

COMMUNITY-BASED RESILIENCE TO THE 2012 FLOOD DISASTER IN ORASHI REGION OF RIVERS STATE, NIGERIA

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Abstract: This study investigated the community-based resilience of Orashi region to the 2012 nationwide flood disaster in Nigeria and the adaptive strategies provided by the indigenes to mitigate the flood. The social ecological resilience theory provided the theoretical framework for the study which adopted qualitative and quantitative methods with the descriptive and cross sectional survey designs using a study population of 983,170. The sample size of 400 selected from eight communities of the 4 affected Local Government Areas formed the basis for data collection. Primary data from questionnaires, key informant interviews, and Focus Group Discussions were utilized alongside secondary sources. Simple percentage statistical tools like mean and grand-mean were applied in analyzing the research questions. The findings revealed absence of NEMA activities, lack of pre-flood information, unplanned evacuation procedure, and lack of preparedness before the 2012 flood. The communities however used self-organized community-based resilience and indigenous adaptive strategies to mitigate the flood. The study recommends the building of the culture of preparedness through community flood disaster education, provision of critical flood infrastructure and flood insurance. Such efforts would strengthen community-based resilience, create a culture of preparedness, raise the adaptive capacity of the nation, and reduce the human and material losses from flood disaster.

Keywords: Community-based, Disaster, Flood, Orashi Region, Resilience.

1. INTRODUCTION

Flooding incidents are one of the most frequently occurring natural hazards in Nigeria. It comes with destructive and overwhelming effects that often encompass a wide geographical space and impinge on socioeconomic activities. According to Obeta, 2014, floods in Nigeria consists 38% of declared natural disaster by the Federal Government between 1995 and 2005. Floods are an integral factor of natural cycle which often occur in variety of ways and inundate areas and communities as well. (Mmom, P.C. and Aifesehi, P.E., 2014);and have therefore continued to be a challenge in virtually all the states of the Federation. The impacts of these floods are usually far reaching with physical, psychological, socioeconomic and cultural dimensions. Available reports indicate that several Nigerian states like Lagos, Cross Rivers, Adamawa, Plateau, Rivers, Bayelsa, Kebbi, Zamfara, to mention few, have recorded serious inundation levels often accompanied by destruction of residential accommodations, means of livelihood, transportation routes, farms and animals, Public utility installations, Markets, and loss of human lives which further inflict psychological and emotional problems on victim (Vanguard on October 03, 2012; upi.com, August 28, 2012.)

Many authorities in Nigerian attribute the recurrent flood situation as local effects of worldwide temperature increase and 'climate change' experiences. Odjugo, 2010; and Bariweni et al, 2012 for instance observed that one of the fallout of increased worldwide temperature fallout is intense and extended rainfalls, melting of ice bergs and more frequent intense

sea events, all of which increases the likelihood of flooding. Gullede, 2012 similarly explains that the globe was likely to witness a rise in temperature by about 3⁰C over the next century with tendency of increasing frequency and severity of flood risks occurring as direct outcome of worldwide warming and the associated climate variability (Bassey, 2012 and Okoronkwo, 2013.)

Nigeria was hit by widespread flooding in September 2012 considered by experts to be the consequences of global climate variability. Affecting 22 states in Nigeria, the flood was as horrible and devastating as it was wide spread Obeta, 2014. The level of flooding was such that the government declared a national state of emergency in view of the overwhelming devastation it caused on lives, environment, and means of livelihood of affected communities. At the last count, 431 people lost their lives, 7 million people had been affected, more than 500,000 houses destroyed, and the country lost N2.6 trillion to the disaster according to the Director General of NEMA, Alhaji Mohammad Sani-Sidi (Daily Times of Nigeria, December 5, 2013; Daily Trust 20 September 2013). Its consequences had implications for the health and wellbeing of the people, the environment, national security and adaptability to future occurrences. The 2012 flood event brought to focus the question of the vulnerability of the coastal, flood-prone communities and their resilience and capability to mitigate flood disaster, adapt and return back to their normal socioeconomic functions and structures after a natural disaster. This underscores the choice of the subject matter as the focus of analysis in this paper.

Aim and Objectives of the Study

The aim of the study is to investigate the indigenous community resilience and the coping strategies implemented by natives of Orashi province of Rivers state to deal with the 2012 flood disaster. Specific objectives are to:

1. Examine the pre-flood information/knowledge and NEMA early warning system available to the people in Orashi area before the 2012 flood.
2. Identify functional critical flood infrastructures that aided community-based resilience and effective management of the 2012 hazard.
3. Ascertain indigenous adaptive strategies, skills, and resources of community resilience nature which were deployed by Orashi people to manage and recover rapidly from the flood disaster.
4. Identify learning experiences and opportunities gained from the 2012 flood disasters that could be harnessed to develop better adaptation and recovery strategies for future flood events in Orashi region.

Research Questions

To generate field data relevant to the research objective, the study posed the following research questions:

1. Were there pre-flood information, knowledge and NEMA's early warning signal to the communities before the 2012 flood?
2. Did functional critical flood infrastructural facilities exist in the communities to facilitate community-based resilience to the 2012 flood hazards?
3. What indigenous local adaptive strategies and skills were utilized by Orashi people to enhance community-based resilience to the flood disaster?
4. What learning experiences and opportunities were gained from the 2012 floods that could be harnessed to improve the community based resilience to future flood hazards?

