

“Expect More Floods in 2013”: An Analysis of Flood Preparedness in the Flood Prone City of Ibadan, Nigeria

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Abstract

In 2013, the Nigerian Meteorological Agency (NIMET) issued a prediction of heavy rainfall with consequent flooding in some major cities of Nigeria particularly Ibadan. In light of the country's previous flood experiences, citizens and government were promptly alerted and advised to be fully prepared for imminent floods. Against this background, this paper sought to determine the level of flood preparedness among households in Ibadan where a survey of 275 households was conducted. Chi-square test was used to establish significant variations in the level of flood preparedness, the level of awareness of NIMET flood warning, flood risk perception and subscription to flood insurance. Findings show that the levels of awareness about NIMET flood warning (36.4%), flood risk perception (24.4%), flood preparedness (26.9%) and the flood insurance subscription rate (11.6%) were generally low. With the Chi square test, significant variations in the level of flood preparedness ($X^2= 32.984$; $p=0.000$) and in flood insurance subscription ($X^2=27.585$; $p=0.002$) were found in the city. The paper recommends that intensive public flood preparedness campaigns, higher flood insurance adoption, regular environmental sanitation among others should be taken in the future.

Keywords: Floods, Flood insurance, Risk perception, Flood preparedness, Ibadan

Introduction

Floods are the most frequent and widespread natural disasters in the world (Ikhuoria et al. 2012). In Nigeria, it is one of the leading environmental challenges with catastrophic effects on both natural and built habitats (Egbinola et al. 2015, Akukwe and Ogbodo, 2015). The country has experienced several flood events of which the October 2012 flood is remembered as the most extensive and destructive. Two hundred and fifty six local government areas (LGAs) of twenty two states of the federation particularly those along the course of the River Niger were greatly affected (NEMA, 2013). More than seven million people were affected; 2.1 million displaced; 363 killed and 579,476 houses destroyed/damaged (NEMA, 2013). In monetary terms, the loss from the flood was estimated to be about 2.6 trillion naira equivalent to 16.9 billion dollars (NEMA, 2013). Before the 2012 national flood disaster, notable flood disasters had occurred in Lagos (July, 2011) and Ibadan (August, 2011). Post disaster recovery efforts have cost the Nigerian government millions of naira in terms of relief items for persons affected by the flood and rehabilitation of services-interrupted or facilities damaged by the flood. These past flood experiences have made the government to realize the urgent need to prevent and prepare for future flood occurrences.

In 2013, the Nigerian Meteorological Agency (NIMET) predicted that there would be more rainfall, which will be greater than that of 2012. The corollary of this prediction is that the country would likely experience massive floods. According to NIMET, some of the States most likely to be affected by the floods were Cross River, Kaduna, Lagos, Ogun, Oyo, Kogi, Imo, Plateau, and Bayelsa (Tribune Newspaper, 2013). In response to the warning, the National Emergency Management Agency (NEMA) conducted a flood vulnerability assessment, and specifically identified ninety LGAs in the earlier mentioned states.

Furthermore, it was announced that some major Nigerian cities would likely witness flood disaster. This was further confirmed by NIMET's press statement, "... flash floods are expected in major urban centres of Lagos, Kano, Onitsha, Osogbo, Ibadan except where urban drainage facilities may have been cleared of debris and waste dumps" (www.floodlist.com/africa/nigeria-expects-floods-2013). Given the country's recent flood experience, citizens and government were informed about the imminent flood and the possible adverse consequences that may

follow, and were advised to take flood preparedness measures so as to considerably reduce loss and damage.

It is against this backdrop that this paper set out to determine the level of flood preparedness in Ibadan city as a case study. Specifically, this study determined (i) the level of awareness of the 2013 NIMET flood warning; (ii) the level of subscription to flood insurance (iii) flood risk perception of households; (iv) the flood prevention methods adopted by neighbourhoods and government; (v) the level of flood preparedness ;(vi) key actors in flood preparedness. These objectives were examined within the spatial framework of the eleven LGAs that constitute Ibadan. The choice of the scale of analysis was motivated by the Incheon Declaration (2010) which recognizes the local government as a major stakeholder in disaster risk reduction and the first responder to disaster. Undoubtedly, the outcome of the study would conform to the spirit and purpose of disaster risk reduction. In the words of Daura (2014):

"Disaster risk reduction is a new paradigm in disaster management with a body of policies, strategies and practices geared towards curtailing vulnerabilities and disaster risks in a society through appropriate prevention, mitigation, preparedness and early warning programmes and facilities. It aims to motivate societies at risk to be more involved in the conscious management of risk and reduction of vulnerability in their communities."

Thus, the study in this spirit, would identify and reduce the population's exposure to flooding in the city. In addition, this paper sees policy implications for flood preparedness that would guide relevant stakeholders in flood risk management.

Methodology

Study area

This study was carried out in the city of Ibadan. Founded in the 1830 as a war camp, it has since grown to be one of the largest indigenous cities in Africa. It is presently the capital city of Oyo State, Nigeria, with a population of 2,559, 853 as at 2006 (National Population Commission, 2006). It lies between latitude 7 19' 08" and 7 29' 25 of the equator and longitude 3 47' 50" and 4 0'22" of the Greenwich Meridian. Though the city's populace is mainly Yoruba, however, it is ethnically diverse. The Hausas, Igbos, Urhobos, Edos, and the Ibibios peacefully co-exist in the city. Ibadan

comprises eleven LGAs namely Akinyele, Egbeda, Ido, Lagelu, OnaAra, Oluyole, Ibadan North, Ibadan Northeast, Ibadan Northwest, Ibadan Southeast and Ibadan Southwest. Ibadan is drained by three rivers: Ona, Ogbere and Ogunpa rivers, and tributaries such as Kudeti, Alapata. The climate of Ibadan is characterized by a longer rainy season induced by the maritime air mass bearing moisture from the Atlantic Ocean. The rainy season starts in March and ends in October. On the other hand, the relatively short dry season spans from November to February during which the dusty north easterly winds blow over the city (Oguntoyinbo, 1994).

