushioning the effects of floods on their livelihood by serving as safety nets and source of extra income in the event of further destructive floods.

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