2. THE ORASHI REGION THE SCOPE OF THE STUDY

The Orashi province of Rivers State constitutes the geographical scope for the study. The province is comprised of four (4) Local Government councils of Abua/ Odual, Ahoada East, Ahoada West and Ogba/Egbema/Ononi. The Orashi province is not a very coastline but a deltaic region, criss-crossed by several rivers which obviously make the area susceptible to flood hazards (Mmom and Aifesehi, 2013.) The Orashi province was hard hit by the 2012 flood hazard described as the worst in 50 years. Orashi region is part of, and bears the same ecological features that characterized the Niger delta area. The region according to Mmom and Aifiseli, 2013, is populated with over 3.8 million and is positioned in the rainforest zone of south/south in Rivers state, Nigeria. The economic mainstay of the people are crop cultivation, Oil Palm processing with farm produce like Yam, Plantain, Cassava, banana, cocoa yam. Their forest is typified by plenty of plant species numbering beyond 150 diverse species per hectare in certain areas. The people therefore engage in lumbering and

harvesting of forest products such as snails, canes, honey and also take on hunting (Mmom and Aifeseli, 2013.) Orashi province has plenty of mineral oil reserves amounting to over 35% of mineral oil wells in the Niger Delta which underscores its importance in the economy of Nigeria. Orashi River from where the province derived its name, is an age long trade and cultural passageway providing transportation and movement route for indigenous population moving from one town to another by canoe, for money-making ventures carrying farm produce for markets along its course.

As disclosed by a former Deputy Governor of the Rivers state who was Chairman of the Rivers state 2012 Flood Victims Management Committee, Engr. Tele Ikuru, and the then State Commissioner for Information, Mrs. Ibim Semenitari, the inundation by flood affected 183 communities spread across the four LGAs with flood height of about 6 feet (3.6 meters in certain places, (Mmom and Aifeseli, 2013), displaced 830,000 persons, and submerged 65% of the entire province (phgardencity.com 2012/10/19). The figure of Internally Displaced Persons (IDPs) accommodated in the 25 camps for flood victims create by the Rivers State in Orashi province as reported by the Rivers state Ministry of special duties stood at 46,295. The sum of 14 deaths was recorded at the IDP camps while 147 deliveries in all were taken in the camps during the months the flood lasted (National Network Vol 9 N0 43, Oct. 31st - Nov.6th, 2012; Ministry of special duty-Governor's office, Rivers State.) The flood advanced with vast velocity and volume sweeping away lives and possessions.

The study investigated the community-based resilience capability of the flood affected Orashi communities that enabled them to mitigate, adapt to, and quickly recovered from the 2012 flood disaster. Attention was directed on the people's social assets - like pre-flood knowledge/awareness; the people's social dimensions - like preparedness/ responsiveness; learning ability and community novelty, and how these influenced their aptitude for self-organization and communal action to surmount the flood and gained experience to reduce their vulnerability to future flood disaster. It is important to state that the importance of disaster agent resides not just in their physical effects, but equally in their social consequences in a defined social setting.

3. THEORETICAL FRAMEWORK AND THE CONCEPT OF RESILIENCE

The work is based on the Resilience theory, specifically the Social-ecological sub strand. Resilience is perceived as a system's capability to absorb disturbances and still continue or bounce back to a stable status in which the entity (e.g. community, individual, or household,) existed before a disturbance (Frankenberger, T., Mueller M., Spangler T., and Alexander S. (2013).) It is conceptualized as the ability of a people, communities or even a nation to moderate, adjust to, and recuperate from distress in a way that diminishes chronic vulnerability and facilitates comprehensive development (USAID, 2012 in Frankinberger et al 2013). In its application to natural hazard management has increased in recent times Liao, 2012; and it reflects the Disaster Risk Reduction (DRR) paradigm that advocates a shift from post disaster response pattern of disaster management to a proactive Disaster risk reduction approach (World Meteorological Organization, 2016.) Resilience theory therefore centers on the aptitude of a human or natural system to persevere, absorb, and pull through from hazardous event or its untoward effects in an apt and efficient manner, maintaining or refurbishing its vital structures, functions and distinctiveness (identity). Aadaptability is the core feature of resilience and signifies an adjustment in natural or human methods in reaction to definite or anticipated adverse stimuli or their effects, which moderates harm or exploits beneficial prospects CARRI (2013). Adaptation should produce positive outcomes (positive trajectory) to the system after experiencing difficulty. The community or system adapts to disturbances by changing how it functions, or by using resources in innovative manner. Conversely, a system can resist adversity (or expends resources) to avoid modification and its resilience is reflected by what level of the adversity it can withstand without collapsing or significantly changing (CARR, 2013). According to Carpenter and Brock, 2008, and Liao, 2012, resilience is frequently related with or illustrated by three crucial characteristics namely adaptive capacity, self- organization and redundancy. (Martin-Breen and Anderies, 2011; Heylighen in Liao 2012)

Social-ecological Resilience describes the capacity of a Social-Ecological System (SES) to continually change, adapt and yet remain within critical thresholds in the face of disturbance. Social-ecological systems are integrated system of ecosystems and human society with reciprocal feedback and interdependence. It emphasizes humans-in-nature perspective. The human domain constantly interacts and influences the biophysical realm both of which are closely interlinked. The concept of resilience in relation to social-ecological Systems conveys the idea of adaptation, learning, self organization and ability to resist disturbance. The choice of resilience theory is based on the reality that it offers explanation for the stability of Social Ecological System (SES) that undergo crisis from natural or manmade processes

4. CLIMATE CHANGE- AN OVERVIEW

Attoh, 2010 defines climate as the characteristic or dominant weather of a place which includes temperature, rainfall, sunshine, wind, humidity, and etcetera. When there is significant change in prevailing temperature, precipitation, humidity, or wind lasting for an extended period time (decades or more), we say climate change has occurred. Such a change can impact people in all forms of their lives. Inter governmental Panel on Climate Change (IPCC) in its 2007 report opine that climate variability is occurring because the world average temperature is increasing as indicated by observable changes such as shrinking of glaciers, later freezing/ early break-up of Ice, Rivers and lakes. Climate variability according to IPCC (2007) also manifests in frequent extreme weather events such as heavy precipitation, flood, rain storm, tropical cyclone, rising sea level - about 6-7 inches in the 20th century, and increase in ocean heat, among other changes. World Health Organization (WHO), 2009 observes that the rate of increase in temperature in the last 25 years is much higher, at over 0.18°C per decade. This implies that the world is always warmed by approximately 0.75°C in the last 100 years. The temperature increase is widespread over the globe, with land regions warming faster than the oceans. Supporting the above assertions, Gullede, 2012 explains that the 16 warmest years recorded (since the instrumental record of global surface temperature began in 1850), all occurred in the last 17 years. He observed that May 2012 was the 327th consecutive month with a global average temperature above the 20th century average (Gullede, 2012). Climate variability will greatly compromise food production, desertification, as well as raise concern over with floods, erosion, droughts, natural ecosystem, transportation, human resources and other consequences of climatic change (Bassey,2012; Adeoti and Ajibade, 2008; Afiesimama, 2008; and Odjugo,2010).

