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FLOOD DISASTER RISK RESPONSE OF URBAN HOUSEHOLDS IN DEVELOPING COUNTRIES: CASE STUDY OF MAKURDI TOWN, NIGERIA

Daniel Peverga DAM[1]*, Emmanuel Msughter ADAMGBE[2]
*[1]*Benue State University, Makurdi, Nigeria*
[2]*Akeran Orshi College of Agriculture, Yandev, Nigeria; Email: adamgbeem@gmail.com*

Corresponding Author:-
Email: dampeverga@yahoo.com

Abstract:-
Flood is one of the natural disasters that is affecting urban households world over however, countries' response to floods disaster risk vary in methods and magnitudes both at national or household levels. This study assesses flood disaster risk response of urban households in Makurdi town-Nigeria, with the aim of ascertaining their level of preparedness and responses before, during and after flood disaster events. Data was collected from 295 household heads of flood prone areas of the town using questionnaire and analyzed using descriptive statistics. The result of the study reveals that 83% of the respondents were aware of the annual flood occurrence in their area and, 56% had received prior information of the 2012 flood occurrence through different means however, only 35% of the respondents took the early warning information very seriously. The level of preparedness taken by the respondents before the flood shows that 25% constructed embankments/drainage around their houses, 23% relocated to safer places, 12% raised the foundation of their houses among others. The study also reveals that during the actual flood disaster events, 56% of the respondents struggled to evacuate household items only, 19% focused on evacuating their family members while 2% waited for the government to rescue them. The study shows that 39% of the flood victims took refuge at the houses of their family relations. Based on the findings, the study recommends for more sensitization of the public on flood disaster risk and greater involvement by NGOs and government in disaster management in the study area.

Keywords: - *Flood, Disaster, Risk, Response, Households, Developing countries, Makurdi town.*

1. INTRODUCTION

Flood disasters are the world's most frequently occurring natural disasters in recent times. Flooding is the flow of water exceeding the capacity of the channel and causing an overflow of water that rises and spreads over land thereby causinsg damages to lives and properties (Howard, 1978, Tingasanchali, 2011). Flooding is caused by both natural and anthropogenic activities. Natural causes include low-lying topography, high tides, climate change, soil characteristics and storm surge, as well as heavy rainfall, highly accelerated snowmelt, severe winds over water, unusual high tides, and tsunamis. Anthropogenic causes include; urban development, dumping of solid waste into drainages, poor drainage systems and failure of hard flood control measures like dams. Floods and their associated consequences thus remain serious threats to sustainable development (FMEnv, 2005).Flood affects both rural and urban areas but the impact is more severe in urban areas because of its clustered population and economic activities.

Urban floods are classified on the basis of their causes; thus we have urban floods due to local heavy rainfall, river overbank flow and flood due to high tides or storm surges. Floods due to local heavy rainfall are enhanced by inadequateor poor drainages; while floods due to river overbank flow occur when water level rises above river banks.Flood disasters have become an inherent problem in most urban areas hence many cities are located in flood plainsand have continue to experience physical development with spatial dimensions which reduces storage and blocks most of the existing network of natural channels. For instance, increased amounts of impervious surfaces that are characteristic of urban areas mean reduced infiltration and vegetation cover that can absorb rainfall. These factor increases run off which can quickly flood an area that is not properly drained. In addition, construction patterns in cities often result in clearing of large parcels of land for development. This aids degradation of natural protection and so absorption of precipitation is reduced. More so, urban areas that are low-lying or located close to water bodies are usually more vulnerable as spatial development on the usually cheaper lands of the floodplains block natural drainage courses. This obstruction causes a buildup of water with increased precipitation which then results in flooding. Also, poor waste collection, which is typical of many cities in developing countries, means huge waste dumps that often clog the mouths of drains and increase the severity of flooding (Oriola, 2011; Tingsanchali, 2011; Mngutyo and Ogwuche, 2013).Noji and Lee (2005) are of the opinion that flood disaster takes its toll on properties, the vulnerable and underprivileged. Flood disasters derail socio-economic progress and intensify poverty by making the poor even poorer. Thus, the marked difference as regards vulnerability to flood disaster arises usually from wide gaps in access to resources and capacity for disaster risk reduction.