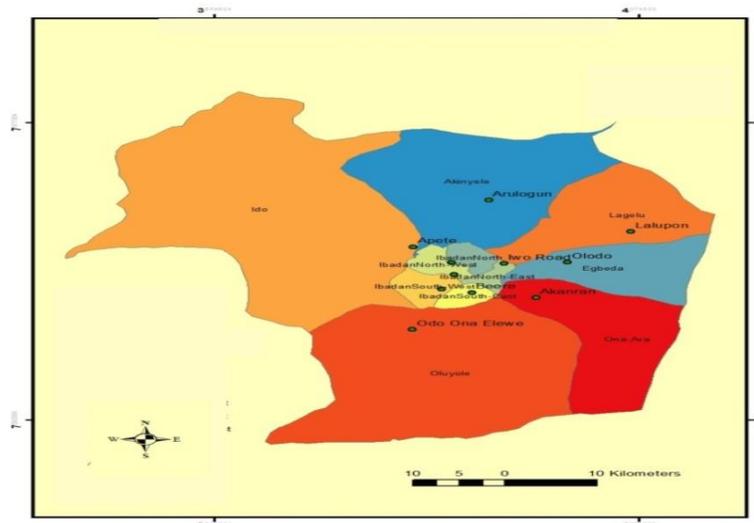


Figure 1: Study locations in Ibadan

Ibadan is “a city with a history of flood disasters” (Agbola et al, 2012; p. 207). Since 1951, it has recorded thirteen flood events (Agbola et al. 2012). The most recent occurred on the August 26th, 2011. According to the weather report of the International Institute of Tropical Agriculture (IITA), “the city experienced an all-time high of 187.5 mm of rainfall, which started at 16:40 hours until 20:00 hours with intermittent drizzling until 23:00 hours accompanied by wind speed as high as 65 km/hr. The rainfall was most intense between 18:10 hours and 19: 20 hours when 75 percent (140.63 mm) of the rain fell. Its average rainfall intensity was 127.84/hours” (National Water Resources Institute, 2011).

On this fateful day, 2,105 buildings were flooded in the city. Akinyele, Egbeda and Ibadan North LGAs had the largest number of

flooded buildings (Government of Oyo state, 2011). It was estimated that 3,000 persons were displaced while 20 fatalities were recorded. Roads and bridges were destroyed at Odo Ona, Oluyole, Bodija and Apete which greatly hindered the movement of people, goods and services within the city (Pictures I-III). The most catastrophic of them was the total collapse of the bridge connecting Apete community to the rest of city (Picture I).

The agricultural sector of the city suffered a heavy setback. Fish ponds and poultry birds worth hundreds of millions of naira were lost to the flood (Momoh, 2011 cited in Agbola et al. 2012). At the University of Ibadan, considerable damages and losses were estimated at 10 billion naira (50.2 million US dollars) (Tribune newspaper, 2013). The August 26th 2011 flood was probably the most widespread in terms of areal extent. It affected 20,013.55 sq. km of the city's total land area. (Brackenridge, 2013 cited in Adelekan, 2015).

The perennial flooding in Ibadan is the product of multiple causal factors. It has been attributed to prolonged rainfall, flood plain development, massive deforestation, and indiscriminate refuse dumping (Areola and Akintola, 1980; Oguntala and Oguntoyinbo, 1982, Agbola et al. 2012; Egbinola et al. 2015).



Figure 1: Collapsed bridge at Apete community, Ibadan



Figure 2: Damaged road at New Bodija, Ibadan



Figure 3: A flooded apartment at Old Bodija, Ibadan

Data and methods

Primary data were collected with a structured questionnaire. It was designed to obtain information on the following: demographic attributes of respondents, awareness of 2013 NIMET flood prediction, flood insurance subscription, flood risk perception, flood preparedness and flood prevention methods. The choice of variables was based on their perceived relevance to the study. Copies of the questionnaire were administered to two hundred and seventy five (275) households selected from eleven neighbourhoods: Arulogun (Akinyele LGA), Odo Ona (Oluyole LGA), Olodo ((Egbeda), Lalupon (Lagelu), Apete (Ido), Akanran (Ona Ara), Beere (Ibadan South East), Ogunpa (Ibadan North West), Iwo Road (Ibadan North East), Mokola (Ibadan North) and Agbeni (Ibadan South West) that were affected by the August 26th, 2011 flood. The questionnaire was self-

administered. Before administration, verbal consent was received from respondents. Chi square analysis was used to test significant variations in the level of flood preparedness, awareness, flood risk perception and flood insurance subscription among the LGAs.

Results and Discussion

Sample characteristics

Sample characteristics of the study sample are presented in Table 1. The majority of the sample were males (62.2%). Nearly fifty percent were within 26-45 age group. About fifty percent were single. In terms of educational background, the largest proportion had tertiary education. Less than forty percent earned 18,000 to 40,000 naira per month

Table 1: Sample characteristics

Demographic attribute		Frequency	Percent
Sex	Male:	171	62.2%
	Female:	104	37.8%
Age	18-25:	85	30.9%
	26-45:	130	47.3%
	46-65:	28	10.2%
	66 and above:	32	11.6%
Marital status	Single:	133	48.4%
	Married:	113	41.1%
	Divorced/Separated/Widowed:	29	10.6%
Education	No formal education:	52	18.9%
	Primary:	23	8.4%
	Secondary:	52	18.9%
	Tertiary:	148	53.8%
Monthly income (in naira)	Less than 18,000:	100	36.4%
	18,000-40,000:	109	39.6%
	40,001-80,000:	37	13.5%
	Above 80,000:	29	10.5%