Afiesimama, 2008 identifies two principal factors implicated in the climate change phenomenon namely - the Green House Effect (GHE) and ozone layer depletion by green house gases (GHGs). He further explains that both of these mechanisms result in global warming. Bast, 2013 asserts that the green house effect and ozone depletion are thought to be rooted in the environmental pollution emanating from natural sources and especially from man's activities on the environment. He referred to it as the "Anthropogenic Global Warming Theory of climate change" (or AGW). The proponents of the AGW theory contend that human emissions of green house gases, principally carbon dioxide (CO₂) methane, and nitrous oxide are causing grievous rise in global temperature (Bast, 2013). The human activities that release these green house gases include gas flaring, industrialization, urbanization and construction, agriculture and deforestation, burning of fossil fuel and energy generation, anaerobic fermentation, poverty and ignorance among others (Parry, 2011; IPCC, 2007; and Gupta, 2001.) Anxiety over negative effects of climate change has heightened over the years due to environmental degradation occasioned by it and the anticipated demographic pressures displaced millions of people in Africa would face and the serious social upheaval this may elicit. Such situation raises important questions about the capability of the communities to effectively tackle the menace of flood disaster as we take a look at the 2012 flood disaster in the Orashi province of Rivers state, Nigeria.

Flood Hazard Management Based on Resilience

Resilience places flood risk management within a dynamic approach that focus attention on Adaptation. This is a rethink of the conventional way risk management is undertaken. Barroca and Serre, 2012 affirm that conventionally, flood risk management is base essentially on a fixed view relying generally on operational safety with a connotation of providing resistance to adversity. But resilience theory indicates a shift towards an approach that put together information about the whole risk timeline by knowing what attitudes to adopt in terms of prevention, crisis, and post crisis context. Community resilience to floods is thus seen as the aptitude of the community to tolerate flooding and to reorganize should physical damage and socioeconomic disruption occur, so as to avert deaths and injuries and maintain existing socioeconomic identity (Liao, 2012). Conventional flood control ignores complexity and unpredictability, emphasizes flood control infrastructures. This approach worsens flood risk and creates ecological disasters. Today many communities are not flood-safe because they are based on the non-natural, artificial environmental stability that is forced by flood-control infrastructure and tolerate little socioeconomic variation. For long-term flood safety, community needs to switch to resilience-based flood hazard management. Flood hazard management based on resilience theory would begin with acknowledging intermittent floods as inherent environmental dynamics, by which socioeconomic activities on floodplains are unavoidably affected (Liao, 2012.) Thus, community resilience to floods encompasses dual concerns: the flood safety of individual citizens and the maintenance of the community's current identity.

Resilience theory holds that periods of gradual development and sudden changes complement each other (Folke, 2006 in Liao 2012). As demonstrated in frequently disturbed ecosystems, resilience is borne out of experiencing and learning from disturbances (Gunderson and Holling 2002 in Liao, 2012). This suggests that flooding itself is an agent for resilience because each flood experience represents an opportunity for affected community to learn, adjust internal structures and processes, and to build knowledge, leading to diverse coping strategies cumulated over time (Folke 2006; Smit and Wandel 2006 in Liao, 2012). Studies have shown that communities that are adapted, not resistant to disturbances are long enduring (Berkes et al. 2003; Gunderson 2000, Walker et al. 2004). Building community resilience to floods is in essence a process of adaptation such as instead of fighting the river; communities live with periodic floods, allowing them to enter the community to learn from them, so as to become resilient to extreme ones. Distinguishing between benign frequent floods and disastrous rare ones, these communities adapt lifestyles and built environments to river dynamics, harness the post flood productivity boosts in fisheries and agriculture (Cuny 1991 in Liao 2012).

Identifying the Role of National Emergency Management Agency (NEMA)

National Emergency Management Agency (NEMA) was established through Act 12 as amended by Act 50 of 1999, to manage disasters in Nigeria. With the Mission to coordinate resources towards competent and effectual disaster prevention, preparation, mitigation and response in Nigeria, it has the task and vision of building a culture of preparedness, prevention, response; and community resilience to disaster in Nigeria.

The outcome of this investigation on Orashi province revealed that NEMA did not carried out its statutory responsibility with dexterity preparatory to the 2012 flood. Table 2, items 1, 2 and 3 indicate that the people of Orashi province lacked the requisite knowledge of flood hazards. This lack of knowledge and information invariably played out on the scale of preparedness of the people which turned out to be shabby and pitiable. The flood therefore came as a surprise with the people unprepared (Vanguard, October 3, 2012). According to Obeta (2014) there was the absence of well articulated, organized institutional structure to coordinate response activities during emergency situation in Nigeria. Existing response he opined, were found to be abhoc, ineffective and poorly coordinated. This is rather an indictment on NEMA, the agency responsible for the prevention, preparation, mitigation and conducting effective response to natural disaster. Because of this unpreparedness, people lost their lives, millions rendered homeless, and the country lost so much in economic terms. (Daily Times of Nigeria, December 5, 2013; Daily Trust 20 September 2013). How many more of these losses shall we contain especially when we realize that according to scientific predictions, more of the extreme weather event awaits Nigeria? Agreed that flood is a natural disaster that cannot be completely avoided, the losses associated with flooding can be mitigated and limited to the barest minimum by adopting good planning and appropriate response.