Flood impact is one of the most significant disasters in the world. More than half of global flood damages occur in developing countries of Asia, and Africa. For instance, in 2007, parts of Africa experienced one of the worst and severe flooding events that affected over 20 countries with Uganda, Ethiopia, Sudan, Burkina Faso, Togo,Mali and Niger being the worst affected; countries including Republic of South Africa, Namibia, Botswana, Mozambique, Zimbabwe, Zambia and Malawi were also affected in 2010&2011 flood events. The 2012 floods occasioned by heavy downpour affected people in 13 countries in West and Central Africa including Nigeria (BBC News, 2007; British Red Cross, 2008; United Nations Office for the Coordination of Humanitarian Affairs, 2012; Egbinola, Olaniran and Amanambu, 2015).

In Nigeria, many marked flood disasters have occurred in her urban areas. Many cities including
Lokoja, Makurdi, Onitsha, Asaba, Port-harcourt, Ibadan, Lagos, Warri have suffered from incessant flooding with the 2012 occurrence heightening the need for flood disaster risk response assessment in Makurdi town, Nigeria. In most of the cases, the devastation caused by urban floods especially on households is usually a reflection of their lack of preparedness. According to IFRC (2007), non-preparedness for flood disaster prevention in developing countries make them experience greatly the impacts of flood disasters. In Makurdi town, of Benue state, flood events have become an annual occurring phenomenon particularly during and after heavy rainfall. The situation has worsen in recent times due to the human-induced factors such as indiscriminate dumping of refuse into the few existing drainage channels, construction of structures across the natural drainage channels as well as sand filling. Although flooding is an annual event in Makurdi town particularly in areas such as Gboko road, Kanshio, Idye, Demekpe/wadata, Logo II and Achusa, many people still live in these areas even during the rainy seasons. While the effects of flooding on the residents of Makurdi town is known (Mngutyo and Ogwuche, 2013), the households' response to flood disaster in the town has not been interrogated. The question is how do households' of Makurdi town respond to flood disaster risk?

1.1 Conceptual Framework

Flooding cannot be completely prevented but the vulnerability associated with flood disaster can be mitigated by the level of preparedness. Preparedness action is closely related to how individuals perceive and act on risk information (Tierney, Lindell and Perry, 2001). Preparedness measures have the big advantage of being able to address root causes and dynamic pressures instead of symptoms in a system, which is more stable than after a disaster (Ezemonye and Emeribe, 2014). Flood disaster preparedness ensures that a set of appropriate arrangements are put in place in advance for an effective response to flood. This is an important phase of flood disaster management which is almost being neglected in developing countries. There is a tendency to rely more on what the government can do while neglecting self-help options. Thus, measures that reduce the vulnerability of households to flood disaster are advocated for in view of the fact that the cost implication of recovery and rehabilitation measures are enormous compared to preventive strategies such as preparedness action.

Flood disaster risk response is aimed at reducing the effects of flood event on residents of the affected communities or areas. It includes measures taken before, during and after the flood events. According to Mitchell (1999) as cited by Oludare, Bashir and Olusegun (2012), the main responses that people can make in the face of any hazard include: dealing with the causes of the hazard, modifying the hazard to minimize loses and bearing the losses. According to Kolawole, Olayemi and Ajayi (2011) human response to flood hazard are manifested in the various adjustment measures including relief and rehabilitation, insurance, warning systems, technological aids and land use management.

The need to assess disaster risk response of affected communities with the view to determining the best practices/responses in each disaster event is more urgent now than ever since in the coming decades climate change is expected to exacerbate the risk of flood disaster not only furore frequent and intense flood events but also through greater vulnerability to the existing hazards (ISDR, 2002).

STUDY AREA AND METHODOLOGY

Makurdi town is one of the cities in the developing countries. It is the capital of Benue state of Nigeria. It is located between latitude $7^0$44'N and $7^0$55'N and longitude $8^0$20'E and $8^0$40'E (fig. 1). The area is about 16km^2 radius. Makurdi is situated along the coast of the River Benue. The climatic condition in Makurdi is influenced by two air masses: the warm, moist south westerly air mass, and the warm, dry northeasterly air mass. The southwesterly airmass is a rain-bearing wind that brings about rainfall from the months of May to October. The dry northeasterly airmass blows over the region from November to April, thereby bringing about seasonal dryness. The annual rainfall in Makurdi is between 1,200-1,500mm (Adamgbe and Ujoh, 2012). Temperature in Makurdi is however, generally high throughout the year, with February and March as the hottest months. Temperature in Makurdi varies from a daily of 40°C and a maximum of 22.5°C (Ologunorisa and Tersoo, 2006). Makurdi town, like most other cities in the lower Benue valley is drained by the Benue River and its tributaries. Other minor rivers that drain the Makurdi town, and in turn empty their waters into River Benue includes: Rivers Idye, Genabe, Urudu, Kpege and Kereke. Due to the general low relief of Makurdi, sizeable portions of the area is waterlogged and flooded during heavy rainstorm (FMWRRD, 1998).