Source: Fieldwork, 2013

Flood experience

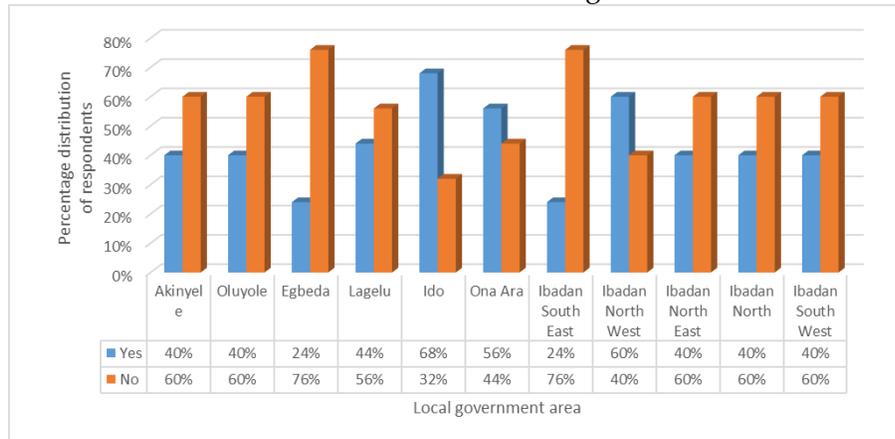
Flood experience partly influences flood preparedness levels. Experience during a flood event is likely to encourage individuals to take precautionary measures against future flood occurrence (Terpstra, 2011). Respondents were asked the question "Have you ever experienced the

flood in the area?" More than two fifths (43.3%) of the households have experienced flood. There is a noticeable variation in flood experience among the households in the eleven local government areas (Figure 2). Flood experience level was high in Ido LGA (68%), Ibadan Northwest (60%), and Ona-Ara (56%) LGAs but low in Egbeda (24%) and Ibadan South East (24%).

Figure 2: Flood experience

Awareness about 2013 NIMET flood prediction

The level of awareness about the flood warning was remarkably low (36.4%) in Ibadan and in fact, lower in some LGAs. From Table 2, the level of awareness was very high in Lagelu and Egbeda LGAs (44%), meanwhile it was low in Akinyele, Ibadan North, Ibadan North East, South East and Southwest LGAs. No significant variation was



found in the level of awareness of flood warning among the eleven LGAs ($X^2 = 3.614$; $p > 0.05$). The low level of flood warning awareness is similar to results of previous studies. Adelekan (2015) in her flood vulnerability study of Ibadan reported that 86% of respondents received no flood warning before the 2011 occurrence. This finding is also similar to Adelekan (2011)'s finding which indicated that majority of respondents at Abeokuta (85 %) had no pre-warning of the 2007 flood. In Port Harcourt city of Nigeria, a small proportion (36.2%) of the respondents indicated they had little awareness of flood warning (Akukwe and Ogbodo, 2015).

Despite the intense publicity from NEMA and Oyo State Emergency Agency (OYSEMA), the level of awareness was poor. According to NEMA, it had organized a zonal awareness flood campaign for Ministries, Departments and agencies (MDAs), Civil based organisations (CBOs), Faith based organisations (FBOs) on the level of preparedness in southwest Nigeria (of which Ibadan is part) on the 10th June, 30th July, and 13th October, 2013 (NEMA, 2013). On the other hand, OYSEMA according to an Oyo state Government official, claimed to have embarked on sensitization and advocacy programmes in all the thirty three LGAs of the state and demolition of buildings on flood plains In the words of the official: "Government ...engaged in massive sensitization measures, especially with residents and stakeholders of flood prone areas on one-on-one basis, as well as on the radio and television..." (National Mirror, 2013 <http://nationalmirroronline.net/new/flooding-nimet-prediction-still-cause-for-alarm/> accessed 27/03/15). The implication of this is that the sensitization and advocacy programmes may not have had far reaching effects on the public.

Table 2: Awareness of NIMET’s prediction of flood

LGA	Awareness of NIMET’s prediction of flood		Total
	Yes	No	
Akinyele	7 (28.0%)	18 (72.0%)	25 (100.0%)
Oluyole	10 (40.0%)	15 (60.0%)	25 (100.0%)
Egbeda	11 (44.0%)	14 (56.0%)	25 (100.0%)
Lagelu	11 (44.0%)	14 (56.0%)	25 (100.0%)
Ido	8 (32.0%)	17 (68.0%)	25 (100.0%)
Ona-Ara	10 (40.0%)	15 (60.0%)	25 (100.0%)
Ibadan South East	9 (36.0%)	16 (64.0%)	25 (100.0%)
Ibadan North West	9 (36.0%)	16 (64.0%)	25 (100.0%)
Ibadan North-East	8 (32.0%)	17 (68.0%)	25 (100.0%)
Ibadan North	7 (28.0%)	18 (72.0%)	25 (100.0%)
Ibadan South-West	10 (40.0%)	15 (60.0%)	25 (100.0%)
Total	100(36.4%)	175 (63.6%)	275 (100.0%)

Source: Fieldwork, 2013

Source of awareness

Figure 3 shows the different media through which respondents obtained information about the 2013 flood warning. The electronic/print

media was the major source of awareness; nearly 30% heard about the flood warning through the electronic/print media. Only few respondents in Egbeda and Lagelu LGAs heard about the prediction at church/mosque. A large percentage in Lagelu, Ibadan South West and Oluyole LGAs obtained the information from TV/Radio/Newspapers (48%). In addition, 20% of respondents in Ido LGA were informed through the internet.

The electronic and print media are arguably the most available and accessible sources of information, and are probably the most effective channels for the dissemination of disaster warnings. Contrary to their availability and accessibility, very small number of respondents were informed by these means. This finding seems to re-echo Agbola et al. (2011, p.214)'s view on the causes of the 2011 Ibadan flood. They identified the lack of early and adequate warning from mass media as a contributory factor to the deaths arising from the flood. They went on to note that "only one radio station out of the six in the city aired the warning about the anticipated flood on that day" (p.214). Similarly, Adelekan (2015) reported that prior to the 2011 flood, a small proportion (4.7%) received flood warning from weather forecast in Ibadan.