5. METHOD OF STUDY

The study adopted the descriptive survey research design. The population of the study consists of 983,170 adult victims in Orashi region of Rivers State reflecting the population of the region as per the 2006 census. The population of Abua/Odua was 282,988; Ahoada – East – 166,747; Ahoada – West – 249,425 and Ogba/Egbema/Ndoni – 284,010 respectively (Source: Rivers State NEMA report of 2012 flood events population report). In this study the Taro Yemen’s formula for sample size was applied. Substituting the census figure in the foregoing section into Taro Yemen’s formula, this study has:

$$\begin{aligned}
 N &= 983,170 \\
 \alpha &= (0.05)^2 = 0.0025 \\
 S &= \frac{983,170}{1+983,170 \times 0.005} = 400 \text{ (Sample size)}
 \end{aligned}$$

The purposive sampling was adopted to select 8 communities, two from each of the four local government areas wiche were assigned the number of sample reflecting that of their respective local Government areas, Thus Abua/Odual – Obrany(12%) and Aminigboko (16.75%); Ahoada East – Ochigba(8%) and Ikata (9%); Ahoada West – Ula-OkoboI (14.5%) and Ula-Okobo II (10.75); Ogba/Egbema/Ndoni – Akabuka (15%) and Ogbogu (14).The respondents were adults (male and female) of varied status such as married, single, divorced and widowed respectively.

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The instruments for data collection include questionnaire, Focus Group discussion and key informant interview. The questionnaire was a preset self-structured item titled: Community-based Resilience to 2012 Flood Events in Orashi Region of Rivers State (CBR2012FEORRS) questionnaire. It was divided into two sections - One and Two. Section one comprises the demographic information such as name of L.G.A./Community, sex, marital status, educational status, occupation, age, year of resident and monthly income. Section two is made up of twenty-two items in four parts- A, B, C and D. The questionnaire was subjected to coding and edited for accurate statistical presentations and analysis using statistical techniques such as percentages, mean and grand-mean to test the Research questions.

Presentation and Analysis of Demographic Information/Data to Answer the Research Questions

Table 1: Result of data analysis Showing Demographic variables of Respondents

Variables	Frequencies	Percentages	Variables	Frequencies	Percentages	Variables	Frequencies	Percentages
Sex	400	100%	Residency in	400	100%	Educational	400	100%
Male	200	50	Locality	11	2.75	Status	42	10.5
Female	200	50	1-20	64	16	None	61	15.25
			21-30	104	26	Primary	160	40
			31-40	102	25.5	Secondary	137	34.25
			41-50	119	29.75	Tertiary		
			51 & above					
Marital Status	400	100%	Ave. Monthly	400	100%	Age	400	100%
Married	146	36.5	Income	118	29.5	18-30	75	18.75
Single	123	30.75	1,000-10,000	96	24	31-40	104	26
Divorced	82	20.5	11,000-20,000	78	19	41-50	102	25.5
Widowed	49	12.25	21,000-30,000	38	9.5	51-60	98	24.5
			31,000-40,000	32	8	61 & above	21	5.25
			41,000-50,000	24	6			
			51,000-60,000	16	4			
			61 & above					
Occupation	400	100%						
Farming/fishing	100	25						
Craftsman	52	13						
Civil servants	68	17						
Business/trade	77	19.25						
Companyworkers	40	10						
Unemployed	63	15.75						

Source: Researcher's field work, 2015

Demographic Information on sex, marital status, and age as indicated in table 1 proved the respondents to be adults capable of providing reliable information for this study. The demographic information on education indicates that 89.5% of respondents had basic education meaning that the questionnaire would be understood by the respondents and that feedback information would be reliable. Analysis of respondent's occupational status revealed 27% only are in regular paid employment, 15% are unemployed, and 53.5% earn below N20, 000.00 per month. This will have implications for post-flood recovery when finance will be needed for rebuilding purposes. Demographic information on years of resident in the locality demonstrates that the 97.25% of respondents have lived in the area for upwards of 20 years and have knowledge and experience of the climate conditions of their environment.

Research Question One: Were there pre-flood information associated with NEMA’s early signal to your community before the 2012 flood?

Table 2: Mean and Grandmean responses of respondents on pre-flood awareness and NEMA activity (n=400)

S/N	ITEMS (Part A)	SA	A	D	SD	TR	TS	Mean	%PR %(NR)	Criteria mean	Decision
1	Prior to the 2012 flood, your community was educated by visiting NEMA and NGOs officials on climate change, the 2012 flood and what to do, during the emergency	20	20	160	200	400	660	1.65	10 (90)	2.5	Rejected
2	Your community was visited or officially contacted and informed of an impending flood hours or days prior to the 2012 flood	26	80	130	164	400	768	1.92	26.5 (73.5)	2.5	Rejected
3	There were early warning signs of flooding instruction, phone or equipment installed to alert you in your community before the 2012 flood	29	70	101	200	400	728	1.82	24.75 (75.25)	2.5	Rejected
4	Within your community people packed their flood kits to muster points - marked safe areas, before evacuation from 2012 flood was done?	24	48	78	250	400	616	1.54	18 (82)	2.5	Rejected
	Grand mean							1.99			Rejected

Source of Data: Researcher’s field work, 2015

Key: SA= Strongly Agree; A= Agreed; D=Disagree; SD=Strongly Disagree; TR=Total Responses; TS=Total scores; x=Mean; Cx= Criteria Mean; %PR=Percentage positive responses = (AS+A); %NR=Percentage Negative Responses = (D+SD).