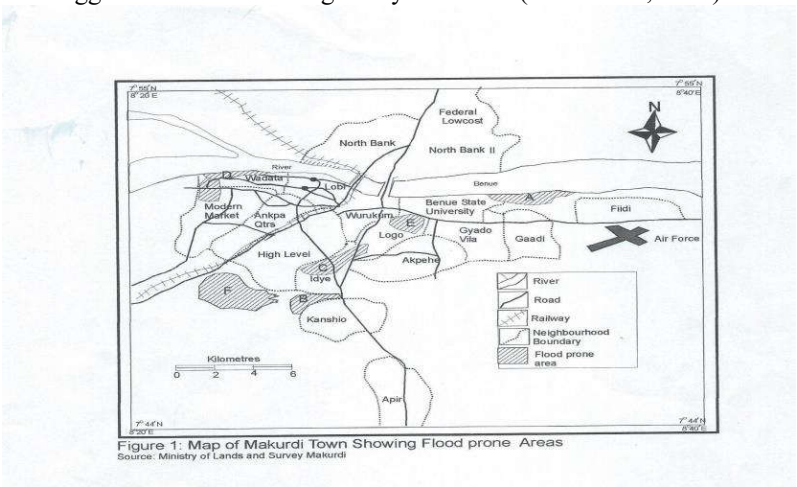

Figure 1: Map of Makurdi Town Showing Flood prone Areas
Source: Ministry of Lands and Survey Makurdi

The data used in this study was collected from 295 head of households of flood prone areas of Makurdi town. Six flood prone areas in Makurdi town were identified and labeled as follows: A= Gboko road, B=Kanshio, C=Idye, D=Wadata and Demekpe, E=Logo II and F=Achusa; from where questionnaires were administered using simple random sampling technique. The specific variables upon which data was collected include the demographic characteristics of respondents, their level of preparedness and responses before and during flood disaster in Makurdi town. The data collected was analyzed using descriptive statistics such sum and percentages.

3. RESULTS AND DISCUSSIONS

The study analyses the demographic characteristics of the sampled population focusing specifically on the following variables, age, sex, literacy level and household size. The result is presented in table 1. The information in table 1 reveals that 64% of the sampled population was male while 36% constituted female. The dominant age group was 26 – 35 years constituting 42% while those below 26years and those above 35 years were 33% and 25% respectively. This implies that they were all adults who did not only understand flood disaster but also experienced it. The literacy level was found tobe high since 71% were graduates of tertiary institutions, 18% had secondary school education. 6% has primary school certificate while only 5% were illiterates. This implies that majority of the respondents were educated enough to be able to understand flood disaster early warnings and take necessary precautions to avoid or reduce its risk. The household sizes of the respondents ranges from 2 (31%), 3-4 (24%), 5-6 (25%) and 7 above were 20%.

TABLE 1: Socio-demographic Characteristics of the Respondents in the Study Area

Variables measured	Frequency						Total	Percentage
	A	B	C	D	E	F		(%)
Sex Male	55	28	32	21	12	23	188	64%
Female	28	16	12	18	4	20	107	36%
Total	83	44	44	43	38	43	295	100%
Age (Years)								
25 Below	35	10	7	14	22	9	97	33%
26-35	36	19	16	21	12	19	123	42%
36 and above	12	15	21	8	4	15	75	25%
Total	83	44	44	43	38	43	295	100%
Educational Attainment								
No formal education	4	2	7	0	0	2	15	5%
Primary education	2	5	6	5	2	0	19	6%
Secondary education	9	5	12	21	4	2	53	18%%
Tertiary education	68	32	19	17	31	39	208	71%
Total	83	44	44	43	38	43	295	100%
Household Size 2 below	26	11	8	21	22	4	92	31%
3-4	19	15	13	7	7	10	71	24%
5-6	23	7	14	7	8	13	72	25%
7 and above	15	11	9	8	1	16	60	20%
Total	83	44	44	43	38	43	295	100%

Source: Authors' Field Work 2014

The analysis on the level of urban households' preparedness for flood disaster in the study area is presented in table 2.