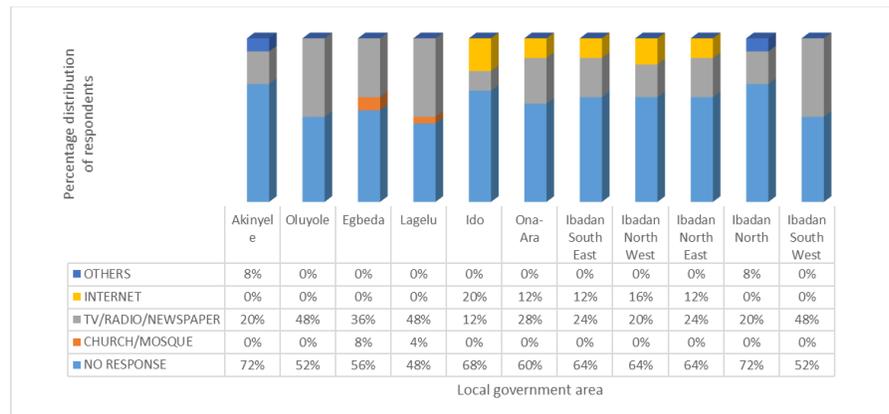


Figure 3: Source of awareness

Flood risk perception

Flood risk perception is a critical factor in flood preparedness in particular and flood risk management in general. Risk perception is the "intuitive judgment of individuals and groups, of risks in the context of limited and uncertain information" (Slovic, 2000 cited in Bradford et al.,

2012). Perceived flood risk, according to Bradford et al. (2012:2300), “is, ... crucial in determining how appropriate flood related information should be disseminated to the public in a manner that will increase public trust in authorities, leading to enhanced capacity to respond to floods and increased resilience”. Thus, flood risk perception leads to the adoption of flood preparedness measures (Miceli et al. 2008, Duzi et al. 2014)

Respondents were asked if they thought they stood the risk of being flooded. Less than 30% claimed to be at risk of flooding. Nearly half of the respondents (48%) in Oluyole and Ibadan Southwest LGAs was of the same view while a few in Ido LGA did not perceive the risk, and many in Egbeda (56%), Ona Ara (52%), Lagelu (52%), Ibadan Northwest (52%) LGAs could not fully ascertain the risk of flooding (see Table 3).

Table 3: Flood risk perception

LGA	Yes	Flood risk perception		Total
		Maybe	No	
Akinyele	7 (28%)	3 (12%)	15 (60%)	25 (100.0%)
Oluyole	12 (48%)	4 (16%)	9 (36%)	25 (100.0%)
Egbeda	6 (24%)	14 (56%)	5 (20%)	25 (100.0%)
Lagelu	7 (28%)	13 (52%)	7 (28%)	25 (100.0%)
Ido	2(8%)	12 (48%)	11 (44%)	25 (100.0%)
Ona-Ara	5 (20%)	13 (52%)	7 (28%)	25 (100.0%)
Ibadan South East	3 (12%)	10 (40%)	12 (48%)	25 (100.0%)
Ibadan North West	3 (12%)	13 (52%)	9 (36%)	25 (100.0%)
Ibadan North-East	3 (12%)	12 (48%)	10 (40%)	25 (100.0%)
Ibadan North	7 (28%)	3 (12%)	15 (60%)	25 (100.0%)
Ibadan South-West	12 (48%)	4 (16%)	9 (36%)	25 (100.0%)
Total	67 (24%)	101 (37%)	107 (39%)	275 (100.0%)

Source: Field survey, 2013. Note:*significant at 5% alpha level

Flood preparedness

Flood preparedness is a key aspect of flood risk management because being prepared for floods reduces the level of exposure to flood and possible effects of flood disaster. Respondents were asked if they were ready to take precautionary measures against any future flood event. Table 4 shows the variation in the level of flood preparedness among the eleven local government areas. In general, the level of flood preparedness was

strikingly low (26.9%) and in fact lower in most of the LGAs. From the table, Ibadan South East had the largest number of people who were fully prepared for flood (64%) while Egbeda and Ido LGAs have relatively high percentage of people (88%) who were not prepared for flood. The result of the chi-square shows that there was a significant variation in the level of flood preparedness among the eleven local government areas ($X^2=32.984$; $p= 0.000$).

There are three possible explanations for the low level of preparedness. First, it can be attributed to the low level of awareness. Flood awareness, as Akukwe and Ogbodo (2015; p.11) put it "...influences the place where people reside, flood preparedness, and thereby their exposure to flooding". Just as the study had earlier pointed out in the preceding section, many might not have been informed of the flood warning. To test this conjecture, the association between the awareness of flood warning and flood preparation was tested with the Pearson correlation technique. The relationship was found to be negatively moderate and statistically insignificant ($r = -0.42$; $p>0.05$). This certainly presupposes that flood warning awareness did not guarantee flood preparedness. One still wonders why there is a mismatch, which leads to the second explanation. It is probable that some might have heard about the warning, but refused to take necessary precautions. A clear reason for the apathy is the frequent public dismissal of the NIMET prediction as false and unreliable. In recent years, Nigerian newspapers have documented several narratives of dismissal from Nigerians about flood predictions, some of which are captured below:

"The rain has come and gone with little or no destruction like we had the previous year. This is to show that we do not have a system that is effective. You can't come out to make statement that deceive millions of Nigerians and go home and relax that all is well. Things don't work like this in developed countries" Civil servant, Abuja ([http:// www.ilorin.info /m/fullnews.php?id =8564#sthash.q6KEXE17.dpuf](http://www.ilorin.info/m/fullnews.php?id=8564#sthash.q6KEXE17.dpuf))

"With God, nothing is impossible... I have not heard NIMET report but I know it will not happen. There is nothing to be afraid of" - Pastor, Agiliti Community, Lagos

"The kind of flooding that happened last year does so only once in a life time. I heard the story from my grandfather and I have never witnessed

such before last year. The elders told us that it happens only once in a while and whatever report they release in Abuja is just a rumour"- Fisherman, Agboyi Community, Lagos ([https://yadnigeria.wordpress.com / 2011/06/04/ignorance-disbelief-as-lagos-issues-flood-alert](https://yadnigeria.wordpress.com/2011/06/04/ignorance-disbelief-as-lagos-issues-flood-alert)).

Thirdly, the compliance to flood prediction is partly a function of previous flood experiences. In the view of Agbola et al (2012), "compliance with early warning instructions might not have been effective, knowing that compliance to given instruction could be significantly influenced by previous experience". The relatively poor flood preparedness in the city could largely be derived from the varied flood experiences of households. This seems to conform to Duzi et al (2015; p.2) hypothesis that "households experiencing more floods and flood damages tend to implement more flood risk reduction measures". The association between flood experience and flood preparedness is negative and moderate ($r=-0.511$; $p>0.05$). This means flood experience did not inform household decisions for flood preparedness, and it obviously refutes Duzi et al. (2015)'s hypothesis. However, it is necessary to know why this is so. A possible reason could be that the respondents see floods as part of their everyday life experience; therefore there is no need to panic.