The response analysis of the pre-flood knowledge, risks and preparedness highlighting NEMA activity as well, is contained on table 2. Item-1 on the table has mean score of 1.65 and was rejected against criteria mean of (2.5) indicating that majority had no pre-flood information or activities. Item 2 also reveals a mean of (1.92) and was rejected against criteria mean of (2.5), indicating the no visitation by Disaster management officials prior to the flood. Similarly, item 3 analyses indicate a mean score of (1.82) and was rejected against the criterion mean of (2.5) revealing absence of early warning signs or equipment installation to alert the community prior to the 2012 flood. Again, item 4 with mean score (1.54) was rejected against criteria mean of (2.5), illustrating that the people were not aware and so did not packed flood kits in readiness for evacuation. Overall, the tables revealed that the people of Orashi were not pre informed or instructed by relevant agencies like NEMA to be aware, prepared and evacuate from the 2012 flood. Adequate fore-knowledge of the nature, risk involved and consequences of an impending flood disaster, instill a consciousnesses that heighten the preparedness of a community and enable them respond appropriately to the disaster and enhance their community-based resilience.

Focus group discussion report on research question one: pre-flood information associated with NEMA's early warning activities.

According to the Focus Group Discussion at Ikata Ahoada East, discussants affirmed that there was no pre information given to the communities prior to the 2012 flood, therefore the community did not prepare for it. One discussant further attested that from his childhood as a legitimate son of the community; he had not seen or heard about visitation by government disaster agencies to educate them on flood and survival skills. Similarly, discussants from Akabuka and Ula-Okobo shared similar experiences. They all contended that NEMA activities were not present in their communities and there were no equipments installed in their communities to alert them of impending flood or intimate them on climate change. With the responses from the questionnaire items and the Focus group discussions report, it's clear that there was lack of pre-flood information and absence of NEMA's early warning before the coming of the 2012 flood. As a result, the response pattern for evacuation during the 2012 flood events was short of planned organized procedure. Evacuation was undertaken primarily on individual basis at the initial stage. The affected communities on self organization parameter, mustered cooperative and collective efforts to evacuate its weak members; and much later, government organizations and NGOs intervened.

Research Question Two: Were there functional critical flood infrastructural facilities existing in the communities that facilitated community-based resilience and better management of the 2012 flood hazard?

Table 3 below represents the investigation on the functional critical flood infrastructures in existence during the flood hazard. Response to Item 5 conveys the idea that there were tarred access roads leading to some of the communities affected by the 2012 flood as demonstrated by a mean score of (3.01) and was accepted against criteria mean of (2.5). Item 6 shows the mean of (1.6) which was rejected against the criteria mean of (2.5) indicating that the communities did not have a central communication system accessible to all in the various affected communities to trigger information/ alert to warn the people of an approaching disaster. Result on the table 3 equally shows there existed drainage system including culverts and gutters to carry run-off waters from round the communities as seen in item 7 with a mean of (2.62) and was accepted against the criterion mean of (2.5). Item 8 on the other hand revealed the mean of (1.7) and was rejected against criteria mean of (2.5) proving that there were no means of transportation, emergency medical services and rescue team during evacuation. Conversely, item 9 with a mean of (3.14) was accepted against the criteria mean of (2.5) indicating the availability of some water storage media. These however, were rudimentary and ill maintained and were therefore inadequate to contain the speed and volume of the flood. Meanwhile, items 10, with mean scores of (3.30) were accepted against criteria mean of (2.5) of the responses demonstrating that the communities participated in environmental sanitation that aided clearing of drainages. Item 11 indicated that government, NGOs, and other philanthropic organization donated food and alongside other material resources that helped sustained the victims during the flood with the mean of (2.91) and was taken against the criteria mean of (2.5). From the results exhibited on table 3, we infer that some functional critical infrastructural facilities existed within the areas under investigation which enhanced their community-based resilience. None the less there were other infrastructures which were lacking. Their absence no doubt influenced negatively the communities' capacity to contain and manage the flood.

Focus group discussion report on research question 2: Functional critical flood infrastructure that facilitated community-based resilience to the 2012 flood event?

In a Focus Group Discussion convened at Ahoada town - the headquarters of Ahoada-East L.G.A, participants from Ochigba and Ikata communities reported that no central communication system exists in their domain to alert people of an impending flood or hazard. They observed that the drainage system constructed years back were not in excellent conditions and could not function effectively to channel run-off waters. These and the local fish ponds dug in the swampy forests located round the communities, offered some help containing limited amount of flood volume but were overwhelmed by the speed and great volume of the flood.

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Table 3: Mean and Grandmean responses of respondents on flood infrastructural facilities that could facilitate community resilience and better management of 2012 flood in the affected communities (n = 400)

S/N	ITEMS (Part B)	SA	A	D	SD	TR	TS	(x)	%PR (%NR)	C(x)	Decision
5	You had a tarred access road to your community before the 2012 flood events.	140	145	95	20	400	1205	3.01	71.25 (28.75)	2.5	Accepted
6	You have central communication system in your community to alert every one of an impending danger	20	40	100	240	400	640	1.60	15 (85)	2.5	Rejected
7	There were functional drainage system including culverts, gutters etc strategically located to carry run off waters from round your community to an emptying point	100	120	110	70	400	1050	2.62	55 (45)	2.5	Accepted
8	Were there Transportations, emergency medical services, sand embankment, and rescue team available during evacuation from the 2012 flood?	20	40	140	200	400	680	1.7	15 (85)	2.5	Rejected
9	There were water storage media (ponds and forest conservations) that retain water during the 2012 flood?	186	120	61	33	400	1259	3.14	76.5 (23.5)	2.5	Accepted
10	Your community participate in environmental sanitation to help protect, cope or manage future flood occurrences	201	138	41	20	400	1320	3.30	84.75 (15.25)	2.5	Accepted
11	Government, NGOs and private individuals provided Food and other materials to cope with the flood emergency.	100	210	45	45	400	1165	2.91	77.5 (22.5)	2.5	Accepted
Grandmean								2.61			Accepted

Source of Data: Researcher’s field work, 2015

Key: SA= Strongly Agree; A= Agreed; D=Disagree; SD=Strongly Disagree; TR=Total Response; TS=Total scores
 x=Mean; %PR=Percentage positive responses=(AS+A); %NR=Percentage Negative Responses=(D+SD); Cx= Criteria Mean.