TABLE 2: Level of Preparedness of Residents for Flood Disaster in the Study Area

Variables measured	Frequency						Total	Percentage
	A	B	C	D	E	F		(%)
Awareness of flood occurrence in the area								
Yes	71	43	36	26	33	35	244	83%
No	12	1	8	17	5	8	51	17%
Total	83	44	44	43	38	43	295	100%
Received prior information before the flood occurrence								
Yes	57	35	11	8	18	35	164	56%
No	26	9	33	35	20	8	131	44%
Total	83	44	44	43	38	43	295	100%
Channels of information on impending flood								
Radio	51	19	16	11	35	14	146	49%
Newspaper	5	5	0	6	0	4	20	7%
Television	5	6	0	6	1	9	27	9%
GSM	5	4	0	3	0	9	21	7%
Religious Centres	4	6	0	6	2	5	23	8%
Town criers	5	0	16	0	0	0	21	7%
Others	8	4	12	11	0	2	37	13%
Total	83	44	44	43	38	43	295	100%
Response to impending flood								
Ignored it	17	6	28	19	10	10	90	31%
Believed will not be affected	31	16	6	19	13	16	101	34%
Took the information serious	35	22	10	5	15	17	104	35%
Total	83	44	44	43	38	43	295	100%
Preparedness against the flood								
Relocated to safer place	34	9	5	0	16	4	68	23%
Raised foundation of building	5	6	2	12	6	5	36	12%
Insured the house	9	4	2	11	1	6	33	11%
Evacuated valuable items	12	8	0	3	1	7	31	11%
Saved money for flood emergency	2	2	1	1	0	12	18	6%
Constructed drainage channel	15	12	20	9	14	3	73	25%
Others	6	3	14	7	0	6	36	12%
Total	83	44	44	43	38	43	295	100%

Source: Authors' Field Work 2014

The study reveals the different levels of preparedness byhouseholds towards flood disaster in the study area. It discovered that 83% of the respondents were aware that their area is prone or liable to flood occurrence whereas only 17% was not

aware. The study also discovered that 56% of the respondents had prior early warning information of the 2012 flood disaster while 44% claimed they received no warning information of the flood occurrence in their area. The channels through which they got the information were through radio (49%), Television (9%), Newspaper (7%), GSM (7%), religious bodies (8%), Town cryer (7%) and other channels accounted for 13%. This implies that indeed, early warning information on flood disaster was given in the study area using different channels. The study also sought to know how the people treated the information (early warning) received. It was discovered based on the field work that 31% of the respondents completely ignored the information, 34% never took the information very serious based on their believed that flooding will not reach/affect their houses.This shows that majority (65%) of the respondents did not believed or took the flood early warning message serious. Ezemonye; Emeribe (2014) while studying households Preparedness for flood disaster in Benin City, reports that 95% of the respondents do not prepare for flood due to their religious beliefs. They perceive flooding as a natural event that is "an act of God" and preparing for it amounts to not having faith that their creator can protect them nor avert disaster occurrence. However, 35% took the information very serious. The measures planned towards avoiding or reducing flood disaster risk in the study area included the following ways: relocated to safer places (23%), raised the foundation of their houses (12%), insured their houses against flood disaster (11%), evacuated valuable household items (11%), save money for flood disaster management (6%), construct embankment/drainage channel around their houses (25%) while other ways accounted for 12%. From the result, it shows that although majority of the respondents never believed the early warning, they did actually planned in one way or the other towards flood disaster risk reduction or prevention.

The study also sought to know the responses of households during the actual flood events as water entered their residence and the analysis is presented in table 3.