Apparently, the low level of preparedness observed in Ibadan is an indication of a poor disaster risk reduction response. This is not peculiar to Ibadan, it is also reflected in Abeokuta where Adelekan (2011) observed that only 33.5% indicated that they had devised strategies to reduce their risks of future flood hazards.

Table 4: Level of flood preparedness

LGA	Level of flood preparedness		Total
	Yes	No	
Akinyele	10 (40.0%)	15 (60.0%)	25 (100.0%)
Oluyole	4 (16.0%)	21 (84.0%)	25 (100.0%)
Egbeda	3 (12.0%)	22 (88.0%)	25 (100.0%)
Lagelu	7 (28.0%)	18 (72.0%)	25 (100.0%)
Ido	3 (12.0%)	22 (88.0%)	25 (100.0%)
Ona-Ara	5 (20.0%)	20 (80.0%)	25 (100.0%)
Ibadan South East	16 (64.0%)	9 (36.0%)	25 (100.0%)
Ibadan North West	4 (16.0%)	21 (84.0%)	25 (100.0%)
Ibadan North-East	8 (32.0%)	17 (68.0%)	25 (100.0%)
Ibadan North	10 (40.0%)	15 (60.0%)	25 (100.0%)
Ibadan South-West	4 (16.0%)	21 (84.0%)	25 (100.0%)
Total	74 (26.9%)	201 (73.1%)	275 (100.0%)

Source: Field work, 2013

Household flood prevention methods

Only 12 % cleared drainage channels for the free flow of flood water while 2.2 percent took flood insurance. Figure 4 shows the various flood prevention methods adopted in the different LGAs. A little above two fifths (42%) of respondents in Ibadan North, Ibadan South and Akinyele LGAs cleared their drainage channels, 24 percent constructed new drainage channels in Ibadan South East LGA while only few people subscribed to flood insurance policies in Oluyole, Akinyele, Ibadan North East and Ibadan South West LGAs.

Dumping of refuse in drainage channels is a common practice in many Nigerian cities particularly Ibadan. In an ethnographic study and pictorial analysis of flooding in Ibadan, Oloyede (2012) identified refuse dumping as a major cause of floods in the city. In addition, Agbola et al. (2012) pointed out that the city's solid wastes and high sediment yield from construction sites block the drainage channels. As a result, the blockage and the diversion of storm water produce increased runoff and intense flood frequency (Agbola et al. 2012). This clearly explains why clearing of drainage channels is the major preventive measure. This flood precaution was one of the mitigative and preventive measures adopted by a few Ibadan residents against the 2011 flood (Adelekan, 2015).

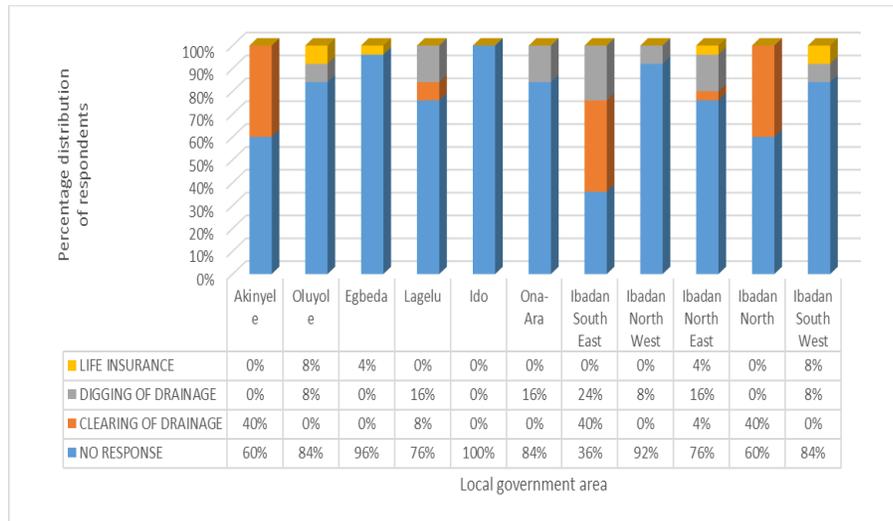


Figure 4: Flood prevention methods

Flood insurance

Flood insurance holds a vital position in flood risk management (DEFRA, 2011). They serve as a guarantee against loss and damage in the event of flood (Aliagha et al. 2015). In aggregate terms, there is a very low level of flood insurance subscription in the study area (11.6%) (Table 5). Ibadan South East and Egbeda LGAs have the largest proportion of respondents with flood insurance cover (28%), followed by Lagelu (20%), Oluyole and Ibadan South West with 16% each. The result of the Chi square shows that there is a significant spatial variation in the level of subscription to flood insurance among the LGAs ($X^2= 27.585$; $p=0.002$). It can be inferred that many residents were not aware of flood insurance policy. Therefore its adoption is limited compared to what obtains in developed countries such as the United States of America and the United Kingdom where it is currently being widely subscribed to (Ologunorisa and Adeyemo, 2005). It is mandatory in Nigeria, according to Section 65(1) of the Insurance Act (2003) that every public building in this sense schools, hospitals etc should be insured against natural and human induced hazards, and heavy penalty is prescribed for defaulters. Despite this, insurance subscription is still not a common flood preparedness practice in Nigeria, given its flood history.

To further strengthen the claim, a Nigerian national daily in 2012 found that many people in flood prone areas did not take up flood insurance policies in anticipation of the floods for several reasons which include the belief that government would readily provide assistance in the event of disaster, and insurance may not readily pay their claims (vanguardgr.com/2012/06/impending-flood - insurance - gets-zero consideration). This certainly contradicts the expectation that “[p]ast experience with disaster motivates insurance adoption. There is higher insurance uptake among homeowners who had suffered previous damages from flood” (Aliagha et al, 2015, p.40). This situation is quite similar to what was reported in Malaysia by Ho (2009) cited in Aliagha et al. 2015. According to Ho (2009), flood insurance adoption is not a key component of flood risk management because of the lack of incentives for uptake. In Czech Republic where flood insurance policies seem to be widely available, a few alleged that “insurance companies refuse to sell it to them or offered high premiums, claiming that the occurrence of floods is more of a trend than of random events” (Duzi et al, 2014, p.7).