At Ahoada-West, in Ula-Okobo I and Ula-Okobo II, participants in the group discussion said they were appointed into the Community Emergency Management Committee of their respective communities. These committees functioned to monitor community assets, rescue weak community members and supervise regular clean up exercises to clear debris from gutters. This, in their view, helped the situation during and after the flood. Another participant from Obrany community among others discussants from Aminigbokor disclosed that dredging of the Ogbema River can help reduce future flood event. Relying on the information gathered from FGD and table 3, it is apparent that the communities under investigation possessed some critical flood infrastructure like drainage system, fish ponds, swamp, wet land forests and a regular practice of environmental cleanups that aided mitigation of the flood. However, these were inadequate to contain

the flood volume and flow during the 2012 nationwide flood. To build effective community-based resilience, their water shed capability especially the fish ponds, forest reserve, etc need to be enhanced. The absence of adequate health care facilities, potable water, and lack of grain (food) storage amenities in the area had a negative setback on communities' ability to cope with and recover speedily from flood or other natural disaster.

Research Question three: What are the indigenous local adaptive strategies applied by the indigenous people that enhanced community-based resilience and their ability to cope with the disasters?

In investigating the community-based resilience ability, knowledge and strategies utilized by Orashi to boost community resilience during the 2012 flood, the items on table 4 were analyzed. Item 12 revealed that some community members constructed wooden structures above the flood height to safe guide life and possessions as seen by response mean of (3.2) which was accepted against the criteria mean of (2.5). Item 13 revealed local fishing nets was brought to bear to protect fish in ponds from being carried away by the flood flow with mean score of (2.66) accepted against criteria mean of (2.5).

Table 4: Mean and Grand-mean responses of the respondents on their indigenous skills and adaptive strategies applied to enhance community resilience and management of disasters in their communities (n = 400)

S/ N	ITEMS (Part C)	SA	A	D	SD	TR	TS	(x)	%PR NR	C(x)	Decision
12	Your community members constructed wooden structures above flood height to protect lives and properties during the 2012 flood events	180	140	60	20	400	1280	3.2	80 (20)	2.5	Accepted
13	Your community used local fishing nets to catch /protect fish in ponds from being washed away by flood.	110	125	90	75	400	1065	2.66	58.75 (41.25)	2.5	Accepted
14	Members of your community used motor-cycle, canoe and wood rafts as means of transportation to evacuate lives and properties	160	120	55	65	400	1175	2.93	70 (30)	2.5	Accepted
15	Community flood management committees were set up to help weak community members cope with the 2012 flooding hazard	202	98	64	36	400	1266	3.16	75 (25)	2.5	Accepted
16	Your community members conduct premature harvesting of their farm produce during the 2012 flood even	140	118	92	50	400	1148	2.87	64.5 (35.5)	2.5	Accepted
Grand mean								2.96		Accepted	

Source of Data: Researcher's field work, 2015

Key: SA= Strongly Agree; A= Agreed; D=Disagree; SD=Strongly Disagree; TR=Total Responses; x=Mean; %PR=Percentage positive responses=(AS+A); %NR=Percentage Negative Responses=(D+SD); Cx= Criteria Mean.

In items 14 victims in the affected communities' utilized canoes, wooden raft and motorcycle as means of transportation as revealed in the mean scores of (2.93) and was accepted against mean criterion of (2.5) of the responses. It was indicated that questionnaire item 15 recorded a mean score of (3.16) against the criterion mean (2.5) showing that Communities inaugurated Community flood Management Committees that helped to track weak community members and assisted them to evacuate from the flood to safety. It became obvious from the investigation of item 16 on table 4 that the

Orashi flood victims conducted early harvesting of their farm produce as was shown by the mean score of (2.87) which was accepted against the criteria mean of (2.5). Early harvesting became an adaptive measure that prevented the total destruction of the crops by the inundation, enabled the people get food or sold the harvest for money that helped sustained families during the flood. By the fallout of the analysis on table 4, we infer that the Orashi communities brought to bear innovative indigenous adaptive skills, practices and knowledge that enabled them to adapt, and survived the 2012 flood disaster.

Focus Group Discussion report on Research Question three: indigenous local skills, knowledge, and strategies

Along the lines of the explanations above, a number of the interviewees and focus group discussants from Obrany and Animigbokor in Abua/Odual L.G.A disclosed that flood victims constructed elevated platforms above the flood height with stones and wood on which they placed important personal and household items to safeguard it from flood destruction. Similarly the fishermen used local skills with nets to catch some of the fishes as the flood increased. The phenomenon also brought more fishes that produced bumper harvest as the flood receded. Shelves-like construction with woods and bamboos were built above the flood height and stabilized with stones and used to suspend and secure properties above the flood water. They also affirmed that they constructed and used that wooden rafts and floating bridges which were utilized alongside Canoes during the flood to convey household property and especially children and the elderly through the flood water. Meanwhile at Ochigba and Ikata in Ahoada-East L.G.A, some of the interviewees and group discussants said that swimming became profitable for those who know how to swim as it became one of the prestigious means of wading through the flood water with their properties. Those from Ula-Okobo I and Ula-Okobo II in Ahoada-West L.G.A held similar views. Though the interviewees and group discussants observed that while local wells and trenches /gutters were dogged to contain and divert the run off flood waters, mud houses still caved in to the flood.

However, in Akabuka and Ogbogu in Ogba/Egbema/Ndoni L.G.A, and at joinkrama the focus group discussants disclosed that premature early harvesting of crops such as cassava, plantain, cocoa yam, yam etc from submerged farm land was carried out to prevent total destruction of the farm produce. They also disclosed that in their various communities, teams of able young men were selected and commissioned to offer help and evacuate the elderly, the sick ones and the children. The explanations above by the group discussants indicates that varieties of local skills, practices and knowledge were brought to bear as adaptive strategies by the people of Orashi region to contain the 2012 flood. Improvement or innovation, which means the development of new approach or technologies, or the reinstatement of old ones in reaction to new conditions (Bass, 2005), is a vital aspect of adaptation, particularly under uncertain future climate conditions. This played out in the experience of Orashi people during the 2012 flood. (Vanguardngr.com Oct, 2012.)