TABLE3: Residents' Response during the Flood in the Study Area

Variables measured	Frequency						Total	Percentage
	A	B	C	D	E	F		(%)
Response during the flood								
Hanged Materials on ceiling	5	0	2	0	0	6	13	4%
Evacuated materials only	53	20	37	9	32	15	166	56%
Evacuated people only	12	20	4	8	1	10	55	19%
Evacuated pets only	1	1	0	0	0	2	4	1%
Evacuated food items	1	0	1	9	5	5	21	7%
Waited for rescue from Government	1	1	0	1	0	4	7	2%
Others	10	2	0	16	0	1	29	10%
Total	83	44	44	43	38	43	295	100%
Means of evacuation during flood								
Personal efforts	47	20	41	38	21	27	194	66%
Help from relations	23	15	2	5	5	12	62	21%
Government agencies	3	2	0	0	0	0	5	2%
NGOs	1	5	0	0	0	0	6	2%
Community efforts	4	2	1	0	12	3	22	7%
Others	5	0	0	0	0	1	6	2%
Total	83	44	44	43	38	43	295	100%
Place of Refuge								
Church/Mosque	4	15	12	9	0	2	42	14%
School Premises	14	2	2	3	3	5	29	10%
Relative's residence	33	5	20	26	15	15	114	39%
Rented house/apartment	5	8	4	2	12	14	45	15%
Friend's residence	18	13	2	0	8	7	48	16%
Others	9	1	4	3	0	0	17	6%
Total	83	44	44	43	38	43	295	100%

Source: Authors' Field Work 2014

The study reveals that people responded differently based on their priorities. 56% of the respondents struggled to evacuate household items, 19% were concerned with evacuating their household members (people only), 7% tried to evacuate food items, 4% hanged household items on their ceiling, 2% were waiting for government to rescue them whereas 1% of the respondents were concerned with rescuing their pet animals. Other responses not specified accounted for 10%. The study also discovered that the rescue/evacuation operation during the actual flood events was dominated by the victims' personal efforts accounting for 66%, help from relatives accounted for 21%, community efforts (7%) government (2%), Non-Governmental

Organizations (NGOs) (2%) as well as other sources accounted for 2%. This implies that during flood disaster, the most immediate reliable and effective rescue mission is personal and community efforts hence government came last when damage had already occurred. The study also sought to know where the victims of the flood disaster did take refuge. The field study reveals that 39% 0f the respondents took refuge in the relatives' residence, 16% in their friends/ colleagues' houses, 15% rented new apartments, 14% stayed in religious centres whereas 10% of the victims moved into the structures of public schools and 6% took refuge in other places.

The study analysis on damages incurred during the flood disaster is presented in table 4. The study reveals that 83% of respondents incurred losses during the flood disaster ranging from damage to household items (48%), damage to buildings (20%), loss of livestock (15%), Farmlands (15%) and death of family members accounted for 2%.

TABLE 4: Damages incurred during the Flood in the Study Area

Variables measured	Frequency						Total	Percentage
	A	B	C	D	E	F		(%)
Caused Damages								
Yes	67	42	44	41	36	42	272	83%
No	16	2	0	2	2	1	23	17%
Total	83	44	44	43	38	43	295	100%
Nature of damages								
Farmland	9	12	0	3	11	9	44	15%
Buildings	26	7	9	4	3	11	60	20%
Household items	45	13	24	28	17	14	141	48%
Death of relations	1	2	0	0	0	4	7	2%
Loss of livestock	2	10	11	8	7	5	43	15%
Total	83	44	44	43	38	43	295	100%

Source: Authors' Field Work 2014

A study in India, by IFRC (2013) reports that flood disaster has caused massive damages to houses, communication facilities, power, and transportation lines, paralyzing human activities and worsening the evacuation process. Egbinola, Olaniran and Amanambu (2015) while studying flood management in Ibadan revealed multiple impacts of flooding in the city to include damage of houses, destruction of contents of buildings, loss of lives and means of livelihood such as shops and workshops, poultry farms. This shows that flood has negative impacts on households and their means of livelihoods as well as their physical wellbeing

4. CONCLUSION AND RECOMMENDATIONS

From the study, it is clear that most of the households of flood prone areas in Makurdi town are aware of the occurrence of flooding in the area but still settle in it without adequate level of preparedness to avert flood disaster even when early warnings are given. It is based on the findings that the study recommends for more sensitization and training of the public on disaster prevention and management. This will help the people to prepare and respond to disasters more effectively.There is the need to improve communication network to enhance information dissemination on flood disaster issues. The study also recommends that the residents of flood prone areas should form community based volunteers to be trained in effective disaster management to reduce community vulnerability.The stakeholders (the government through National Emergency Management Agency 'NEMA", State Emergency Management Agency 'SEMA' and the non-governmental organizations NGOs) should show greater involvement in attending to disaster issues.

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