Table 5: Flood insurance

LGA	Flood insurance		Total
	Yes	No	
Akinyele	0 (.0%)	25 (100.0%)	25 (100.0%)
Oluyole	4 (16.0%)	21 (84.0%)	25 (100.0%)
Egbeda	7 (28.0%)	18 (72.0%)	25 (100.0%)
Lagelu	5 (20.0%)	20 (80.0%)	25 (100.0%)
Ido	2 (8.0%)	23 (92.0%)	25 (100.0%)
Ona-Ara	0 (.0%)	25 (100.0%)	25 (100.0%)
Ibadan South East	7 (28.0%)	18 (72.0%)	25 (100.0%)
Ibadan North West	1 (4.0%)	24 (96.0%)	25 (100.0%)
Ibadan North-East	2 (8.0%)	23 (92.0%)	25 (100.0%)
Ibadan North	0 (.0%)	25 (100.0%)	25 (100.0%)
Ibadan South-West	4 (16.0%)	21 (84.0%)	25 (100.0%)
Total	32 (11.6%)	243 (88.4%)	275 (100.0%)

Source: Field survey, 2013

Government's flood prevention methods

About ten percent (9.6%) of respondents in the study area indicated that the provision of waste disposal drums was the major flood prevention

measure of government. This finding is consistent with Egbinola et al (2015). They noted that the Oyo State Government, following the 2011 flood disaster, re-engineered the solid waste disposal collection system by providing more waste collection trucks for the evacuation of refuse. Waste disposal drums were also positioned along the major roads in the city. Other precautionary measures identified in the survey were public enlightenment, construction of drainage and building new houses for the 2011 flood victims (Figure 5).

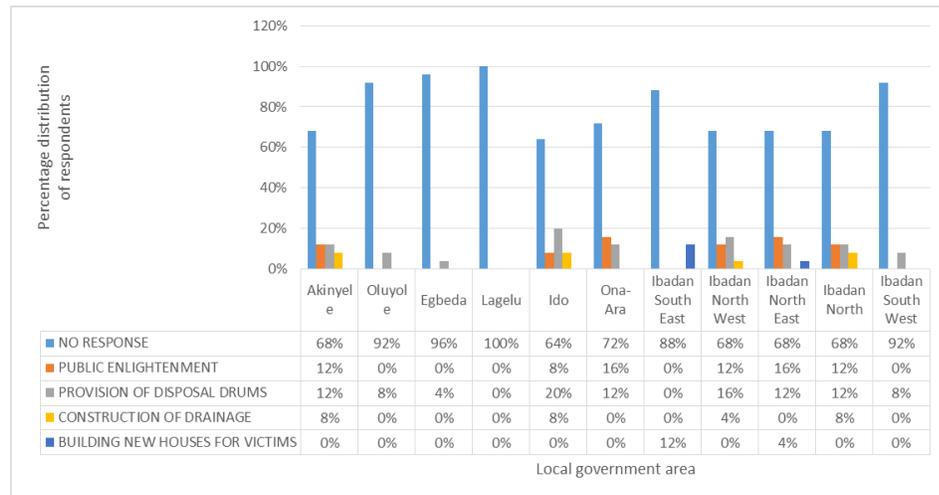


Figure 5: Government flood prevention methods

Neighbourhood’s flood prevention methods

The study reveals the various flood prevention strategies taken by the neighbourhood association as shown in Figure 6. Drainage channel clearing was identified to be the major flood prevention strategy among neighbourhoods in the study area (14.2 %). In Ibadan North East and Ona Ara LGAs, it was the main flood prevention strategy of neighbourhoods. This agrees with Ayoade and Akintola (1980)’s observation in Lagos city where most of the respondents considered the construction of gutters, clearing and deepening of channels as the best solutions. In addition, it conformed to Ologunorisa and Adeyemo (2005)’s observation in the Niger Delta region of Nigeria where 26.6% of the respondents believed that provision of good drainage was a suitable preventive approach.

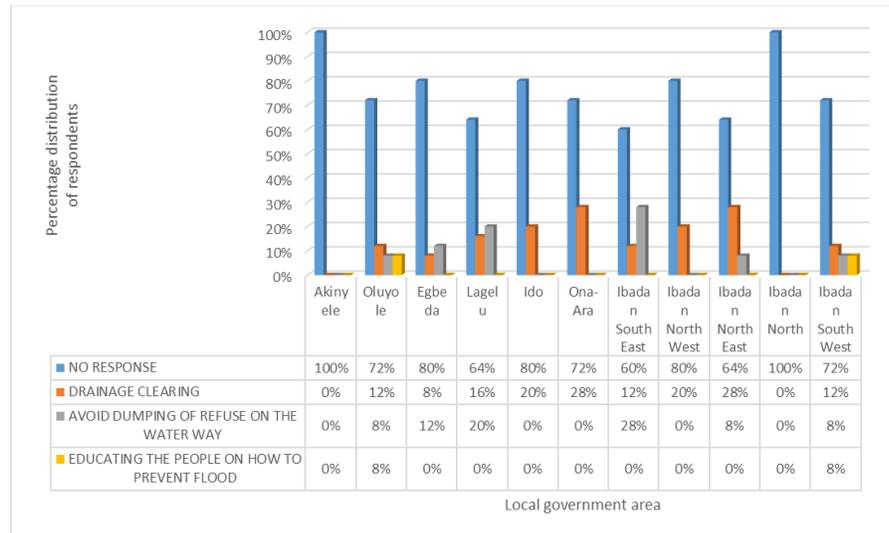


Figure 6: Neighbourhood's flood prevention methods

Responsibility for flood preparedness

Most of the respondents (52.7%) claimed it was the responsibility of households, government and neighbourhood to be fully prepared for the flood (Table 6). Ido and Ibadan North West LGAs have relatively high percentage of people who believe it is the responsibility of the government to prepare for flood occurrence. Ibadan South East had the largest percentage of people who believed that all (households, government and neighbourhood) should be responsible for flood preparedness (76%), while Akinyele, Oluyole, and Egbeda LGAs had relatively high percentage of people who believed that neighbourhoods should be responsible for flood preparedness. In addition, most respondents in Ido LGA claim that flood preparedness is within the purview of the government only.