Research Question Four: What learning experiences and opportunities were presented by the 2012 floods that could be harnessed to improve the community resilience to future flood disaster?

Table 5 below illustrates the responses to item 17 with mean score of (3.18) and was accepted against criteria mean of (2.5) indicating that people in the communities under consideration incurred losses during the 2012 flood and were evacuated to camps for protection and sustainability during the flood. Item 18 response analysis recorded mean score of (2.75) and was accepted against the criteria mean of (2.5), demonstrating that the people of Orashi developed increased bonding relationships and community capacity for collective action during the flood. This was evidenced in the way they cooperatively evacuated during the flood emergency and by establishing committees that helped weak community members to evacuate. Item 19 revealed a mean of (2.81) which was accepted against criterion mean of (2.5) signifying that the communities learnt from the experiences of the flood and had other opportunities that could be harnessed in developing community resilience to future disasters. Similarly, the study of responses to item 20 Table 5 revealed a mean of (2.85) against the criteria mean of (2.5) as accepted showing that the people developed and built relationships and linkages with personnel of the NGOs, government agencies and officials who took part in the humanitarian effort for the duration of the flood as well as with the immediate neighboring communities that provided shelter and help. Responses to item 21 signified a mean of (2.95) above the criteria mean of (2.5) showing that the flood ravaged communities of Orashi region became more familiar and popular to the outside world on the account of the 2012 flood.

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Table 5: Mean and Grand-mean responses on communities’ new learning, opportunities and rehabilitation from 2012 flood to improve the adaptive capacity of the affected communities to future disasters. (n= 400)

S/ N	ITEMS (Part D)	SA	A	D	SD	TR	TS	(x)	% PR NR	C(x)	Decision
17	You incur losses, and were evacuated to IDPs camp due to the 2012 flood.	182	140	48	30	400	1274	3.18	80.5 (19.5)	2.5	Accepted
18	The flood situation increased bonding relationships and community capacity for collective action.(cooperatives)	120	120	100	60	400	1100	2.75	60 (40)	2.5	Accepted
19	Your community gained learning and opportunities from the 2012 flood relevant to community’s coping ability in future floods.(trading)	94	200	45	61	400	1127	2.81	73.5 (26.5)	2.5	Accepted
20	Relationships/ linkages developed with agencies, NGOs and officials who worked with community during the 2012 flood disaster.	111	181	48	60	400	1143	2.85	73 (27)	2.5	Accepted
21	Your community became socially more recognizable (familiar/popular) with outside world on account of the 2012 flood disaster.	90	220	71	19	400	1181	2.95	77.5 (22.5)	2.5	Accepted
22	You participated in government/ NGOs sensitizations and counseling sessions to help community adapt, effect rehabilitation, and be equipped for future flood.	140	182	38	40	400	1222	3.05	80.5 (19.5)	2.5	Accepted
Grand mean								2.93			Accepted

Source of Data: Researcher’s field work, 2015

Key: SA= Strongly Agree; A= Agreed; D=Disagree; SD=Strongly Disagree; TR=Total Reponses; x=Mean; %PR=Percentage positive responses=(AS+A); %NR=Percentage Negative Responses=(D+SD); Cx= Criteria Mean.

As the news concerning the consequences of the flood spread through the electronic and print media highlighting the deplorable conditions of the people, good spirited organizations and individuals were moved to offer help to the region. This popularized the area which came to be more familiar within the wider society. The communities in Orashi province participated in counseling and sensitization sessions organized in the camps by government, NEMA and NGOs to promote adaptive skills and rehabilitation, that helped to fortified the people and prepared them to response effectively to future flood disaster. This became evident in the mean score of responses to item 22 on table 5 recorded as (3.05) against the criteria mean of (2.5) and was accepted. Adaptive capacity enables systems and institutions to take advantage of the benefits which difficult opportunities provide to learn and improve upon a rather uncomfortable situation to make better the situation of its existence. Adverse situation from climate change event such as a longer growing season becomes opportunity to plant more crops that will increase harvest yields or increased potential for tourism.

Focus group discussion report on research question 4: Experiences and opportunities gained the 2012 floods and rehabilitation activities.

The Focus Group Discussion reported substantial loss of the people's property and means of livelihood which made them prone to receiving good assistance while at the IDPs camp. They confirmed also that rehabilitative assistance such a token for transportation, seedling and farm implements were extended to them to enable them re-establish their life and form bases for continued existence (as indicated by item 22). To argument this help, the community members organized into post-flood cooperative networks that provided soft loans and services for its members. Such cooperative endeavor extended to farm, in which members of the cooperative worked rotationally on each member's farm. As indicated by respondents affirming that community members resorted to trading and selling of their personal belongings as coping strategy to raise the great deal of fund needed to sustain their families during the flood crisis. The Focus Group Discussion participants responded affirmatively that the advent of the flood gave opportunity for their community members to rebuild damaged mud houses (post flood) using more resilient cement and blocks. This is clear sign that the inhabitants of Orashi has learnt with purpose, preferring to build flood resistant houses that could resist flood should it occur in the future. This implies that new learning took place, and opportunities existed by reason of the flood for community members to do things better and differently as a result of the experiences during the flood. Interviews with NEMA officials, officials of Ministry of special Duties Governors office, and other key informants selected for this investigation uncovered the fact that government, NEMA, NGOs, Churches, community based organizations and well-meaning individuals were involved in efforts aimed at helping the flood victims to deal with the flood emergency and recover rapidly to continue their normal lives, (Tables 4 and 5). They disclosed during interviews and discussions that owing to the losses incurred by the affected community members, skill acquisition program and modern ways of fishing and farming were introduced right in the camps. This measure assured that the displaced persons adapt to new learning, resume normal life and cope with the flood situation and so boost their resilient capacity. Those of Ula-Okobo I and Ula-OkoboII, precisely disclosed that 10 persons died; at Ochigba and Ikata, it was revealed that 3 adults female died; 1 from Ochigba and 2 from Ikata. In another report, at least 12 persons were said to have lost their lives as flood submerged communities in Ubie clan Ahoada East between September 15, and October 21, 2012. (Spyghana, October 25, 2012). The officials of Ministry of special duties disclosed that while 14 persons died at the different IDPs camp, a total of 147 babies were taken delivered in the camps.