This finding, on one hand, agrees with that of Agbola et al (2011) who indicated many respondents were of the opinion that the responsibility of flood management should be shared by the community and the government. Similarly, Terpstra and Gutteling (2008) found both government and citizens equally responsible for preparing for flood disasters as indicated by the majority of the respondents in Netherlands. On the other hand, it goes contrary to Adelekan (2011)'s findings, which established that most of the respondents in Abeokuta (91.6%) did not

consider themselves to be active agents in flood risk management. The same majority were of the opinion that it is the primary obligation of the government to address flood problems (Adelekan, 2011). Lastly, a very large proportion of respondents (82 %) in Ibadan was of the view that the government should bear full responsibility for managing floods (Adelekan, 2015). The strong emphasis on the government's role in flood management probably stemmed from the fact that flood risk management is the primary concern of the state government (Egbinola et al. 2015). Irrespective of the divergent views expressed above, the position of the majority has important implications for flood preparedness. Thus, it must be taken in account in the disaster risk reduction process.

Table 6: Responsibility for flood preparedness

LGA	Responsibility for flood preparedness				Total
	Government	Households	Neighbour- hood association	All of the above	
Akinyele	13 (52.0%)	2 (8.0%)	0 (.0%)	10 (40.0%)	25 (100.0%)
Oluyole	2 (8.0%)	2 (8.0%)	7 (28.0%)	14 (56.0%)	25 (100.0%)
Egbeda	4 (16.0%)	2 (8.0%)	4 (16.0%)	15 (60.0%)	25 (100.0%)
Lagelu	4 (16.0%)	1 (4.0%)	5 (20.0%)	15 (60.0%)	25 (100.0%)
Ido	16 (64.0%)	0 (.0%)	0 (.0%)	9 (36.0%)	25 (100.0%)
Ona-Ara	12 (48.0%)	0 (.0%)	0 (.0%)	13 (52.0%)	25 (100.0%)
Ibadan South East	6 (24.0%)	0 (.0%)	0 (.0%)	19 (76.0%)	25 (100.0%)
Ibadan North West	14 (56.0%)	0 (.0%)	0 (.0%)	11 (44.0%)	25 (100.0%)
Ibadan North-East	9 (36.0%)	0 (.0%)	1 (4.0%)	15 (60.0%)	25 (100.0%)
Ibadan North	13 (52.0%)	2 (8.0%)	0 (.0%)	10 (40.0%)	25 (100.0%)
Ibadan South-West	2 (8.0%)	2 (8.0%)	7 (28.0%)	14 (56.0%)	25 (100.0%)
Total	95 (34.5%)	11 (4.0%)	24 (8.7%)	145 (52.7%)	275 (100.0%)

Source: Field survey, 2013

Conclusion

Against the backdrop of the 2013 NIMET flood warning, this study analyzed the level of public awareness of the warning, flood risk perception, flood insurance policy subscription, flood preparedness and flood prevention strategies in Ibadan, Oyo State, Nigeria. This study revealed that there was a generally low level of flood warning awareness. Only 36.4% of the sample was aware, of which many of the respondents

heard about the prediction from the electronic/print media. Very few households in the city perceived to be at the risk of flooding. Although the level of flood preparedness was very low, a number of precautionary measures were taken such as digging drainage systems, consistent clearing of the existing drainage channels and adoption of flood insurance. The subscription to flood insurance was observed to be very low, which is most likely a reflection of the relatively poor insurance culture in Nigeria. Furthermore, neighbourhoods took some precautionary measures to reduce the effect of the flood by warning people against refuse dumping in the drainage systems and water ways. Majority of the respondents were of the opinion that households, communities and the government are key stakeholders in flood risk management. More importantly, the assessment of the flood preparedness in Ibadan could be viewed as a likeness of Nigeria's level of preparedness against the 2013 possible flood.

Some limitations of the study need to be mentioned. Firstly, the study was borne out of circumstance and therefore it could not further investigate more pertinent issues such as contingency and emergency planning, volunteerism and so on. Secondly, the results of the study are peculiar to Ibadan city and therefore cannot be inferred for other cities.

Based on the findings, the study recommends the following: Flood preparedness needs to be strengthened at all tiers of governments, households and community for effective response; Regular flood preparedness surveys should be conducted to assess the preparedness of households not only when circumstances demand so; Local authorities should develop flood preparedness plans such as contingency planning, emergency measures, flood preparedness planning; Environmental sanitation and proper solid waste disposal management should be carried out consistently so as to eliminate potential barriers to the flow of storm water during flood events; There should be flood awareness and enlightenment programmes about the causes, effects and dangers of floods. In addition, these programmes should not only be organized by the government (through the National Emergency Management Agency (NEMA)), but also by the academic community and civil society; NIMET should urgently, as they have always done, issue flood warnings to the concerned people and territories, when the situation calls for it. Also, electronic/print media should aggressively publicize flood warnings issued by NIMET. Besides, they should educate citizens on the importance of flood preparedness; Insurance companies should advertise flood insurance

products to the public, and households should take up flood insurance policies so as to be able to recover from damages and losses.

In conclusion, this paper emphasizes that the importance of flood preparedness and the need to increase the level of flood preparedness must be incorporated in flood risk communication strategies (Bradford et al. 2012). In addition, it highlights the fact that effective flood preparedness requires the active involvement of all stakeholders- households, communities, and government at all tiers, non-governmental organisations and even the private sector. Finally, it is hoped that the study results and suggestions would serve as policy inputs which would eventually help build a disaster resilient society.