6. SUMMARY OF FINDINGS

In respect to this paper the demographic information was viewed in seven dimensions. The findings affirms that 400 respondents was selected for the analysis from 8 communities in 4 Local Government Areas including male and female, married, single, widowed, divorced, literate and illiterate etc. Overall the respondents cooperated and performed excellently well throughout the duration of the study.

The findings affirmed that the Orashi people lacked pre-flood information and awareness in relation to the 2012 flood. That the pre-flood activity of NEMA as well as those of other aids agencies, designed to raise flood awareness and instill the culture of preparedness, was absolutely lacking and not bequeathed to the people of Orashi province before the 2012 flood. This lack of knowledge and sudden occurrence of the flood portrayed absence of planning and unpreparedness which invariably resulted in the inability of the people to respond appropriately during flood emergency. This is opposed to community-based resilience.

The findings revealed that certain infrastructural amenities such as access road to the affected communities, drainage system among others were in place in some of the communities but these were outdated and in a state of disrepair. Modern climate sensitive equipments, sand embankment, etc, were lacking or ill maintained and so did not provide efficient community-based resilience to combat the 2012 flood.

The results of the findings revealed that the flood affected communities of Orashi region developed and utilized certain indigenous skills, knowledge, and coping strategies which helped them mitigate the 2012 flood disaster and bounce back rapidly to normal life. These adaptive strategies enhanced their community-based resilience to the disturbances. For example, they undertook early harvesting of farm produce to prevent the crops from being damaged by the flood water. This provided sustenance and sources of income to affected household for the period the flood lasted. Also the use of

locally fabricated canoe and wood raft as a means of transportation to convey to safety humans and personal belongings was an innovative outcome of the flood situation.

It became clear from the study that the flood event provided learning experiences and opportunities for improvement of community based resilience and the community members themselves. This was a factor in their rapid recovery and constitutes a resilient factor to future flood events. The younger generation for instance learnt the art and science of fabrication of wood raft, canoe and canoeing. The canoe and raft constituted modes of transportation to ferry people and personal belongings across the flood to safe grounds. The people equally learnt and understood the need for cooperation and working mutually as a team. The predisposition to team spirit featured prominent during evacuation when rescue committees were established to rally round each other and particularly the weak and feeble amongst them. One innovative and developmental stride aftermath of the flood experience was that majority of those whose mud houses caved in to flood, reverted to building houses with blocks and cement during the reconstruction period. The flood, for the government, was an opportunity to relocate those who may have built and were residing on flood channels and plains. It presented a time for the powers of government to reappraise and rethink the conventional community development style that do not take into account the actual needs impinging on the people; and switch over to a needs/people-oriented community development initiative with community need as the focus for developmental projects.

7. CONCLUSION

This study focused on community-based resilience which describes the adaptive capacity by which a community or society, potentially exposed to hazards, engage in an ongoing process of continual positive adaptive changes to the adversity, the changes of which enable future positive adaptive changes therefore enabling the community to maintain an acceptable level of function and structure. This played out in the case of the victims of the 2012 floods hazard in the Orashi region. This study, to a large extent revealed that high level of community-based resilience to adversity determines the persistence of relationships within the community. It is evident from the study that there were no pre-flood awareness, early warning system and effective level of preparedness in the respective communities before the coming of the 2012 flood. This situation negatively impacted on the community-based resilience of the affected communities. In spite of absence of NEMA's activities, lack of awareness, and preparedness among the Orashi people, they mustard their community resilience structure through self organized efforts to tackle the challenge of the 2012 flood utilizing local skills and strategies. Concerted effort should be made by government, and other responsible disaster management agencies, to put in place measures that will awaken the consciousness and innovation skills of the indigenous communities to build a culture of preparedness; promote risk reduction and boost sustainable community based resilience.

8. RECOMMENDATIONS

Relying on the results and conclusions of this work, the following recommendations are put together for the purpose of improving community-based resilience:

The metrological, hydrological and climate services, which are science based risk management profiles, should be improved upon to provide efficient early warning signs and transmit relevant climate information to relay stations installed in flood prone communities. This alert system would ensure that communities receive climate sensitive information ahead of an impending disaster, and enable them to have time to organize for proper collective actions. Similarly other basic critical flood (disaster) infrastructure and lifeline should be provided. This will certainly influence positively the level of preparedness and community-based resilience of the communities

Governments at all levels should embark on a proactive flood management option by providing community flood plan and procedure, and flood disaster awareness and flood education program that will instill a culture of prevention, preparedness, effective response and strengthen community based resilience. A well informed community is the fundamental prerequisite for collective action that will guarantee effective preparedness, response and suitable evacuation and rescue operations. Again, flood disaster insurance is one effective means to indemnify (cover) loss emanating from flood disaster. This risk reduction initiative should be popularized through community flood education and be encouraged amongst the citizenry with particular reference to vicinities at the risk of flooding.

The flood disaster in Orashi region presented opportunities for the people and especially for government to improve upon the lives and general welfare of the population. The opportunities include the prospect of relocating communities or settlement along flood channels and flood plains, opportunity to assess firsthand the critical infrastructural needs of communities so affected and provide same, mapping out flood prone areas and designating such areas as such, channelization and canalization as veritable flood management option. Similarly it could mean opportunity to begin a conservation program of Rain and mangrove forests, game reserve and tourist attraction, and improving on the local fish ponds for enhance fish farming and water shed capability of the communities. The Nigerian government (by an agreement with Cameroon in 1980) should build a control dam downstream along the Benue River at Dasin Village of Fufore LGA of Adamawa State, to stop the incessant flooding and the accompanying losses.

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