References

- Adelekan, I.O. (2011). Vulnerability assessment of an urban flood in Nigeria: Abeokuta flood 2007. *Natural Hazards* 56(1), 215-231.
- Adelekan, I. (2015). Integrated Global Change Research in West Africa: Flood Vulnerability Studies. In *Global Sustainability* (pp. 163-184). Springer International Publishing.
- Aliagha, G. U., Mar Iman, A. H., Ali, H. M., Kamaruddin, N., & Ali, K. N. (2015). Discriminant factors of flood insurance demand for flood-hit residential properties: a case for Malaysia. *Journal of Flood Risk Management*, 8(1), 39-51.
- Ajayi, O., S.B. Agbola, B.F. Olokesusi, B. Wahab, O.J. Taiwo, M. Gbadegesin, D.O. Taiwo, O. Kolawole, A. Muili, M.A. Adeola, O.G. Olutade, F. Shiji and N.A. Abiola (2012). Flood Management in an Urban Setting: A Case Study of Ibadan Metropolis. Special Publication of the Nigerian Association of Hydrological Sciences.
- Akintola, F.O. (1994). Flooding phenomenon. In Filani M.O, Akintola, F.O. and Ikporukpo, C.O. (eds) Ibadan Region. Ibadan: Rex Charles Publications.
- Akukwe, T.I. and C.Ogbodo (2015) Spatial Analysis of Vulnerability to Flooding in Port Harcourt Metropolis, Nigeria. *SAGE Open* 5.1: 2158244015575558.
- Aliagha, G.U., A.H. Mar Iman, H.M. Ali, N. Kamaruddin &K.N. Ali (2015). Discriminant factors of flood insurance demand for flood-hit residential properties: a case for Malaysia. *Journal of Flood Risk Management*, 8(1), 39-51.

- Areola, O. and F.O. Akintola (1980). Managing the urban environment in a developing country: The Ogunpa river channelization scheme in Ibadan City, Nigeria. *Environment International* 3.3: 237-241.
- Ayoade, J. O., and F. O. Akintola (1980) Public perception of flood hazard in two Nigerian cities. *Environment International* 4.4: 277-280.
- Babatunde S.A., O. Ajayi, J.T. Olalekan and B.W. Wahab (2012). The August 2011 Flood in Ibadan, Nigeria: Anthropogenic Causes and Consequences. *International Journal of Disaster Risk Science*. 3 (4): 207-217.
- Bradford, R.A, Sullivan, J.J.O, van der Craaats, I.M., Krywkoo, Rotko, P; Aaltonen, J.; M, Bonaiuto, S. De Dominics, K. Waylen and K. Schelfaut (2012) Risk perception- issues for flood management in Europe. *Natural Hazards and Earth Systems Sciences*. 12. 2299-2309.
- Daura, M. (2014) Geography and Disaster Risk Management: Presidential Address. *The Nigerian Geographical Journal New Series* No. 9 (2)
- Department for Environment, Food, and Rural Affairs (DEFRA) (2011) Flood risk and Insurance: A roadmap to 2013 and beyond. Final report of the flood insurance working groups. Department for Environment, Food and Rural Affairs, United Kingdom. Accessed online: www.defra.gov.uk/environment/flooding
- Duží, B., D. Vikhrov, I. Kelman R. Stojanov & D. Juříčka (2015). Household measures for river flood risk reduction in the Czech Republic. *Journal of Flood Risk Management*. DOI: 10.1111/jfr3.12132.
- Egbinola, C.N., H.D. Olaniran and A.C. Amanambu (2015). Flood management in Cities of Developing Countries: the Example of Ibadan, Nigeria. *Journal of Flood Risk Management*. DOI: 10.1111/jfr3.12157.
- Government of Oyo State (2011). Government of Oyo state report on the assessment of the 26th August 2011 Flood Disaster in Ibadan Metropolis. 78 pp. Prepared for the Government by the Oyo state Task force on the Flood Prevention and Management. Members: B.Wahab, T. Agbola, O. Ajayi, F. Olokesusi, M. Gbadegesin, S. Taiwo, O. Kolawole, A. Muili, M.Adeola, G.Olutade, F. Shiji, and N. Abiola.
- Ikhuoria, I, Yesuf, G.; Enaruvbe, G. and O. Ige-Olumide (2012). Assessment of the impact of flooding on farming communities in Nigeria: A case study of Lokoja, Kogi State Nigeria. Geoinformation Society of Nigeria (GEOSON) & Nigerian Cartographic Association (NCA) Joint Annual Workshop/Conference, at Regional Centre for

- Training in Aerospace Surveys (RECTAS), Obafemi Awolowo University, Ile-Ife, Nigeria
- Miceli, R., Sotgiu, I., & Settanni, M. (2008). Disaster preparedness and perception of flood risk: A study in an alpine valley in Italy. *Journal of Environmental Psychology*, 28(2), 164-173.
- National Mirror(2013). <http://nationalmirroronline.net/new/flooding-nimet-prediction-still-cause-for-alarm/> accessed 27/03/15.
- National Water Resources Institute (2011). Report of Assessment of the 26th August 2011. Ibadan Flood Disaster, Oyo State, Nigeria. NWRI, Mando Road, Kaduna. 16 pp.
- NEMA (2013) NEMA Annual Report 2013. NEMA, The Presidency, Abuja. 248 pp.
- Oguntala, A.B., and J.S. Oguntoyinbo. (1982).Urban flooding in Ibadan: A diagnosis of the problem. *Urban Ecology* 7.1: 39-46.
- Oguntoyinbo, J.S. (1994). Climate characteristics In Filani M.O, Akintola, F.O. and Ikporukpo, C.O. (eds) Ibadan Region. Ibadan: Rex Charles Publications.
- Ologunorisa, T.E., & A. Adeyemo (2005). Public perception of flood hazard in the Niger Delta, Nigeria. *Environmentalist*, 25(1), 39-45.
- Oloyede, M.O. (2012). the Ethnography of Flooding in Ibadan. Unpublished B.Sc. Original Essay. Department of Sociology, Department of Sociology, University of Ibadan.
- Terpstra, T., & Gutteling, J. M. (2008). Households' perceived responsibilities in flood risk management in the Netherlands. *International Journal of Water Resources Development*, 24(4), 555-565.
- Terpstra, T. (2011). Emotions, trust, and perceived risk: Affective and cognitive routes to flood preparedness behavior. *Risk Analysis*, 31(10), 1658-1675.
- The Tribune (2013). <http://www.tribune.com.ng/news2013/index.php/en/news/item/18850-90-lgs-in-13-states-to-witness-flooding.html>.